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THE ROLE OF THE MOST RECENT PRIOR PERIOD'S PRICE IN VALUE RELEVANCE STUDIES

A THESIS PRESENTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY IN FINANCE AT MASSEY UNIVERSITY, PALMERSTON NORTH, NEW ZEALAND

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2009

Abstract

Numerous value relevance investigations use the Ohlson (1995) model to empirically explore the value relevance of accounting variables such as earnings and goodwill amortisation by employing equity price as the dependent variable, but do not incorporate the most recent prior period's equity price as an additional explanatory variable. The Ohlson (1995) model and the efficient market literature indicate that, since share prices represent the present value of future permanent earnings in an efficient market, the most recent prior period's equity price should be a crucial variable for explaining the current price in value relevance models. This thesis therefore outlines how the Ohlson (1995) model incorporates the most recent prior period's price as a potentially important value relevant explanatory variable, and reformulates the Ohlson (1995) model to demonstrate how the empirical specification of value relevance regression models can be greatly improved by including the most recent prior period's price as an additional explanatory variable. We revisit the Jennings, LeClere, and Thompson (2001) empirical specification used to study whether goodwill amortisation is value relevant and potentially informative with respect to future earnings to illustrate the improvement to the Ohlson (1995) value relevance model empirical specification.

When the model specification is improved by including the most recent prior period's price as an additional explanatory variable, trailing earnings are shown, using time series, cross-sectional, and returns-based analysis, to be at best marginally value relevant when empirically explaining share prices in value relevance regression models. The thesis also indicates that goodwill amortisation should not be deducted from earnings in accounting statements because the presence of goodwill amortisation is significantly positively (not negatively) related to equity prices. This effect is eliminated when the most recent prior period's price is included as an additional explanatory variable in the regression analysis, thus indicating that goodwill amortisation information as well as trailing earnings information have already been incorporated into the most recent prior period's price. The thesis further indicates that value relevance studies that use the Ohlson (1995) model should use, for econometric reasons, change in price or else returns, not the price level, as the dependent variable. When returns are used to test the value relevance of goodwill amortisation, firms that report positive goodwill amortization actually have higher subsequent returns, a result that could possibly be due to the fact that growing firms tend to possess goodwill when they use acquisitions to expand. Results obtained when using returns to test whether goodwill amortisation is value relevant therefore extend the existing literature, since the prevailing expectation in the accounting literature is that goodwill amortization either represents a reduction in the value of goodwill over time or is not value relevant.

Acknowledgements

The success of this PhD thesis becomes possible with valuable contribution from resourceful people who have extended their wholehearted untiring support without limits.

At the outset, I would like to pay and record a special gratitude to **Associate Prof. John G. Powell**, Department of Economics and Finance, Massey University, Palmerston North for his invaluable, unbounded, continuous, and untiring assistance to make this thesis success. I greatly appreciate him for his willingness, patience, and concern that allowed me to make a continuous progress toward the success of this project.

I extend my thanks to **Dr. Jianguo Chen**, for his timely advice and concern to bring the thesis live and resourceful.

My special thanks are very much for **Dr. Ganesalingam S.**, and **Mr. David Smith**, who spent their invaluable time to provide meaningful facts and information through appreciable discussions, suggestions, and support towards completion of this thesis in a constructive manner.

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CHAPTER 1

INTRODUCTION

Numerous value relevance investigations use the Ohlson (1995) value relevance model to empirically explore the value relevance of accounting variables such as earnings and goodwill amortisation by employing equity price as the dependent variable, but do not incorporate the most recent prior period's equity price as an additional explanatory variable. This thesis demonstrates how to improve the empirical specification of models that explore the value relevance of accounting information by accommodating the most recent prior period's equity price as an additional explanatory variable. We also demonstrate that including the most recent prior period's price as an additional explanatory variable eliminates the scale problem in value relevance models whereby the scale (or size) of dependent and independent variables in value relevance studies affects the apparent explanatory power of the models. When the model specification is improved by including the most recent prior period's price as an additional explanatory variable, current trailing earnings are shown to be at best marginally value relevant when empirically explaining share prices in value relevance regression models. The thesis also indicates that goodwill amortisation should not be deducted from earnings in accounting statements because the presence of goodwill amortisation is significantly positively (not negatively) related to equity prices. This effect is eliminated when the most recent prior period's price is included as an additional explanatory variable in the regression analysis. The thesis further indicates that value relevance studies that use the Ohlson (1995) model should use, for econometric reasons, change in price or else returns, not the price level, as the dependent variable.

Ohlson (1995) considers a firm's closing book value of equity and future abnormal earnings as explanatory variables, and conceptualises the current equity price as being determined by book value, current trailing earnings, and other information related to future abnormal earnings. Numerous value relevance models have been derived from Ohlson's (1995) equity valuation model. Most models that implement Ohlson's (1995) modelling framework consider equity prices as the dependent variable, and do not consider the most recent prior period's price as an additional independent variable in the value relevance model. We outline how this approach can be greatly improved, using the original Ohlson (1995) model framework, to incorporate an important informational role for the most recent prior period's equity price.

The Ohlson (1995) model is used to directly demonstrate how and why the most recent period's price should be included as an explanatory variable when testing value relevance using share price as the dependent variable. More importantly, the analysis indicates that change in price or else returns, not the price level, should be the dependent variable in empirical studies that implement the Ohlson (1995) model. The price and price change stationarity literature further reinforces the argument that change in price (or returns) should be the dependent variable in value relevance studies. Employing change in equity price as the value relevance study dependent variable is an even better control for scale effects (see Brown, Lo, and Lys, 1999), thus further justifying the use of price change (not price) in value relevance studies. Additionally, past price can be shown to play a theoretical role even when share returns are used to test value relevance within the Ohlson (1995) modelling framework. This has motivated us to outline the importance of using past price as a highly informative explanatory variable in value relevance models, including earnings-based value relevance models, when considering the value relevance of accounting variables.

Efficient market theory implies that equity prices should incorporate all relevant information. Since market efficiency considerations and the random walk model of share prices imply that the most recent prior period's price is important for explaining the current period's equity price, the information contained in the most recent period's price should have important value relevance. Consistently, Marsh and Merton (1987) and Beaver, Lambert, and Morse (1980) find that prior period share prices incorporate information about future permanent earnings and dividends. Since the share price represents the present value of future permanent earnings in an efficient market, the most recent prior period's equity price should be a crucial variable in value relevance models. The second chapter therefore reviews the value relevance literature as well as the market efficiency literature.

The third chapter uses the Ohlson (1995) model as well as the accounting, finance and economics literature to theoretically demonstrate that the empirical specification of value relevance models with equity price as the dependent variable can be vastly improved by utilising the most recent prior period's equity price as an additional explanatory variable. The chapter explains why value relevance studies that use the Ohlson (1995) model should use change in price or else returns, not the price level, as the dependent variable. These improvements to the empirical specification are shown to be important when past share price is highly correlated with important information that affects future earnings. In the final sections of the chapter, we revisit the Jennings, LeClere, and Thompson (2001) empirical specification used to study whether goodwill amortisation is value relevant and potentially informative with respect to future earnings to illustrate the improvement to the Ohlson (1995) value relevance model empirical specification.

The fourth chapter explores the empirical benefits of incorporating past equity price as an additional explanatory variable when examining the value relevance of earnings related accounting variables using the Ohlson (1995) value relevance model. We start with time series analysis to demonstrate this point, since the level of equity prices follows a highly persistent, non-stationary process, so it is fairly obvious in a time series setting that the most recent prior period's equity price should be used to explain next period's share value. The time series analysis emphasizes why change in price, not the price level, should be used as the dependent variable in value relevance studies. We empirically illustrate these points by revisiting the Jennings, LeClere, and Thompson (2001) empirical specification used to study whether goodwill amortisation is value relevant and potentially informative with respect to future earnings.

The results support a random walk process for equity prices, namely that the value relevance of current trailing earnings is limited, in contrast to Jennings, LeClere, and Thompson (2001). The ability to explain subsequent equity prices lies with the most recent prior period's equity price, as in a random walk process, rather than with current trailing earnings. Consistent with Jennings, LeClere, and Thompson (2001), however, we also find that a continuous measure of goodwill amortisation is not value relevant and does not provide significant future earnings related information. The results show that without past price as an additional explanatory variable, value relevance models can be misspecified due to a missing variable problem, since current trailing earnings can act as a proxy for the strong forward-looking information provided by the most recent prior period's price. Earnings and equity prices are both non-stationary, so they move together over time, thus potentially creating a spuriously significant statistical relationship between earnings and next period's price when a non-autoregressive empirical model is used to explain prices. It is not surprising that the most recent prior period's price is important for explaining subsequent prices, since it is well-known that the level of equity prices follows an autoregressive, non-stationary process (e.g., Aggarwal and Kyaw, 2004). The first difference in equity price appears to follow a stationary, non-persistent process, however, as noted by Jeon and Jang (2004). We therefore subsequently use change in equity price as the dependent variable, for econometric reasons, to explore the value relevance of earnings, thus further improving the model specification. When the model specification is improved by utilising change in price as the dependent variable, the results reveal a random walk process, and earnings play only a weak role in predicting or explaining changes in price.

The fifth chapter demonstrates the importance of incorporating the most recent prior period's equity price as an additional explanatory variable in regression models for cross-sectionally testing the value relevance of earnings related accounting variables such as earnings and goodwill amortisation within the Ohlson (1995) value relevance model framework. The Ohlson (1995) model is rearranged to demonstrate why the most recent prior period's price plays a potentially important explanatory role in the model and can be used to greatly improve the regression model empirical specification of cross-sectional value relevance tests. The chapter therefore builds on the previous time series analysis chapter (Chapter 4) which demonstrates the importance of including the most recent prior period's price as an important explanatory variable in time series value relevance tests.

The chapter's results indicate that the most recent prior period's price plays a much more important role than current trailing earnings as well as goodwill amortisation when explaining or forecasting next period's price. More importantly, the analysis again indicates that change in price (or returns), not the price level, should be used as the dependent variable in value relevance studies (see also chapter 4). When we use change in equity price as the dependent variable, the results indicate that current trailing earnings explanatory variables as well as the most recent prior period's price are value relevant, but the most recent prior period's price plays a much more important role in explaining price changes. The chapter's results also imply, much more strongly than prior studies, that systematic goodwill amortisation should not be deducted from earnings in accounting statements because the presence of goodwill amortisation is significantly positively (not negatively) related to equity prices. This effect is eliminated when the most recent prior period's price is included as an additional explanatory variable in the regression analysis, thus indicating that goodwill amortisation information as well as trailing earnings information have already been incorporated into the most recent prior period's price.

The sixth chapter demonstrates how share returns can be used to test the value relevance of accounting information such as goodwill amortisation within the Ohslon (1995) value relevance modelling framework. The Ohlson (1995) model is reformulated to demonstrate how goodwill amortisation and its presence can be included as explanatory variables to empirically test their value relevance using monthly share returns. The chapter's results show that the presence, but not the level, of positive goodwill amortisation explains subsequent returns, and imply that investors could perceive the presence of positive goodwill amortisation as a wealth creating element. Consistent with past chapters, we find that a continuous goodwill amortization explanatory variable is not value relevant. When using a discrete dummy explanatory variable to test whether the presence or non-presence of goodwill amortization affects returns we find, however, that firms that report positive goodwill amortization actually have higher subsequent returns, a result that could possibly be due to the fact that growing firms tend to possess goodwill when they use acquisitions to expand. Results obtained when using returns to test whether goodwill amortisation is value relevant therefore extend the existing literature, since the prevailing expectation in the accounting literature is that goodwill amortization either represents a reduction in the value of goodwill over time or is not value relevant.

CHAPTER 2

LITERATURE REVIEW

This literature review explores the relationship of equity prices to information, and the value relevance of accounting information. The roles of the dividend discount and residual income valuation models in Ohlson's (1995) value relevance model are also briefly explained.

2.1 EFFICIENT MARKETS AND INFORMATION

Fama (1970) indicates that equity prices incorporate all information in an efficient market. Fama (1970) analyses market efficiency using assumptions which are closely related to perfect market assumptions.[1] If information on past and future events is incorporated in equity prices, only unexpected events can cause equity prices to change. Market efficiency therefore implies that equity price changes in efficient markets are independent, and it also implies that obtaining abnormal gains using information already incorporated in historical prices is not possible. Since the random walk theory also indicates that changes in prices are independent, the efficient market and random walk theories are closely linked (e.g., Malkiel, 2003).

Accounting variables help to indicate a firm's future earnings potential, and thus help to make equity prices efficient (e.g., Kothari, 2001; Holthausen and Watts, 2001; Barth, Beaver, and Landsman, 2001). Kothari (2001) reviews the extent to which accounting variables are related to equity prices, and the extent to which this relationship facilitates efficient and effective investment decisions by investors. Empirical value relevance studies

[1] The assumptions of an efficient market are: zero transaction costs, availability of all information at zero cost for all market participants, no ability to influence the market by any of the participants, and rational participants in the market having homogeneous expectations.

that examine the relationship of fundamental accounting variables with equity prices indicate that equity prices are efficient at incorporating accounting information (e.g., Lee, Myers, and Swaminathan, 1999; Gebhardt, Lee, and Swaminathan, 2001; Ohlson, 1995; Feltham and Ohlson, 1995; Conroy, Eades, and Harris, 2000). Rationality of equity prices depends on the informational efficiency of a market (e.g., Marsh and Merton, 1986 and 1987; Fama, 1970; Beechey, Gruen, and Vickery, 2000). Beaver (2002) therefore justifies a requirement for effective financial reporting and disclosures to facilitate equity price rationality, and indicates that valuation theories should formally establish the relationship between accounting variables and equity values (see also Ball and Brown, 1968; Hand, 2003; Barth, Beaver, and Landsman, 2001; Ohlson, 1995; Collins, Maydew, and Weiss, 1997; Dechow, Hutton, and Sloan, 1999; Hand and Landsman, 2005; Brief and Zarowin, 1999; Conroy, Eades, and Harris, 2000).

2.2 VALUE RELEVANCE OF ACCOUNTING INFORMATION

Share prices can depend on financial information such as earnings and dividends (e.g., Ohlson, 1995; Feltham and Ohlson, 1995; Conroy, Eades, and Harris, 2000) as well as non-financial information such as proprietary patents and technology (e.g., Amir and Lev, 1996; Liang and Yao, 2005; Hughes, 2000). Numerous studies explore whether and how financial and non-financial variables are related to share prices.

Amir and Lev (1996), using a cellular phone firm sample, document value irrelevance of financial variables such as earnings, book value, and cash flows. They find that financial variables of cellular firms become value relevant only when they are examined together with non-financial variables. Due to the rapidly changing technological environment, Amir and Lev (1996) question the value relevance of accounting information in comparison with non-financial information. They conclude that financial variables on a stand-alone-basis are not value relevant. Amir and Lev (1996) explain why financial variables are sometimes value irrelevant. They indicate that high technology industries may not be well equipped to release the value relevant information that is required by investors, including information on marketing and research and development activities.

On the other hand, Liang and Yao (2005) find value relevance of financial variables. They investigate how a firm's market value relates to financial and non-financial variables in the electronics industry in Taiwan. Liang and Yao (2005) find that residual income and, especially, economic value added are value relevant, whereas firms' non-financial variables such as information on suppliers, customers, the number of new patents, organisational age, operational activities, and human resources do not explain share values. Lee (1999) explores the role of financial information, and indicates that financial information reduces vagueness in the valuation process. Lee (1999) finds that historical financial statements provide important information for assessing a firm's value. Miller and Modigliani (1966) explore a firm's value as a function of the firm's permanent future earnings (see also Ball and Brown, 1968; and Beaver, 1968). These studies conclude that net income has considerable information content in relation to equity prices, and find that firms' financial accounting data contribute significantly to equity price movements.

Holthausan and Watts (2001) document that value relevance studies in accounting are mostly in relation to econometric issues. They point out that these studies make a considerably lower contribution to the process of accounting standards setting than might be expected. They further indicate that the value relevance of accounting variables with respect to equity valuation has limited implications for standard setting because accounting, standard setting, and valuation theories are not sufficiently descriptive. Barth, Beaver, and Landsman

(2001) examine the same issues as Holthausan and Watts (2001) and conclude, in contrast, that value relevance studies are useful for standard setting in financial accounting. Barth, Beaver, and Landsman (2001, page 77) emphasise that "Value relevance studies address econometric issues that otherwise could limit inferences, and can accommodate and be used to study the implications of accounting conservatism."

2.3 VALUE RELEVANCE OF EARNINGS INFORMATION

Ball and Brown (1968) and Beaver (1968) indicate that stock prices incorporate investors' reactions to earnings announcements. Beaver, Lambert, and Morse (1980) find that equity price changes reflect changes in future earnings expectations, and also find that equity price changes provide a basis for inferring expected future earnings. Bernard (1995) indicates that investors pay more attention to earnings than dividends and book values, and theorises that earnings are more value relevant than book values and dividends. Conroy, Eades, and Harris (2000) examine the relative effects of earnings and dividends on equity prices using simultaneous earnings and dividends announcements in Japan, and find that the impact of earnings on equity prices is highly significant compared to the information conveyed by dividends. Gajewski and Quere (2001) demonstrate that first-quarter and third-quarter earnings announcements are not value relevant, but annual and half year earnings are value relevant.

Martikainen, Kallunki, and Perttunen (1997) document that good earnings news results in positive equity price changes, but the relationship of negative earnings news to equity price changes is insignificant. This implies that investors view positive earnings as a value relevant variable, whereas earnings declines do not necessarily forecast firms' future cash flows. Brief and Zarowin (1999) use Ohlson (1995) and Feltham and Ohlson (1995) to document that earnings, on a stand-alone basis, have high explanatory power for the share prices of firms with positive earnings. They conclude that the overall explanatory power of earnings is similar to dividends, but earnings, on a stand-alone basis, dominate book values and dividends for explaining equity prices when firms have positive earnings.

Generally, the literature finds that earnings are value relevanct (e.g., Ball and Brown, 1968; Collins, Maydew, and Weiss, 1997; Martikainen, Kallunki, and Perttunen, 1997; Collins, Pincus, and Xie, 1999; Jennings, LeClere, and Thompson, 2001; Gajewski and Quere, 2001). More recently, it has been found that the value relevance of earnings has declined over time (e.g., Francis and Schipper, 1999; Dontoh, Radhakrishnan, and Ronen, 2004). Brown, Lo, and Lys (1999) document that value relevance of accounting variables is a result of a scale effect, when levels variables are modelled. Because of this scale effect in levels variables in regression models, they indicate that there is only a weak relationship between equity price and accounting variables (particularly current trailing earnings and book value of equity) when controlling for scale effect in levels variables regression models.

According to Ohlson (1995) and Bernard (1995), the inclusion of earnings in value relevance models becomes inevitable. Studies by Brief and Zarowin (1999) and Landsman and Maydew (2001) indicate that earnings are a crucial explanatory variable in value relevance models for examining the incremental value relevance of other variables in the models. Value relevance studies are dependent on equity valuation models (e.g., Ohlson, 1995), so the following section provides a general description of accounting theory equity valuation models.

2.4 VALUATION MODELS AND OHLSON (1995)

The discounted cash flow model, residual income valuation model, capital asset pricing model, earnings capitalisation model, dividend discount model, and balance sheet model are important firm valuation models that have been tested empirically (see, e.g., Fernandez, 2003; Jagannathan and Wang, 1993; Collins, Pincus and Xie, 1999; Nasseh and Strauss, 2004; Jennings, LeClere, and Thompson, 2001, respectively). The balance sheet model has been used to establish the causal relationships of balance sheet components with a firm's market value. Holthausen and Watts (2001) suggest that financial reporting standards can be evaluated using balance sheet models, with balance sheet items being tested for their value relevance. Kothari (2001) suggests incorporating earnings in balance sheet value relevance models.

According to Kothari (2001) and Beaver (2002), the dividend discount model and the residual income valuation model are the equity valuation models which have drawn the most attention recently. These models have price as the dependent variable. Williams (1938) introduces the dividend discount model, and other equity valuation models have built on this model (e.g., Ohlson, 1995). According to Williams (1938), the share price is the sum of the present value of expected future dividends. The expected risk-adjusted rate of return is used as a discounting factor to obtain the present value of expected future dividends. Ohlson (1995) utilises William's dividend discount model for equity valuation (equation (A1) on page 666 of Ohlson, 1995).[2] Gordon (1962) extends the dividend discount model by incorporating a dividend growth rate, and his model is known as the Gordon growth model.

[2] Ohlson's (1995) equity valuation model is outlined in the following chapter.

Preinreich (1938) derives the residual income valuation model as a tool for determining the economic value of a firm. Examples of studies that empirically investigate the application of the residual income valuation model are Lee (1999) and Fernandez (2003). Ohlson (1995) and Feltham and Ohlson (1995) devise models for equity valuation by using the residual income valuation model and the assumption of a clean surplus relation among accounting variables (i.e., change in book value equals earnings minus dividends). Kothari (2001) indicates, by citing Frankel and Lee (1998) and Dechow, Hutton, and Sloan (1999), that the residual income valuation model is a transformation of the dividend discount model.

Ohlson (1995) gains significant credit for revitalising the residual income valuation model for equity valuation. Ohlson's (1995) model explains the market value of a firm using trailing earnings, book value, dividends, future abnormal earnings, and other information, and is thus known as the earnings, book values, and dividends model (Ohlson, 2001). Easton (1998) indicates that the information perspective of accounting variables can be assessed with Ohlson's (1995) returns-based model. Many empirical value relevance studies employ Ohlson's (1995) equity valuation model and attempt to explore the value relevance of accounting variables and other information. However, no study has investigated the additional informativeness of earnings beyond the information that is already incorporated in the most recent prior period's equity price.

2.5 VALUE RELEVANCE OF FUTURE EARNINGS RELATED INFORMATION

Many studies accommodate future earnings related information in value relevance models (e.g., Bryan and Tiras, 2004; Rees, 1999; Krishnan and Kumar, 2005). Ownership (e.g., Lee and Ryu, 2003), accruals (e.g., Krishnan and Kumar, 2005), goodwill amortisation (e.g., Smith, 2003), and analysts' consensus earnings forecasts (e.g., Bryan and Tiras, 2004) are some of the future earnings related variables that have been investigated. Ohlson (2001) argues that future earnings related information (designated v_t in Ohlson (1995) model) plays an important role in empirical assessments of equity value. Ohlson (2001, page 112) indicates that "We now turn our attention to the model's empirical implications. To discern these requires one to identify a role for the perhaps somewhat mysterious scalar variable v_t. Equating v_t to zero may be of analytical interest, but it severely reduces the model's empirical content."

Dechow, Hutton, and Sloan (1999) explore the importance of future earnings related information, and indicate that Ohlson's (1995) model highlights the relationship between current information, information dynamics, and expected future residual income. Their findings reveal that short term earnings forecasts improve Ohlson's (1995) model. They document that earnings are less value relevant than analysts' consensus earnings forecasts. Ohlson (2001) argues that analysts' consensus earnings forecasts can be a proxy for future earnings related information. Bryan and Tiras (2004) conclude that analysts' consensus forecasts can be an effective proxy for future earnings related information in Ohlson's (1995) model.

Jennings, LeClere, and Thompson (2001) examine the value relevance of goodwill amortisation and find that goodwill amortisation has no value relevance and does not improve the ability of earnings to explain equity prices. Their study concludes that the explanatory power of earnings before goodwill amortisation exceeds that of earnings after goodwill amortisation. The findings of Jennings, LeClere, and Thompson (2001) motivate Smith (2003) to examine the relevance of goodwill amortisation in the New Zealand context.

Smith's (2003) findings generally support Jennings, LeClere, and Thompson (2001), but also indicate that goodwill amortisation may be value relevant for service firms in New Zealand, thus raising the possibility that the value relevance of goodwill amortisation might be sector-based.

CHAPTER 3

THEORETICAL ROLE OF THE MOST RECENT PRIOR PERIOD'S EQUITY PRICE IN VALUE RELEVANCE STUDIES

3.1 INTRODUCTION

This chapter uses the Ohlson (1995) model as well as the accounting, finance and economics literature to theoretically demonstrate that the empirical specification of value relevance models with current or next period's equity price as the dependent variable can be vastly improved when they utilize the most recent prior period's equity price as an additional explanatory variable. The chapter further indicates that value relevance studies that use the Ohlson (1995) model should employ change in price or else returns, not the price level, as the dependent variable. These improvements to the empirical specification are shown to be important when past share price is highly correlated with important information that affects future earnings. In the final sections of the chapter, we revisit the Jennings, LeClere, and Thompson (2001) empirical specification used to study whether goodwill amortisation is value relevant to illustrate the improvement to the Ohlson (1995) value relevance model empirical specification.

Ohlson (1995) considers a firm's closing book value of equity and future abnormal earnings as explanatory variables, and conceptualises the current equity price as being determined by book value, current earnings, and other information related to future abnormal earnings. Numerous value relevance models have been derived from Ohlson's (1995) equity valuation model (e.g., Collins, Pincus, and Xie, 1999; Ahmed and Falk, 2006). Many of these value relevance investigations explain contemporaneous or next period's equity price with earnings measures only. Examples are Jennings, LeClere, and Thompson (2001), Collins, Pincus, and Xie (1999), and Collins, Maydew, and Weiss (1997). Most models that implement Ohlson's (1995) modelling framework consider equity prices as the dependent variable, and do not consider the most recent prior period's price as an additional independent variable in the value relevance model. We outline how this approach can be greatly improved, using the original Ohlson (1995) model framework, to incorporate an important informational role for the most recent prior period's equity price.

The Ohlson (1995) model is used to directly demonstrate how and why the most recent period's price should be included as an explanatory variable when testing value relevance using share price as the dependent variable. More importantly, the analysis indicates that change in price or else returns, not the price level, should be the dependent variable in empirical studies that implement the Ohlson (1995) model. The price and price change stationarity literature further reinforces the argument that change in price (or returns) should be the dependent variable in value relevance studies. Additionally, past price can be shown to play a theoretical role even when share returns are used to test value relevance within the Ohlson (1995) modelling framework. This has motivated us to outline the importance of using prior period's price as a highly informative explanatory variable in value relevance models, including earnings-based value relevance models, when considering the value relevance of accounting variables.

In order to further demonstrate the theoretical underpinnings for the role of past price in value relevance studies, we also consider the market efficiency literature. Efficient market theory implies that equity prices should incorporate all relevant information. Market efficiency considerations and the random walk model imply that the most recent prior period's price is important for explaining the current period's equity price, so the information contained in the most recent period's price should have important value relevance. Consistently, Marsh and Merton (1987) and Beaver, Lambert, and Morse (1980) find that the most recent prior period's share price incorporates information about future permanent earnings and dividends. Marsh and Merton (1987) note that the share price represents the present value of future permanent earnings in an efficient market, so the most recent prior period's equity price should be a crucial variable for explaining the current share price in value relevance models.

The rest of this chapter consists of five sections. The next section introduces the Ohlson (1995) model and reviews the value relevance literature that implements Ohlson's (1995) equity valuation model. The third section explores the explanatory contribution of the most recent prior period's equity price in Ohlson's (1995) model. The behaviour of equity prices in efficient markets is outlined in a fourth section in order to further motivate the importance of including the most recent prior period equity price as an explanatory variable in value relevance models. Ohlson (1995) value relevance model regression equations that highlight the benchmarking role of the most recent prior period's share price are explored in the fifth section. Finally, concluding remarks are presented.

3.2 OHLSON (1995) VALUE RELEVANCE MODEL

Ohlson (1995) derives a primary model and a simplified equity valuation model in terms of accounting variables, expected abnormal earnings, and other firm-related information. Ohlson's (1995) simplified model has stimulated many accounting information value relevance studies (e.g., Subramanyam and Venkatachalam, 1998; Brief and Zarowin, 1999; Hand and Landsman, 2005).

3.2.1 Ohlson (1995)

Ohlson (1995) conceptualises how the equity price of a firm can be modelled using the dividend discount model as well as a clean surplus relationship among accounting variables (i.e., change in book value equals earnings minus dividends). Ohlson's (1995) model explains the market value of a firm using earnings, book value, dividends, future abnormal earnings, and other information, and is thus known as the earnings, book values, and dividends model (Ohlson, 2001) [1] Many empirical investigations consider Ohlson's (1995) model to explore the value relevance of accounting variables.

The Ohlson (1995) model starts with the dividend discount model (equation (A1) on page 666 of Ohlson, 1995):

$$P_t = \sum_{\tau=1}^{\infty}(1+r)^{-\tau}E_t(d_{t+\tau}), \qquad (1)$$

where

t = a particular point in time,

P_t = the end of period equity price,

r = risk free rate of interest,

$E_t(.)$ = expectations operator at time t,

d_t = dividends for period t,

and the clean surplus relation (equation (A2a) on page 666 of Ohlson, 1995),

[1] Abnormal earnings, also known as residual income, equal earnings minus a capital contribution, as defined below.

$$y_{t-1} = y_t + d_t - x_t\,, \qquad (2)$$

where

y_t = book value of equity at time t

and

x_t = current trailing earnings for period t.

From these relationships, Ohlson (1995) derives the reformulated dividend discount model (equation (1) on page 667 of Ohlson, 1995):

$$P_t = y_t + \sum_{\tau=1}^{\infty}(1+r)^{-\tau}\,E_t(x^a_{t+\tau}) \qquad (3)$$

where

$$x^a_t \equiv (x_t - r.y_{t-1}) \qquad (4)$$

represents abnormal earnings for period t.

Equation (3) indicates that a firm's future abnormal earnings determine the firm's market value, along with current book value and current earnings. Ohlson (1995), page 667 indicates:

> "Relation (1) has a straightforward and intuitively appealing interpretation:[2] a firm's value equals its book value adjusted for the present value of anticipated abnormal earnings. In other words, the future profitability as measured by the present value of the anticipated abnormal earnings sequence reconciles the difference between market and book values."

[2] Relation (3) in our set of equations.

Ohlson (1995) considers AR(1) dynamics for earnings within the earnings, book values, and dividends model. For this, he postulates that next period's future abnormal earnings (x^a_{t+1}) are determined by current abnormal earning and other information (v_t). In this context, his assumptions (equations (2a) and (2b) on page 668 of Ohlson, 1995) are given as:

$$x^a_{t+1} = \omega x^a_t + v_t + \varepsilon_{1,t+1} \ , \qquad (5)$$

and

$$v_{t+1} = \gamma v_t + \varepsilon_{2,t+1} \ , \qquad (6)$$

where ω and γ are persistence parameters that are identifiable by market participants. Using the combination of residual income, clean surplus relations among accounting variables, and these assumptions, Ohlson (1995) shows (equation (5) on page 669 of Ohlson, 1995) that

$$P_t = y_t + \alpha_1 x^a_t + \alpha_2 v_t \ , \qquad (7)$$

where

$$\alpha_1 = \left(\frac{\omega}{1 + r - \omega} \right)$$

and

$$\alpha_2 = \left(\frac{1 + r}{(1 + r - \omega)(1 + r - \gamma)} \right).$$

Ohlson (1995) indicates that equation (7) is a simplified form of the primary model (equation (3) above), where v_t is future value relevant information that affects future but not current earnings (i.e., information not related to abnormal earnings at time t). In the simplified model (equation (7)), the closing book value (y_t), current abnormal earnings

(x_t^a) and future value relevant information (v_t) explain the time t equity price (P_t).[3] According to Ohlson (2001), the empirical nature of the earnings, book values, and dividends model very much depends on future value relevant information. He argues that any value relevant variable could represent future earnings related information (v in equation (7)) in a model. More importantly, he further argues that eliminating or leaving out appropriate future value relevant information from the earnings, book values, and dividends model can have a drastic effect (Ohlson, 2001).[4]

Ohlson (1995) notes that assuming v_t = 0 allows the current share price to be related to current abnormal earnings and book value only (see equation (7)). This simplifying assumption has been used by researchers to implement a simplified version of equation (7) where v_t = 0, as outlined below, but can potentially create a missing variable problem when additional information is important for explaining future expected earnings (i.e., when v_t does not equal zero).

To further illustrate this point, consider the price change version of the Ohlson (1995) valuation model, obtained using the period t and period t+1 versions of equation (7), that is outlined at the top of page 683 of Ohlson (1995):

$$P_{t+1} + d_{t+1} - (1+r)P_t = y_{t+1} + d_{t+1} + \alpha_1 x_{t+1}^a + \alpha_2 v_{t+1} - (1+r)(y_t + \alpha_1 x_t^a + \alpha_2 v_t)\,. \quad (8)$$

Equation (8) simplifies to the price change equation

$$P_{t+1} - P_t = r\,P_t + y_{t+1} - (1+r)y_t + \alpha_1[x_{t+1}^a - (1+r)x_t^a] + \alpha_2[v_{t+1} - (1+r)v_t]\,. \quad (9)$$

[3] Ohlson (1995) does not give specific examples of future value relevant information, but an example would be research and development expenditures which do not increase current earnings but are expected to increase next period's earnings.

[4] Ohlson (2001) does not give examples of future value relevant earnings information (see also footnote 3), but implies that it can be inferred from the empirical relationship between current and future earnings (see equation (5)).

Equations (8) and (9) indicate that the most recent prior period's price (P_t) as well as changes in future value relevant information ($v_{t+1} - (1+r)v_t$) can play a very important role in the Ohlson (1995) model for explaining price and price changes, so the inclusion of these variables in value relevance studies could be crucial. This aspect of the Ohlson (1995) model is explored further below, but first the Ohlson (1995) model empirical literature is briefly reviewed to illustrate that empirical studies implementing the Ohlson (1995) model have generally excluded the role of the most recent prior period's price (P_t) and future earnings related value relevant information (v) in their analysis.

3.2.2 Value Relevance Investigations of Ohlson (1995)

Using Ohlson's (1995) simplified model (equation (7) above), empirical investigations relate accounting variables as independent explanatory variables to either the contemporaneous or next period equity price. Table 3.1 outlines a sample of these value relevance studies. All of the cited studies do not include past price as an explanatory variable, and many of the studies do not include proxies for important future earnings related value relevant information either.

[Please insert Table 3.1]

Some of the studies relate year end accounting variables to contemporaneous equity prices and thus utilize information that is not yet available to investors when the end of period share price is determined. Other studies relate next period's price to the most recent prior period accounting variables.[5] These studies assume that (a) end of period accounting variables are not available immediately; and (b) the accounting

[5] End of fiscal year accounting information is generally used to explain the share price three months or six months after the fiscal year end.

variables are not disclosed by a firm until, for example, 3 or 6 months after the end of the period.

3.2.2.1 Book Value in Value Relevance Models

The book value of equity is a summary measure that reflects a firm's trailing financial position, so many studies examine the value relevance of book value using Ohlson's (1995) simplified model (e.g., Collins, Pincus, and Xie, 1999; Collins, Maydew, and Weiss, 1997). These empirical studies suggest that book value is value relevant (see also Ohlson, 1995). Other studies indicate, however, that the value relevant nature of book value is dependent upon a firm's financial position and earnings potential (e.g., Collins, Maydew, and Weiss, 1997; Barth, Beaver, and Landsman, 1998). These authors argue that value relevance of book value is generally present in firms that are financially unhealthy, reporting negative earnings, approaching bankruptcy, or subject to liquidation, and is not present otherwise.

3.2.2.2 Earnings-Based Value Relevance Models

Some value relevance investigations focus exclusively on earnings and have devised exclusively earnings-based models for assessing the value relevance of earnings (e.g. Collins, Pincus and Xie 1999; Collins, Maydew, and Weiss 1997).[6] These studies generally find that earnings are value relevant. Brown, Lo, and Lys (1999) indicate that there is a scale effect in value relevance studies whereby the scale (or size) of dependent (equity price) and independent variables (earnings) in value relevance studies affects the apparent explanatory power of the models. They indicate that there is only a weak

[6] Many value relevance studies cite Ohlson (1995) for their value relevance model formulation, while other studies use, but do not directly cite, Ohlson (1995) (e.g., Jennings, LeClere, and Thompson, 2001; Black and White, 2003).

relationship between equity price and current trailing earnings when controlling for scale effect in levels variables regression models.

Ohlson (1995) has indicated, and Bernard (1995) has also argued, that the inclusion of earnings variables in value relevance models becomes inevitable. More generally, Peasnell, Skerratt, and Ward (1987), Brief and Zarowin (1999), and Landsman and Maydew (2001) argue that earnings are a summary measure that underlies a firm's value and so earnings should always be included when testing value relevance models to verify the incremental value relevance of other variables in the models.

3.2.2.3 Dividend Value Relevance Models

Studies by Hand and Landsman (2005), Brief and Zarowin (1999), and Rees (1997) use Ohlson (1995) to derive dividend value relevance models and find value relevance of dividends. Hand and Landsman (2005, page 467) indicate that loss making firms distribute dividends to signal future earnings potential, and also indicate "… that dividends are positively priced because they are a proxy for mispricing by investors of current earnings and/or book equity." Other value relevance studies (e.g., Wood, 2000; Conroy, Eades, and Harris, 2000) have found evidence in favour of dividend irrelevancy.

3.2.2.4 Other Variables in Value Relevance Models

Ohlson's (1995) model accommodates future earnings related value relevant information variables when explaining equity prices, so long as they are correlated with future but not current profitability (see equations (5) to (7)). Ohlson (2001) argues that future earnings related value relevant information can be very important in an equity valuation model.[7] Examples of value relevance studies that incorporate potential future earnings related value relevant information such as goodwill amortisation, analysts' earnings forecasts, or firm ownership include Smith (2003), Dechow, Hutton, and Sloan (1999), and Lee and Ryu (2003), respectively.

Some of this potential future earnings related value relevant information (e.g., goodwill amortisation) can be extracted from earnings and directly examined to determine if it contains additional value relevant information. Studies therefore examine, for example, the value relevance of goodwill amortisation (e.g., Smith, 2003; Jennings, LeClere, and Thompson, 2001). These studies examine whether goodwill amortisation increases the informativeness of earnings, and conclude that goodwill amortisation has no incremental value relevance. We revisit the empirical set-up of these goodwill amortisation studies throughout the thesis in order to demonstrate why value relevance studies should contain the most recent prior period's price as an additional explanatory variable, as revealed below.

3.3 OHLSON (1995) AND THE ROLE OF THE MOST RECENT PRIOR PERIOD'S EQUITY PRICE

This section demonstrates that the most recent prior period's equity price can play a very important role in the Ohlson (1995) model, and reveals that price change or return, not price, should be the dependent variable in Ohlson (1995) model value relevance empirical implementations.

[7] Ohlson (2001) does not, however, give specific examples of future value relevant earnings information. Examples of future value relevant information could include research and development expenditures and earnings forecasts.

To demonstrate the role of the most recent prior period's price in the Ohlson (1995) value relevance model when price is the dependent variable, the Ohlson (1995) model price change equation (9) can be rearranged to

$$P_{t+1} = (1+r)P_t + y_{t+1} - (1+r)y_t + \alpha_1[x^a_{t+1} - (1+r)x^a_t] + \alpha_2[v_{t+1} - (1+r)v_t]. \quad (10)$$

Equation (10), derived directly from the Ohlson (1995) model price change equation (page 683 of Ohlson, 1995), reveals an important random walk feature of the Ohlson (1995) model. In particular, the time t+1 price (P_{t+1}) is equal to the future value of the most recent prior period price ($(1+r)P_t$) plus adjustments representing innovations in book value ($y_{t+1} - (1+r)y_t$), innovations in current abnormal earnings $(x^a_{t+1} - (1+r)x^a_t)$, and innovations in future earnings related value relevant information ($v_{t+1} - (1+r)v_t$). The most recent prior period's price can therefore be a crucial component of the Ohlson (1995) model.

To see this even more clearly, book value (y) can be all but eliminated from equation (10) by substituting in the book value identity (2) as well as the abnormal earnings definition (4). The resulting price equation is

$$P_{t+1} = (1+r)P_t - d_{t+1} + (1+\alpha_1)x^a_{t+1} - \alpha_1(1+r)x^a_t + \alpha_2[v_{t+1} - (1+r)v_t]. \quad (11)$$

The random walk characteristic of the Ohlson (1995) model is further revealed, since in equation (11) next period's dividend adjusted price ($P_{t+1} + d_{t+1}$) equals the future value of the current price ($(1+r)P_t$) plus innovations in current and future earnings related information (x^a and v). We will argue below that market efficiency implies that the most recent prior period's price (P_t) will incorporate expected future earnings related information. Leaving the most recent prior period's price out of the Ohlson (1995) model in an empirical set-up will therefore be doubly problematic when other future value relevant variables (v) related to future earnings are left out as well, since both important indicators of expected future earnings are likely to be highly correlated and will be absent from the model (see also Ohlson, 2001). This can give rise to a missing variable problem, and potentially misleading inferences concerning the value relevance role of current earnings (x_t), if current earnings are also correlated with the most recent prior period's price P_t (Wooldridge, 2002).

The random walk characteristic of the Ohlson (1995) price valuation model, revealed by equation (11), further implies that price change or return, not price, should be the dependent variable in value relevance studies that use Ohlson (1995), since changes in random walk series are stationary whereas the level of the series is not.[8] This is an especially important consideration when past price is left out of the value relevance model framework, as is usually the case in value relevance studies, since in a random walk price change process the immediate past price is a crucial determinant of the current price. Aggarwal and Kyaw (2004) demonstrate that the level of equity prices follows an autoregressive, non-stationary process. Jeon and Jang (2004) argue that the first differences in equity prices are a stationary, non-persistent process, so, for econometric reasons, change in price (or returns), not price, should be the dependent variable in value relevance studies.

Rearrangement of equation (11) leads to a simplified version of the Ohlson (1995) price change equation (see page 683 of Ohlson, 1995):

$$P_{t+1} - P_t = r\,P_t - d_{t+1} + (1+\alpha_1)x^a_{t+1} - \alpha_1(1+r)x^a_t + \alpha_2[v_{t+1} - (1+r)v_t]. \quad (12)$$

[8] Earnings and equity prices are both non-stationary, so they move together over time, thus potentially creating a spuriously significant statistical relationship between current trailing earnings and next period's price when a non-autoregressive empirical model is used to explain prices (see, e.g., Enders, 1995). Earnings and price could still be cointegrated, but it will be shown in later chapters that earnings lose their explanatory power when price change (not price) is the dependent variable, so levels regression between earnings and prices can be potentially spurious.

The most recent prior period's price variable (rP_t) on the right hand side of equation (12) represents the proportionate drift aspect of a random walk price change process (see also equation (14) below) and thus represents a potentially important role for past price in the Ohlson (1995) framework even when price change is the dependent variable. Further rearrangement of equation (12) leads to a returns version of the Ohlson (1995) value relevance model:

$$\frac{P_{t+1} - P_t + d_{t+1}}{P_t} = r + \frac{(1+\alpha_1)x^a_{t+1}}{P_t} - \frac{\alpha_1(1+r)x^a_t}{P_t} + \frac{\alpha_2[v_{t+1} - (1+r)v_t]}{P_t}. \qquad (13)$$

The most recent prior period's period price inversely enters equation (13), thus creating a value effect for returns.

Equations (11), (12), and (13) are used to derive simplified regression equations for the Ohlson (1995) model that incorporate the role of past price and future value relevant information, once the market efficiency literature is reviewed to further reveal the potentially important informational role played by the most recent prior period's price in value relevance studies.

3.4 EQUITY PRICES AND INFORMATION IN CAPITAL MARKETS

The informational efficiency of equity prices depends on how equity prices incorporate information about firms, industries, and the wider economy (e.g. Fama, 1970). If equity prices reflect all information in markets, Fama (1995) indicates that equity prices form a random walk process, since changes in equity prices will be random. Fama (1995), Malkiel (2003) and others therefore identify a close relationship between efficient markets and the random walk model of equity prices. Prior period's equity prices incorporate value relevant information in an efficient market, thus explaining the important role that can be played by the most recent period's equity price in value relevance studies such as Ohlson (1995).

3.4.1 Market Efficiency and the Random Walk Model

The efficient market hypothesis implies that equity prices fully incorporate all information available in markets, including forward-looking information, so investors cannot earn excess returns by using old information because it has been already incorporated in equity prices (e.g., Fama, 1970). If current information on past and future events is already incorporated in current equity prices, only new information can cause equity prices to change unexpectedly. Equity price changes therefore do not form a trend and are independent from each other.

Consistent with the efficient market price change process, a random walk process implies that changes of a variable are independent from each other and thus display no memory. Malkiel (2003) therefore indicates that the efficient market model is closely linked with the random walk model, since prices deviate randomly from previous prices in the random walk model. Malkiel (2003, page 59) highlights this point:

> "The logic of the random walk idea is that if the flow of information is unimpeded and information is immediately reflected in stock prices, then tomorrow's price change will reflect only tomorrow's news and will be independent of the price changes today. But news is by definition unpredictable, and, thus, resulting price changes must be unpredictable and random."

In an efficient market, the rationality of equity prices therefore leads to a random walk process. Hence, the time series relationship between tomorrow's price changes and today's price changes a well as between next period's price changes and current information such as earnings is one of independent changes, as explained below.

3.4.2 The Random Walk Model and Information

When equity prices accommodate information immediately, the efficient market hypothesis implies that predicting next period's prices with past equity prices beyond the current price becomes unrealistic, i.e., only a firm's most recent prior period's price is useful for predicting next period's equity price. In this context, the most recent prior period's equity price (P_t) predicts the following period's equity price (P_{t+1}) according to

$$P_{t+1} = (1 + \lambda) P_t + e_t , \qquad (14)$$

where λ is the proportionate drift and e_t is the error term. Dynamic changes in news are unpredictable, so using a series of past prices to explain future excess price changes (beyond the expected proportionate drift λP_t) should be impossible because price changes are a result of new information becoming available to the market (Malkiel, 2003).

3.4.3 Efficient Market Equity Prices, Future Earnings and Value Relevance Studies

In an efficient market, equity prices come to represent the rationality of markets by incorporating all new information (e.g., Beechey, Gruen, and Vickery, 2000). Beaver (2002) therefore justifies a requirement for effective financial reporting and disclosures to facilitate the informational efficiency of equity prices. Thus, effective financial reporting helps to make equity prices efficient. Marsh and Merton (1987) demonstrate, however, that equity prices are also a source of information with respect to future earnings and dividends when markets are efficient. Since the most recent equity price incorporates all anticipated future information, the most recent prior period's price helps to predict next period's price, as happens with a random walk model of share prices.

As earnings are a crucial contributor to a firm's value, Marsh and Merton (1987) highlight the importance of past prices in relation to future permanent earnings in an efficient market. They assert that past prices contain more information about future earnings than past earnings provide, so stock prices are important predictors of future permanent earnings. Marsh and Merton (1987) explore dividend behaviour in the stock market by modelling next period's dividend as a function of unexpected changes in future earnings. As the stock price in an efficient market equals the present value of future permanent earnings, and since permanent earnings are positively related to next period's dividend, current stock price changes therefore can provide information about next period's dividends. Marsh and Merton (1987) test the role of equity prices and contemporaneous earnings in predicting next period's dividends, and find that it is consistent with their model. They show that changes in stock prices are predictors of changes in dividends and therefore changes in earnings.

As Marsh and Merton (1987) demonstrate that past prices contain information concerning future earnings and dividends, their study implies that the most recent prior period equity price will be an informative independent variable, in addition to contemporaneous earnings and dividends, in value relevance models of share prices. Beaver, Lambert, and Morse (1980) also argue that the information contained in past equity prices is important for explaining next period's equity prices, beyond accounting variables. This highlights the importance of employing the most recent prior period equity price as an additional explanatory variable in value relevance models. It is therefore important in value relevance tests to examine together: (a) the ability of financial reporting and disclosure to explain equity prices; and (b) the usefulness of the most recent prior period's equity prices to explain next period's prices, in combination with accounting and other information. The Ohlson (1995) model price, price change, and return equations (11) to (13) reveal how just such an examination can be conducted, since the most recent prior period's price is incorporated as an explanatory variable along with current and future earnings related information. This point can be highlighted by noting that the most recent prior period's price, by incorporating current and future earnings related information, serves as a benchmark for evaluating the value relevance of accounting information.

3.5 THE OHLSON (1995) MODEL REGRESSION EQUATIONS

Equations (11) to (13) can be used to derive simplified regression equations for the Ohlson (1995) model that incorporate the potentially important informational role played by the most recent prior period's price (P_t), trailing earnings (x), and future earnings related information (v) in value relevance studies. To make the Ohlson (1995) model equations directly comparable with the Jennings, LeClere, and Thompson (2001) goodwill amortisation value relevance model empirical framework, three simplifications can be used. First, the level of trailing earnings (x) and future value relevant information (v) are examined, not innovations in the level (see equations (11) and (12)). Secondly, only information that is already available at time t+1 is utilised in the regression model equations. Thirdly, the current abnormal earnings variable (x_t^a) is simplified to current trailing earnings (x_t), and the regression equations are further simplified by using the ex-dividend share price P_{t+1}, thus deleting the dividend term d_{t+1} from the regression equation.[9] These simplifications of equations (11) to (13) lead to the following regression equations for price P_{t+1}, price change ΔP, and return, as a function of period t trailing earnings x_t, the most recent prior period equity price P_t, and future earnings related information v_{t+1}:

$$P_{t+1} = \beta_0 + \beta_1 P_t + \beta_2 x_t + \beta_3 v_{t+1} + \varepsilon_{t+1} \ , \quad (15)$$

$$\Delta P_{t+1} = \theta_0 + \theta_1 P_t + \theta_2 x_t + \theta_3 v_{t+1} + \varepsilon_{t+1} \ , \quad (16)$$

and

$$\frac{\Delta P_{t+1} + d_{t+1}}{P_t} = \mu_0 + \mu_1 \left(\frac{x_t}{P_t} \right) + \mu_2 \left(\frac{v_{t+1}}{P_t} \right)_t + \varepsilon_{t+1} \ , \quad (17)$$

where β, θ, and μ are coefficients of regression equations (15) to (17), respectively.

Equations (15) to (17) explore the important incremental role of current trailing earnings for explaining subsequent share prices, share price changes, and returns, above and beyond the role played by the most recent prior period's share price (P_t) as well as by other forward looking earnings related information (v), thus providing a benchmark to evaluate the information dynamics of earnings information. When the most recent prior period's price P_t and forward-looking information v_{t+1} are important and are correlated, their inclusion together can greatly improve the value relevance model regression equation specification (see value relevance regression equations (15) to (17)).

Current trailing earnings (x) represent aggregated earnings, but it is also possible to disaggregate the earnings by extracting goodwill amortisation to assess the informativeness of goodwill amortisation separately from earnings (see Jennings, LeClere, and Thompson, 2001). As we intend to assess the additional informativeness of goodwill amortisation in this thesis, we consider whether goodwill amortisation

[9] The dividend term and earnings lags could easily be incorporated in the regression equations.

represents potential future earnings related value relevant information (v_{t+1}), and thus provides relevant forward-looking information concerning future earnings. The rest of the thesis considers the value relevance of the explanatory variables earnings before goodwill amortisation, goodwill amortisation, earnings after goodwill amortisation, and the most recent prior period equity price using the value relevance regression equations (15) to (17) derived in this chapter.

3.6 CONCLUDING REMARKS

We reformulate the Ohlson (1995) value relevance model to demonstrate how it accommodates the most recent prior period equity price as an additional explanatory variable. Ohlson (1995) explains the value of equity as a function of current abnormal earnings, book value, dividends, expected future abnormal earnings, and other relevant information. Many value relevance studies have utilized Ohlson's (1995) equity valuation model to explore the value relevance of accounting variables. We utilise Ohlson (1995) to demonstrate how the most recent prior period share price can be incorporated in value relevance studies, and we assess the additional informativeness of current trailing earnings for explaining share prices, changes in price, and returns in three related models in which the most recent prior period's equity price plays an important role.

We demonstrate how our earnings-based value relevance regression model equations can be used to improve the empirical specification for our investigation of the value relevance of goodwill amortisation. Accommodating goodwill amortisation in value relevance models is explained in relation to assessing whether goodwill amortisation provides future earnings related value relevant information.

Table 3.1

Samples of Models in Twenty Two Previous Studies on Value Relevance of Accounting and Other Information

This table lists value relevance studies where equity price is the dependent variable. The first column consists of the study's author(s). The column "database" refers to the source from which data are collected. The third column is the sample period. The fourth column refers to positive coefficient estimate significance levels of independent variables as: "+++" for the 0.01, "++" for the 0.05 level, and "+" for the 0.1 level, and negative coefficient estimate significance levels are shown with "(–)***", "(–)**", and "(–)*", respectively. The column sample size refers to the number of observations. The last column indicates the adjusted R^2 or R^2 of the model.

Author or Authors (year)	Database	Sample Period: (Number of years)	Independent Variable(s) Coefficient Estimates	Sample Size	**Adjusted R^2 or R^2**
Jennings, Robinson, Thompson II, and Duvall (1996)	Compustat	1982-1988 (6)	ABGWP +++ GW +++ PPE +++ LIAB +++	1381	0.90
Collins, Maydew, and Weiss (1997)	Compustat, CRSP, NYSE, AMEX, NASDAQ	1953 – 1993 (40)	***x*** +++ ***y*** +++	115,154	0.536
			x +++	115,154	0.455
			y +++	115,154	0.466
Rees (1997)	Extel Financial Company Analysis Service	1987-1995 (9)	***x*** +++ ***y*** +++	8287	0.54
			d +++, RE +++ ***y*** +++	8287	0.60
			x +++ (***y*** + TD) +++ TD (-)**	8287	0.54
			d +++ RE +++ (***y*** + TD) +++ TD +++	8287	0.60
			x +++ IV +++ ***y*** +++	8287	0.56
			d +++ RE +++ IV +++ (***y*** + TD) +++ TD (-)**	8287	0.64
King and Langli (1998)	Worldscope Global Researcher	Germany 1982-1996 (15)	***y*** +++ , ***x*** +++	2716	0.402
			y +++	2716	0.356
			x	2716	0.021
		Norway 1982-1996 (15)	***y*** +++ , ***x***	922	0.646
			y +++	922	0.637
			x ++	922	0.405
		UK 1982-1996 (15)	***y*** ++ , ***x*** ++	11005	0.662
			y ++	11005	0.442
			x ++	11005	0.554

Barth, Clement, Foster, and Kasznik (1998)	Financial World (FW) Compustat CRSP	1991-1996 (6)	***y*** +++ ***x*** +++ BRANDS +++	508	0.56
			y +++ ***x*** +++ BRANDS_PRD +++	487	0.56
Collins, Pincus, and Xie (1999)	Compustat,	1975 – 1992 (18)	***x*** (-)*** (loss firms)	15843	0.09
			x +++ (profit firms)	53734	0.54
			x +++ (all firms)	69577	0.38
			x + $y_{(t-1)}$ +++ (loss Firms)	15843	0.42
Bao and Chow (1999)	Taiwan Economic Journal (TEJ)	1992 – 1996 (5)	x^{D} +++ y^{D} ++	213	0.211
			x^{I} +++ y^{I}	213	0.236
Dechow, Hutton, and Sloan (1999)	Compustat, CRSP, IBES	1976-1995 (20)	***y*** ++ ***x*** ++	50133	0.40
			y ++ ***x*** f ++	50133	0.69
Harris and Kemsley (1999)	Compustat	1975-1994 (20)	***y*** +++ RE (-)*** ***x*** +++ REBV* ***x*** +++	27647	0.82
Francis and Schipper (1999)	Compustat CRSP	1953-1994 (42)	***y*** ***x*** +++	103684	0.62
Lo and Lys (2000)	Compustat	1962-1997 (36)	***y*** +++, ***x*** +++, ***d*** +++, NCD (-)***	5744	0.6368
Graham and King (2000)	Worldscope Global Researcher	Indonesia 1991-1995 (5)	***y*** +++ , x^{a} +++	338	0.308
			y +++	338	0.219
			x^{a} +++	338	0.062
		Korea 1988-1995 (9)	***y*** +++ , x^{a} +++	902	0.683
			y +++	902	0.669
			x^{a} +++	902	0.115
		Malaysia 1987-1996 (10)	***y*** +++ , x^{a} +++	1311	0.277
			y +++	1311	0.253
			x^{a} +++	1311	0.067
		Philippines 1995-1995 (2)	***y*** +++ , x^{a} ++	139	0.680
			y	139	0.625
			x^{a}	139	0.005
		Taiwan 1993-1995 (3)	***y*** +++ , x^{a} +++	369	0.169
			y +++	369	0.070
			x^{a} +++	369	0.097
		Thailand 1991-1995 (5)	***y*** +++ , x^{a} +++	596	0.397
			y +++	596	0.265
			x^{a} +++	596	0.267
Jennings, LeClere, and Thompson (2001)	NYSE, AMEX, NASDAQ	1993 – 1998 (6)	EBG +++	2807	0.604
			EAG +++	2807	0.584
			EBG +++ GAPS	2807	0.604

Chen, Chen, and Su (2001)	SSSE, TEJD	1991-1998 (8)	***x*** +++ ***y*** +++	2548	0.250
Graham, Lefanowicz, and Petroni (2003)	Compustat	1993-1997 (5)	y_{O} +++ y_{EMI} + x_{O} +++ x_{EMI} (FV- y_{EMI}) +++	172	0.84
Rajgopal, Venkatachalam, and Kotha (2003)	EDGAR, CRSP, IBES, Yahoo, PC Data Online's Website	1999-2000 (2)	***y*** +++ ***x*** ΔCC R&D +++ M&A	434	0.5867
			y +++ ***x*** (-)*** ΔCC R&D ++ M&A NTWK +++	434	0.7758
Easton and Sommers (2003)	NA	1963-1999 (37	***y*** ++ ***x*** ++	163097	0.7821
Hand and Landsman (2005)	Compustat NYSE, AMEX, NASDAQ, and IBES	1984-1995 (10)	***y*** ++ ***x*** ++	15066	0.84
			y ++ ***x*** ++ ***d*** ++ NETCAP ++	15066	0.84
Ahmed and Falk (2006)	Securities Industry Research Centre of Asia-Pacific (SIRCP)	1992-1999 (8)	***x*** +++ ***y*** +++ LGTASS +++ RDBALPS ++	603	0.631
			x +++ ***y*** +++ LGTASS +++ RDBALPS	601	0.385
Bugeja and Gallery (2006)	Australian Stock Exchange (FinDa)	1995 – 2001 (7)	***y*** +++ ***x*** +++	475	0.8369
			yExIA +++ ***x*** +++ TIA +++	475	0.8389
			yExIA +++ ***x*** +++ IIA GWT +++	475	0.8381
Landsman, Miller, and Yeh (2007)	Compustat IBES	1990 – 2000 (11)	x^{a} +++ ***y*** +++	21748	0.643
			x^{a} +++ TE (-)*** ***y*** +++	21748	0.654
Bae and Jeong (2007)	KSE, KIS-FAS	1987-1998 (12)	***x*** +++, ***y*** +++,	4285	0.345
			x +++	4285	0.211
			y +++	4285	0.293

In the column "Database", **AMEX** = American Stock Exchange, **CRSP** = Center for Research and Security Prices, **IBES** = Institutional Brokers' Estimate System, **KSE** = Korean Stock Exchange, **KIS-FAS** = Korea Investor's Service – Financial Analysis System, **NA** = not available, **NASDAQ** = National Association of Securities Dealers Automated Quotations system, **NYSE** = New York Stock Exchange, **SSSE** = Shangai and Shenzhen Stock Exchange, **TEJD** = Taiwan Economic Journal Database.

The independent variables in the fourth column "Independent Variable(s) Coefficient Estimates" are listed below for reference:

$\boldsymbol{x}$ = earnings per share
$\boldsymbol{y}$ = book value per share
EBG = earnings per share before goodwill amortisation
EAG = earnings per share after goodwill amortisation
GAPS = goodwill amortisation per share
$\boldsymbol{y}$ExIA = book value of equity excluding intangible assets
TIA = total intangible assets
IIA = identifiable intangible assets
GWT = total net goodwill
$\boldsymbol{y}_{(t-1)}$ = opening book value
$\boldsymbol{x}^{D}$ = domestic earnings per share
$\boldsymbol{y}^{D}$ = domestic book value per share
$\boldsymbol{x}^{I}$ = international earnings per share
$\boldsymbol{y}^{I}$ = international book value per share
$\boldsymbol{y}_{O}$ = book value of investment from other source
$\boldsymbol{y}_{EMI}$ = book value of investment from equity
$\boldsymbol{x}_{O}$ = income from equity method investment
$\boldsymbol{x}_{EMI}$ = income from equity method investment
(FV - $\boldsymbol{y}_{EMI}$) = difference between disclosed fair value and book value of equity method investment
LGTASS = log of total assets excluding capitalised research and development balance per share
RDBALPS = capitalised research and development expenditure per share
BRANDS = estimated values of brand
BRANDS_PRD = fitted values of brands
f = next year consensus analyst's forecast
$\boldsymbol{d}$ = dividends declared
NETCAP = net capital contributions
$\boldsymbol{y}$_LO = book value of equity of lower financial health and zero for others
$\boldsymbol{x}$_LO = net income of lower financial health and zero for others
RE = retained earnings
REBV* $\boldsymbol{x}$ = produce of earnings to book value ratio by $\boldsymbol{x}$
ΔCC = change in contributed capital
R&D = research and development
M&A = marketing and advertisement expense
NTWK = network
ABGWP = book value of assets less book value of purchased goodwill and property, plant and equipment
GW = book value of purchased goodwill
PPE = book value of property, plant and equipment
LIAB = sum of book values of liabilities and preferred stock
$\boldsymbol{x}^{a}$ = abnormal earnings
TE = total exclusions
TD = book value of debt including non-ordinary equity capital such as preference shares
IV = capital investments
NCD = net capital distribution.

CHAPTER 4

THE ROLE OF THE MOST RECENT PRIOR PERIOD'S PRICE IN OHLSON (1995) VALUE RELEVANCE MODEL TIME SERIES ANALYSIS TESTS

4.1 INTRODUCTION

This study explores the benefit of incorporating the most recent prior period's equity price as an additional explanatory variable when examining the value relevance of earnings related accounting variables using the Ohlson (1995) value relevance model. We demonstrate the theoretical and empirical connection between price and change in price within the Ohlson (1995) value relevance model, and explore how the empirical specification of value relevance studies can be greatly improved by including the most recent prior period's price as an additional value relevance explanatory variable. We start with time series analysis to demonstrate this point, since the level of equity prices follows a highly persistent, non-stationary process, so it is fairly obvious in a time series setting that the most recent prior period's equity price should be used to explain next period's share value. More importantly, the time series analysis indicates that change in price, not the price level, should be used as the dependent variable in value relevance studies to further improve the econometric specification of value relevance studies. We also demonstrate that including the most recent prior period's price as an additional explanatory variable eliminates the scale problem in value relevance models whereby the scale (or size) of dependent and independent variables in value relevance studies affects the apparent explanatory power of the models (see Brown, Lo, and Lys, 1999). We illustrate these points by revisiting the Jennings, LeClere, and Thompson (2001) empirical specification used to study whether goodwill amortisation is value relevant and potentially informative with respect to future earnings.

Ohlson (1995) demonstrates how the equity price of a firm can be explained with a clean surplus relationship among accounting variables. Ohlson (1995) considers a firm's closing book value of equity and future abnormal earnings as explanatory variables, and conceptualises the current equity price as being determined by book value, current earnings, and other information related to future abnormal earnings. Numerous value relevance studies utilise Ohlson's (1995) equity valuation model to explain concurrent or future equity prices with end of period earnings measures as well as potential forward looking earnings information such as goodwill amortisation. Examples are Jennings, LeClere, and Thompson (2001), Collins, Pincus, and Xie (1999), and Collins, Maydew, and Weiss (1997). Studies that implement Ohlson's (1995) modelling framework have equity price as the dependent variable but do not include the most recent prior period's price as an additional independent variable in the value relevance model.

We demonstrate that the Ohlson (1995) model directly incorporates the most recent prior period's price as a potentially important value relevance explanatory variable. Since current and future earnings are related to the most recent period's equity price, current earnings alone are not sufficient for explaining next period's equity price, so the most recent period's equity price should be accommodated as a value relevance benchmark in earnings-based value relevance models. Hence, we show how the empirical specification of an earnings-based value relevance model (e.g., Jennings, LeClere, and Thompson, 2001) can be greatly improved by incorporating the most recent period's equity prices as an additional explanatory variable.

Efficient market theory implies that equity prices should incorporate all relevant information, so the information contained in the most recent period's price should have important value relevance. Consistently, Marsh and Merton (1987) and Beaver, Lambert, and Morse (1980) find that prior period share prices incorporate information about future permanent earnings and dividends. Ohlson (1995) values firms using expected future earnings, so if the most recent period's price contains information on future earnings, then the most recent period's past price will be a proxy for future as well as contemporaneous earnings.

Our study examines a 16 year period when goodwill amortization was potentially reported. Examining a time series with only 16 observations limits the time series techniques that can be employed, but time series analysis is an extremely important step for illustrating the benefit of incorporating the most recent prior period's price in value relevance studies. In addition to limits on the length of the time series samples, a further challenge is the extremely limited number of companies that consistently report goodwill amortisation related data each year. In spite of these challenges, a representative sample of 20 randomly selected companies is obtained for the time series analysis. The majority of the 20 sample firms display a share price random walk when the most recent period's price is included as an additional explanatory variable in the regression analysis, and only a few firms in the sample indicate a significant contribution of earnings or goodwill amortisation information for explaining next period's price. The results indicate that the value relevance of current trailing earnings is limited, in contrast to Jennings, LeClere, and Thompson (2001). The ability to explain subsequent equity prices lies with the most recent prior period's equity price, as in a random walk process, rather than with current trailing earnings. Consistent with Jennings, LeClere, and Thompson (2001), however, we also find that goodwill amortisation is not value relevant and does not provide significant future earnings related information.

To interpret this finding that the value relevance and usefulness of current earnings is limited when explaining next period's price, compared to the informativeness of the most recent prior period's price, two things can be noted. First, it is well-known that equity prices react to the unexpected component of earnings announcements, not the earnings level itself, since the expected level of earnings is incorporated into the most recent equity price prior to the earnings announcement.[1] Secondly, it can also be noted that equity prices should be explained with a variable that contains current and future earnings information. The most recent prior period's price contains such earnings information, as indicated by Marsh and Merton (1987), so the role of the most recent prior period's equity price is much more important than current trailing earnings for explaining next period's equity price. Without past prices as an additional explanatory variable, value relevance models can therefore be misspecified due to a missing variable problem, since current trailing earnings can act as a proxy for the strong forward-looking information provided by the most recent prior period's price (see, e.g., Wooldridge, 2002). Earnings and equity prices are both non-stationary, so they move together over time, thus potentially creating a spuriously significant statistical relationship between earnings and next period's price when a non-autoregressive empirical model is used to explain prices.[2]

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[1] The reaction of share price to unexpected earnings can be assessed using an event study method that identifies the event date reaction (and potential post-announcement drift).

[2] The sample period is too short for formal cointegration analysis, but earnings are shown to lose their explanatory power when price change (not price) is the dependent variable, thus indicating that the relationship between earnings and prices is potentially spurious (see, e.g., Enders, 1995).

It is not surprising that past price is important for explaining subsequent prices, since it is well-known that the level of equity prices follows an autoregressive, non-stationary process (e.g., Aggarwal and Kyaw, 2004). When examining the level of share prices with the most recent prior period's price as an additional explanatory variable, we find that there is often a unit root in share prices, thus potentially biasing the most recent prior period price explanatory variable coefficient estimate. The first difference in equity price appears to follow a stationary, non-persistent process, however, as noted by Jeon and Jang (2004). We therefore subsequently use change in equity price as the dependent variable, for econometric reasons, to explore the value relevance of earnings, thus further improving the model specification. When the model specification is improved by utilising change in price as the dependent variable, the results reveal a random walk process, and current trailing earnings play only a weak role in predicting or explaining changes in price.

The following sections are presented as: literature review, Ohlson (1995) value relevance model reformulation, data, statistical results of the time series analysis, and conclusion.

4.2 LITERATURE REVIEW

4.2.1 Ohlson (1995) and the Most Recent Prior Period Equity Price as a Value Relevant Explanatory Variable

Ohlson (1995) relates equity valuation models to the residual income valuation model under the assumption of a clean surplus, i.e., the assumption that change in book value equals earnings less dividends.[3] Kothari (2001) subsequently explores the residual income valuation model as a transformation of the dividend discount model and indicates the fundamental role of earnings information as a determinant of equity prices (see also Frankel and Lee, 1998; and Dechow, Hutton, and Sloan, 1999). Hence, Ohlson (1995) has gained significant credit for revitalizing the residual income valuation model for equity valuation. Ohlson (1995) conceptualises the current equity price as being determined by book value, current earnings, and other information related to future abnormal earnings.

Ohlson's (1995) model can be rearranged to reveal a potentially important role for the most recent prior period's price when explaining the current or future equity price, an explanatory role that is emphasized by Marsh and Merton (1987). Marsh and Merton (1987) demonstrate that past prices are a source of information about permanent earnings in an efficient market. The most recent prior period's price is therefore useful for predicting next period's price, as happens with a random walk model of equity prices. Marsh and Merton (1987) assert that past prices contain more information about future earnings than past earnings provide, so stock prices are predictors of future permanent earnings. As the stock price in an efficient market equals the present value of future permanent earnings, and since permanent earnings are positively related to next period's dividend, current stock price changes can therefore provide information about next period's dividends. Marsh and Merton (1987) show that changes in lagged stock prices are predictors of changes in dividends and, by implication, changes in earnings.

[3] Residual income valuation models explain the equity price as a function of the present value of expected future residual income.

Beaver, Lambert, and Morse (1980) argue that the information contained in past equity prices is important for inferring the earnings process, so equity prices provide a base for predicting earnings. This implies that earnings information is already incorporated in past or current prices, and further highlights the importance of employing the most recent prior period's equity prices as an additional explanatory variable to assess the informativeness of earnings in value relevance models. It will be shown below that the most recent prior period's equity price provides important information in Ohlson's (1995) model, consistent with Marsh and Merton (1987) and Beaver, Lambert, and Morse (1980), once the efficient market and accounting literature is summarised in relation to the Ohlson (1995) value relevance model.

4.2.2 The Market Efficiency Literature and Value Relevance Models

When equity prices reflect all information in markets, Malkiel (2003) indicates that equity prices form a random walk process, since changes in equity prices (beyond a constant proportionate drift) will be random (Fama, 1965 and 1995). Consistent with the efficient market price change process, a random walk process implies that changes of a variable are independent from each other and thus display no memory. Malkiel (2003) therefore indicates that the efficient market model is closely linked with the random walk model, since in an efficient market the rationality of equity prices will lead to a random walk process, and the impact of new information is immediately reflected in equity prices. Prior period's equity prices incorporate value relevant information in an efficient market, so the most recent prior period's equity price is very likely to be an important value relevant variable in value relevance studies.

4.2.3 Earnings-Based Value Relevance Models

Some value relevance investigations focus on earnings, and have devised exclusively earnings-based models for assessing the value relevance of earnings (e.g. Collins, Pincus, and Xie, 1999; Collins, Maydew, and Weiss, 1997). These studies generally find that earnings are value relevant.

Goodwill amortisation can be extracted from earnings and directly examined to determine if it provides additional value relevant information and is informative with respect to future earnings. Studies therefore examine, for example, the value relevance of goodwill amortisation for its additional contribution to explaining equity prices (e.g., Smith, 2003; Jennings, LeClere, and Thompson, 2001). These studies have separated goodwill amortisation from earnings and examine how goodwill amortisation improves the informativeness of earnings. They conclude that goodwill amortisation has no incremental value relevance. These value relevance investigations have examined the value relevance of accounting variables without incorporating the information role of past prices. We revisit the empirical set-up of goodwill amortisation studies in this chapter in order to demonstrate why value relevance studies should contain the most recent prior period's price as an additional explanatory variable, as we explore whether goodwill amortisation provides forward-looking earnings related information.

4.3 OHLSON (1995) VALUE RELEVANCE MODEL REFORMULATION

4.3.1 The Ohlson (1995) Model

As mentioned already, Ohlson (1995) conceptualises how the equity price of a firm can be modelled using the dividend discount model as well as a clean surplus relationship among accounting variables. Ohlson's (1995) model explains the market value of a firm using current abnormal earnings, book value, dividends, and future abnormal earnings, and is thus known as the earnings, book values, and dividends model (Ohlson, 2001).[4]

The Ohlson (1995) model starts with the dividend discount model (equation (A1) on page 666 of Ohlson, 1995):

$$P_t = \sum_{\tau=1}^{\infty} (1+r)^{-\tau} E_t(d_{t+\tau}), \qquad (1)$$

where

t = a particular point in time,

P_t = the end of period equity price,

r = risk free rate of interest,

$E_t(.)$ = expectations operator at time t,

d_t = dividends for period t,

and the clean surplus relation (equation (A2a) on page 666 of Ohlson, 1995),

$$y_{t-1} = y_t + d_t - x_t, \qquad (2)$$

where

y_t = book value of equity at time t

and

x_t = earnings for period t.

From these relationships, Ohlson (1995) derives the reformulated dividend discount model (equation (1) on page 667 of Ohlson, 1995)

$$P_t = y_t + \sum_{\tau=1}^{\infty} (1+r)^{-\tau} E_t(x_{t+\tau}^a) \qquad (3)$$

4 Abnormal earnings, also known as residual income, equal earnings minus a capital contribution, as defined below.

where

$$x_t^a \equiv (x_t - r \cdot y_{t-1}) \qquad (4)$$

represents abnormal earnings for period t. Equation (3) indicates that a firm's future abnormal earnings determine the firm's market value, along with current book value and current abnormal earnings.

Ohlson (1995) considers AR(1) dynamics for abnormal earnings within the earnings, book values, and dividends model. For this, he postulates that next period's future abnormal earnings (x_{t+1}^a) are determined by current abnormal earning and other forward looking earnings related information (v_t). In this context, his assumptions (equations (2a) and (2b) on page 668 of Ohlson, 1995) are given as:

$$x_{t+1}^a = \omega x_t^a + v_t + \varepsilon_{1,t+1} \qquad (5)$$

and

$$v_{t+1} = \gamma v_t + \varepsilon_{2,t+1} \ , \qquad (6)$$

where ω and γ are persistence parameters that are identifiable by market participants. Using the combination of residual income, clean surplus relations among accounting variables, and these assumptions, Ohlson (1995) shows (equation (5) on page 669 of Ohlson, 1995) that

$$P_t = y_t + \alpha_1 x_t^a + \alpha_2 v_t \ , \qquad (7)$$

where

$$\alpha_1 = \left(\frac{\omega}{1 + r - \omega} \right)$$

and

$$\alpha_2 = \left(\frac{1 + r}{(1 + r - \omega)(1 + r - \gamma)} \right).$$

Ohlson (1995) indicates that equation (7) is a simplified form of the primary model (equation (3) above), where v_t is future value relevant information that affects future but not current earnings (i.e., information not related to abnormal earnings at time t).[5] In the simplified model (equation (7)), the closing book value (y_t), current abnormal earnings (x_t^a), and future value relevant earnings information (v_t) explain the time t equity price (P_t). According to Ohlson (2001), the empirical nature of the earnings, book values, and dividends model very much depends on future value relevant earnings related information. He argues that any value relevant variable could represent future earnings related information (v in equation (7)). More importantly, he further argues that eliminating or leaving out appropriate future value relevant earnings related information from the earnings, book values, and dividends model can have a drastic effect (Ohlson, 2001).[6]

Ohlson (1995) notes that considering $v_t = 0$ allows the current share price to be related to current abnormal earnings and book value only (see equation (7)). This simplifying assumption has been used by researchers to implement a simplified version of equation (7) where $v_t = 0$, but can potentially create a missing variable problem when additional information is important for explaining future expected abnormal earnings (i.e. when v_t does not equal zero). To further illustrate this point, consider the price change version of the Ohlson (1995) valuation model, obtained using the period t and period t+1 versions of equation (7), that is outlined at the top of page 683 of Ohlson (1995):

$$P_{t+1} + d_{t+1} - (1+r)P_t = y_{t+1} + d_{t+1} + \alpha_1 x_{t+1}^a + \alpha_2 v_{t+1} - (1+r)(y_t + \alpha_1 x_t^a + \alpha_2 v_t) . \quad (8)$$

[5] Ohlson (1995) does not give specific examples of future earnings related value relevant information, but an example would be research and development expenditures which do not increase current earnings but are expected to increase next period's earnings.

[6] Ohlson (2001) does not give examples of future earnings related value relevant information (see also footnote 4), but implies that it can be inferred from the empirical relationship between current and future earnings (see equation (5)).

Equation (8) simplifies to the price change equation

$$P_{t+1} - P_t = r\,P_t + y_{t+1} - (1+r)y_t + \alpha_1[x^a_{t+1} - (1+r)x^a_t] + \alpha_2[v_{t+1} - (1+r)v_t]. \quad (9)$$

Equations (8) and (9) indicate that the most recent prior period's price (P_t) as well as changes in future earnings related value relevant information ($v_{t+1} - (1+r)v_t$) can play a very important role in the Ohlson (1995) model for explaining price and price changes, so the inclusion of these variables in value relevance studies could be crucial.

4.3.2 The Ohlson (1995) Value Relevance Model Reformulation

To obtain the Ohlson (1995) value relevance model reformulation, equation (9) can be further rearranged to

$$P_{t+1} = (1+r)P_t + y_{t+1} - (1+r)y_t + \alpha_1[x^a_{t+1} - (1+r)x^a_t] + \alpha_2[v_{t+1} - (1+r)v_t]. \quad (10)$$

Equations (9) and (10), derived directly from the Ohlson (1995) model price change equation (page 683 of Ohlson, 1995), reveal an important random walk feature of the Ohlson (1995) model. In particular, the time t+1 price (P_{t+1}) is equal to the future value of the most recent prior period price ($(1+r)P_t$) plus adjustments representing innovations in book value ($y_{t+1} - (1+r)y_t$), innovations in current abnormal earnings ($x_{t+1} - (1+r)\,x_t$), and innovations in future earnings related value relevant information ($v_{t+1} - (1+r)v_t$). The most recent prior period's price is therefore seen to be a crucial component of the Ohlson (1995) model.

To see this even more clearly, book value (y) can be all but eliminated from equation (10) by substituting in the book value identity (2) as well as the abnormal earnings definition (4). The resulting price equation is

$$P_{t+1} = (1+r)P_t - d_{t+1} + (1+\alpha_1)x^a_{t+1} - \alpha_1(1+r)x^a_t + \alpha_2[v_{t+1} - (1+r)v_t]. \quad (11)$$

The random walk characteristic of the Ohlson (1995) model is further revealed, since in equation (11) next period's dividend adjusted price ($P_{t+1} + d_{t+1}$) equals the future value of the current price ($(1+r)P_t$) plus innovations in current abnormal earnings and future earnings related information (x^a and v). As we have already argued, market efficiency implies that the current price (P_t) will incorporate expected future earnings related information. Leaving the most recent prior period's price out of the Ohlson (1995) model in an empirical set-up will therefore be doubly problematic when other future value relevant variables (v) related to future earnings are left out as well, since both important indicators of expected future abnormal earnings are likely to be highly correlated and will be absent from the model (see also Ohlson, 2001). This can give rise to a missing variable problem, and potentially misleading inferences concerning the value relevance role of current trailing earnings (x_t), if current trailing earnings are also correlated with the most recent prior period's price P_t (see, e.g., Wooldridge, 2002).

The random walk characteristic of the Ohlson (1995) model, revealed by equation (11), further implies that price change (or return), not price, should be the dependent variable in time series value relevance studies that use Ohlson (1995), since changes in random walk series are stationary whereas the level of the series is not.[7] This is an especially important consideration when past price is left out of the value relevance model framework, as is usually the case in value relevance studies, since in a random walk price change process the immediate past price is a crucial determinant of the current price. Jeon and Jang (2004) argue that the first differences in equity prices are a stationary, non-persistent process so, for econometric reasons, change in price (or returns), not price, should be the dependent variable in value relevance studies.[8]

[7] Aggarwal and Kyaw (2004) demonstrate, for instance, that the level of equity prices follows an autoregressive, non-stationary process.
[8] The sample period is too short for formal cointegration analysis, but earnings are shown to lose their explanatory power when price change (not price) is the dependent variable, thus indicating that the relationship between earnings and prices is potentially spurious (see, e.g., Enders, 1995).

Rearrangement of equation (11) leads to a simplified version of the Ohlson (1995) price change equation (see page 683 of Ohlson, 1995):

$$P_{t+1} - P_t = r\, P_t - d_{t+1} + (1+\alpha_1)x^a_{t+1} - \alpha_1(1+r)x^a_t + \alpha_2[v_{t+1} - (1+r)v_t]\,. \qquad (12)$$

The most recent prior period's price variable (rP_t) on the right hand side of equation (12) represents the proportionate drift aspect of a random walk price change process and thus represents a potentially important role for past price in the Ohlson (1995) framework even when price change is the dependent variable.

Equations (11) and (12) can be used to derive simplified regression equations for the Ohlson (1995) model that incorporate the potentially important informational role played by the most recent prior period's price (P_t), current trailing earnings (x), and future earnings related information (v) in value relevance studies. Three simplifications are required to make the Ohlson (1995) model equations directly comparable with Jennings, LeClere, and Thompson (2001). First, the level of current trailing earnings (x) and future value relevant information (v) are examined, not innovations in the level (see equations (11) and (12)). Secondly, only information that is already available at time t+1 is utilised in the regression model equations.[9] Thirdly, the current abnormal earnings variable (x^a_t) is simplified to current trailing earnings (x_t), and the regression equations are further simplified by using the ex-dividend share price P_{t+1}, thus deleting the dividend term d_{t+1} from the regression equation.[10] These simplifications of equations (11) and (12) lead to the following regression equations for price P_{t+1} and price change ΔP:

$$P_{t+1} = \beta_0 + \beta_1 P_t + \beta_2 x_t + \beta_3 v_{t+1} + \varepsilon_{t+1} \qquad (13)$$

and

$$\Delta P_{t+1} = \theta_0 + \theta_1 P_t + \theta_2 x_t + \theta_3 v_{t+1} + \varepsilon_{t+1}\ , \qquad (14)$$

[9] In unreported results, we do not make these first two simplifications, and the results remain unchanged.
[10] The dividend term could easily be incorporated in the regression equations.

where β and θ are coefficients of regression equations (13) and (14), respectively. Equations (13) and (14) explore the incremental role of current trailing earnings (x_t) for explaining subsequent share prices and share price changes, respectively, above and beyond the role played by the most recent prior period's share price (P_t) as well as by other forward looking earnings related information (v_{t+1}). This provides a benchmark to evaluate the information dynamics of current trailing earnings information. When the most recent prior period's price P_t and forward looking information v_{t+1} are important and are correlated, their inclusion together can greatly improve the value relevance model regression equation specification (see value relevance regression equations (13) and (14)).

Current trailing earnings (x_t) represent aggregated earnings, but it is also possible to disaggregate the earnings by extracting goodwill amortisation to directly assess the informativeness of goodwill amortisation. Goodwill is the excess amount beyond the stated value of a firm's underlying assets. In other words, goodwill can reflect the value of unidentifiable intangibles within the firm (Jennings, LeClere, and Thompson, 2001). Goodwill amortisation is the amount by which goodwill is reduced each year to represent the declining value of intangible assets in a fiscal period. As we intend to assess the additional informativeness of goodwill amortisation, we consider two measures of current trailing earnings, earnings before goodwill amortisation ($\boldsymbol{X_t}$ =EBG_t) and earnings after goodwill amortisation ($\boldsymbol{X_t}$ =EAG_t), as well as goodwill amortisation per share (v_{t+1} = $GAPS_t$). We employ these earnings variables from Jennings, LeClere, and Thompson (2001) to examine their price value relevance using regression models (13) and (14).

4.3.3 Method

We begin our investigation by first replicating the Jennings, LeClere, and Thompson's (2001) regression models which incorporate various combinations of earnings before and after goodwill amortisation. The Jennings, LeClere, and Thompson's (2001) regression models do not include the most recent prior period's price P_t, but are otherwise similar to or identical to value relevance model regression equation (13) above:

$$P_{t+1} = \beta_0 + \beta_1 \, EBG_t + \varepsilon_{t+1} , \quad (15)$$

$$P_{t+1} = \beta_0 + \beta_1 \, EBG_t + \beta_2 \, GAPS_t + \varepsilon_{t+1} , \quad (16)$$

and

$$P_{t+1} = \beta_0 + \beta_1 \, EAG_t + \varepsilon_{t+1} , \quad (17)$$

where

P_{t+1} = next period's end of quarter price,

β_0 = intercept of the model,

β_1 = coefficient estimate of earnings,

β_2 = coefficient estimate of goodwill amortization per share (GAPS),

EBG_t = annual trailing earnings per share before GAPS for period t,

$GAPS_t$ = goodwill amortization per share for period t,

EAG_t = annual trailing earnings per share after GAPS for period t,

and

ε_{t+1} = error term.

Regression models (15) to (17) explore the value relevance relationships between current trailing earnings and subsequent equity prices. Firms cannot disclose accounting information immediately at fiscal year end, so three months duration is assumed to be the information delay required for the release of a firm's annual financial statements, as assumed in many studies (e.g., Jennings, LeClere, and Thompson, 2001; Collins, Maydew, and Weiss, 1997), thus explaining why the time t+1 share price is explained by time t trailing earnings information. Trailing twelve months earnings are used in regression equations (15) to (17), as is standard, to avoid the problem of quarterly earnings seasonality. Jennings, LeClere, and Thompson (2001) examine the value relevance of goodwill amortisation for explaining next period's equity prices in a pooled cross-section. We reproduce their findings within a time series relationship.

The second step to implement regression equations (13) and (14), derived from Ohlson (1995), is to incorporate the most recent prior period's equity price as an additional value relevance model explanatory variable. Thus, we utilize value relevance regression equation (13) to accommodate the most recent prior period's equity price P_t as an incremental explanatory variable by adding it to regression equations (15), (16), and (17) to obtain regression equations (18) to (20). We also utilize value relevance regression equation (14) to modify regression equations (18) to (20) so that they contain price change as the dependent variable in regression equations (21) to (23). The resulting regression equations are as follows:

$$P_{t+1} = \beta_0 + \beta_1 \, EBG_t + \beta_3 \, P_t + \varepsilon_{t+1} , \qquad (18)$$

$$P_{t+1} = \beta_0 + \beta_1 \, EBG_t + \beta_2 \, GAPS_t + \beta_3 \, P_t + \varepsilon_{t+1} , \qquad (19)$$

$$P_{t+1} = \beta_0 + \beta_1 \, EAG_t + \beta_3 \, P_t + \varepsilon_{t+1} , \qquad (20)$$

where

P_t = equity price at time t

and

β_3 = estimate of the time t equity price coefficient,

$$\Delta P_{t+1} = \beta_0 + \beta_1 \, EBG_t + \beta_3 \, P_t + \varepsilon_{t+1} , \qquad (21)$$

$$\Delta P_{t+1} = \beta_0 + \beta_1 \, EBG_t + \beta_2 \, GAPS_t + \beta_3 \, P_t + \varepsilon_{t+1} , \qquad (22)$$

and

$$\Delta P_{t+1} = \beta_0 + \beta_1 \, EAG_t + \beta_3 \, P_t + \varepsilon_{t+1} , \qquad (23)$$

where

ΔP_{t+1} = change in equity price (i.e., $P_{t+1} - P_t$).

A three month change in price is utilised in the regression analysis so that the results of regression equations (21) to (23) can be directly compared to the results of regression equations (18) to (20) and (15) to (17).[11]

4.3.4 Regression Model Estimation

Time series estimation of regression models (15) to (23) is conducted using Ordinary Least Squares (OLS) estimation. The time series standard error estimates are based on Newey-West heteroskedasticity and autocorrelation consistent standard errors to overcome the problem of non-constant variance and autocorrelation of error terms, a problem that is especially important in regression equations (15) to (20) where the share price dependent variable (P_{t+1}) will be highly persistent. We also obtain coefficient estimates using fixed time effects, fixed firm effects, and pooled estimation.[12] These latter (non-time series) coefficient standard error estimates are based on White's heteroskedasticity-consistent standard errors to overcome the problem of non-constant variance of the cross-sectional error terms. For comparison purposes with Jennings, LeClere, and Thompson (2001), each estimated regression equation is assessed using

[11] We also check the sensitivity of the results to the use of a 12-month (instead of a three month) price change dependent variable in regression equations (21) to (23), and the results remain unchanged.

[12] The pooled samples do not contain the same number of observations each year because of missing observations in some of the firm time series. Details for the fixed effect coefficient estimation are provided in the results tables.

adjusted R^2, in addition to assessing the statistical significance of the coefficient estimates. [Note, however, that Brown, Lo, and Lys (1999) indicate that adjusted R^2 is not an appropriate measure for assessing the explanatory power of value relevance regression models, due to scale effects whereby the scale (or size) of dependent and independent variables in value relevance studies affects the apparent explanatory power of the models.]

4.4 DATA

The data set is obtained from the United States COMPUSTAT database. The data set consists of quarterly equity price data (DATA14) and annual earnings-based data. The annual variables are earnings per share before extraordinary items (DATA58), intangible assets (DATA33), amortisation of intangibles (DATA65), goodwill (DATA204), amortisation of goodwill (DATA394), and number of common shares outstanding (DATA25).

The earnings per share data have been manipulated to satisfy the data requirements for our study, as in Jennings, LeClere, and Thompson (2001). Firstly, goodwill amortisation is estimated when it is not directly reported.[13] Goodwill amortisation per share (GAPS) is determined as goodwill amortisation (DATA394) divided by shares outstanding (DATA25).[14] Earnings per share are then adjusted to

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[13] The Financial accounting Standard Board has implemented two new accounting standards for goodwill accounting (SFAS 141: Business Combination, and SFAS 142: Goodwill and Other Intangible Assets) effective from financial year 2002. Under the new standards, firms no longer account for goodwill amortisation in their financial statements. Firms are allowed, however, to provide goodwill amortisation information separately with other financial information.

[14] Goodwill amortisation is estimated in accordance with the method devised by Jennings, LeClere, and Thompson (2001): (1) directly reported amortisation of goodwill (GWA) is directly used. Otherwise, (2) if current year goodwill (GW) equals current year intangible assets (IA) then the amortisation of goodwill (GWA) equals amortisation of intangibles (IAA), i.e., if GW=IA then GWA = IAA; (3) if GW≥0, IAA≥0, and IA=0 or missing (“ ”), then GWA = IAA; (4) if GW>0.9*IA (i.e., >90% of GW), then GWA =

obtain earnings per share before goodwill amortisation (EBG) and earnings per share after goodwill amortisation (EAG).[15] The quarterly and annual datasets are merged based on classifications common to both datasets.

Our study examines a 16 year period, 1988 to 2003, when goodwill amortization was potentially reported.[16] To conduct the time series analysis, sample firms must report earnings for a minimum of 12 years as well as have positive estimated goodwill amortisation for a minimum of nine years, thus avoiding domination by zero goodwill amortisation values. In the sample period 374 firms report earnings for at least 12 (75%) of the 16 years, and 58 of these 374 firms have positive estimated goodwill amortisation for at least nine years. A choice is made to analyse a randomly selected sample rather than the entire 58 firms. We therefore randomly select 20 firms (out of the 58 firms with sufficient data) to illustrate the benefit of including the most recent prior period's equity price in the time series analysis.[17] The full names of the firms are provided in Panel A of Table 4.1, along with the symbol used to designate the firms in the results tables. Summary statistics for the data set as well as a correlation table for the data set variables are provided in Table 4.1. The pooled descriptive measures and percentile measures for market equity value (MEV) are also reported to indicate that the company time series sample represents random sampling of both small and large firms (see Panels B and C

(IAA*GW)/IA; and (5) if GW<0.9*IA and 0.9*GWL<GW<GWL, then GWA = GWL-GW, where GWL = last (previous) year goodwill.

[15] Because of new accounting rules (SFAS 141: Business Combination, and SFAS 142: Goodwill and Other Intangible Assets) introduced by the Financial Accounting Standards Board (FASB), DATA58 (EPS – earnings per share) is reported in COMPUSTAT in two ways: before 2002 as after goodwill amortisation, and from 2002 as before goodwill amortisation. For the years 2002 onwards, we then adjust DATA58 (earnings per share) to include goodwill amortisation in order to obtain earnings after goodwill amortisation (EAG). For the years before 2002, DATA58 is adjusted to exclude goodwill amortisation in order to determine earnings before goodwill amortisation (EBG).

[16] Goodwill amortization is no longer reported in COMPUSTAT from 2004 onwards, so 2003 is the endpoint of the data sample.

[17] We do not restrict the analysis to certain industries since, unlike in other corporate finance studies, there is no a priori reason why the relationship between share price (or price change), earnings, and goodwill amortisation should differ between industries, and even if it did then the fixed firm effect estimation would account for this.

of Table 4.1). Panel D of Table 4.1 reveals that the most recent prior period's equity price (P_t) is highly correlated with current trailing earnings per share (EBG or EAG), thus revealing that current trailing earnings could act as a proxy for the most recent prior period's price if the prior period's price is not included in value relevance regression analysis.[18]

[Please insert Table 4.1 about here.]

4.5 STATISTICAL RESULTS FOR THE TIME SERIES ANALYSIS

4.5.1 Replicating the Jennings, LeClere, and Thompson (2001) Study Using Time Series Analysis

Results for regression equations (15) to (17) are reported in Tables 4.2 to 4.4 for each firm as well as the pooled, fixed year, and fixed firm effect samples to replicate the Jennings, LeClere, and Thompson (2001) study using time series analysis.[19] The results fairly closely replicate the Jennings, LeClere, and Thompson (2001) cross sectional results. The adjusted R^2s for the pooled estimation in Tables 4.2 to 4.4 are very close to Jennings, LeClere, and Thompson (2001), as are the *t*-statistics for the trailing earnings coefficient estimates, but the time series R^2 and *t*-statistics are slightly lower on average (as could be expected when analysing individual, potentially idiosyncratic, company share price time series).[20] The similarity of the pooled results with the Jennings, LeClere, and Thompson (2001) results indicate that subsequent findings in this study

[18] A missing variable effect can occur when an important regression variable is not included in the regression model, but is correlated with an included explanatory variable.
[19] Note that fixed firm effect estimation controls for size effects; firm size is a frequent control variable in corporate finance studies, but we do not control for firm size in the regression analysis so that the results can be directly compared to Jennings, LeClere, and Thompson (2001).
[20] For Tables 4.2 to 4.4, three of the firms (FAJ, SON, and PFE) have time series adjusted R^2 values that are close zero, thus bringing the average down (e.g., when compared to Jennings, LeClere, and Thompson (2001)), but for the rest of the firms the adjusted R^2 values range from 0.259 (for the firm BBA in Table 4.2) to 0.879 (for the firm HCSG in Table 4.3).

are not likely to be due to differences in the time series sample used in this study versus the Jennings, LeClere, and Thompson (2001) cross-sectional sample.

[Please insert Tables 4.2 to 4.4 about here.]

The regression results for the earnings before goodwill amortisation (EBG) measure in Table 4.2 and the earnings after goodwill amortisation measure (EAG) in Table 4.4 are roughly similar. Even though goodwill amortization per share (GAPS) is added as an extra explanatory variable in Table 4.3, the inclusion of goodwill amortisation does not increase the explanatory power of the model (compare Tables 4.3 and 4.2). The reported *t*-statistics and the respective p-values of the coefficient estimates indicate that about 80% of the time series sample firms' earnings coefficient estimates are significant at the 5% level (see rows THO to PFE in Tables 4.2 and 4.4).

The Table 4.2 to 4.4 results are consistent with Jennings, LeClere, and Thompson (2001), even though Jennings, LeClere, and Thompson (2001) consider a six year period (1993-1998) in cross section, whereas we focus on a time series analysis of twenty sample firms using a much longer time period (1988 to 2003). Our study considers not only a longer period (16 years), but also years before 1993 as well as after 1998, the endpoints of the Jennings, LeClere, and Thompson (2001) sample period.

The Table 4.2 to 4.4 results lead to the conclusion that goodwill amortisation does not contribute to an accounting difference between earnings before goodwill amortization (EBG) and earnings after goodwill amortisation (EAG). Jennings, LeClere, and Thompson (2001) interpret this as indicating that goodwill amortisation is a noisy measure of goodwill impairment, and support the changes made by the Financial Accounting Standard Board (FASB) for accounting of goodwill, SFAS 141 (Business

Combinations) and SFAS 142 (Goodwill and Other Intangible Assets).[21] We will provide a different interpretation, that current trailing earnings itself is not very informative relative to the most recent prior period's price, when we incorporate the most recent prior period's price in the regression model or utilize change in price as the value relevant dependent variable (see Tables 4.5 to 4.13), as indicated below.

4.5.2 Value Relevance Regression Model Results with Price as the Dependent Variable

The value relevance regression model results for price as the dependent variable, regression equations (18), (19), and (20), reveal that the introduction of the most recent prior period's equity price P_t as an additional explanatory variable greatly increases the adjusted R^2 values of the models (see Tables 4.5 to 4.7). More importantly, the results also indicate that the earnings related accounting variables do not tend to explain next period's price when the most recent prior period's equity price P_t is included as an explanatory variable in the regression model. The increase in the explanatory power that is obtained using regression equations (18) to (20) is as predicted, since using an autoregressive rather than a non-autoregressive regression equation is important when modeling highly persistent processes like the level of the share price. The non-significance of the earnings coefficient estimates in Tables 4.5 to 4.7 indicates that the exclusion of the most recent prior period's price in value relevance studies can lead to a potential missing variable problem, since current trailing earnings appear to be a

[21] Many studies question the compatibility of accounting principles with the concept of goodwill amortisation (e.g., Smith, 2003; Jennings, LeClere, and Thompson, 2001; Jennings, Robinson, Thompson, Duall, 1996; Duvall, Jennings, Robnson, and Thompson, 1992). Due to dissatisfaction with systematic goodwill amortisation (APB 16, Business Combinations, and APB 17, Intangible Assets), the Financial Accounting Standard Board has superseded APB 16 and APB 17 with new rules (SFAS 141 and SFAS 142 respectively). The new rules state that, from 2002 onwards, firms no longer account for goodwill amortisation in their financial statements, but can report it separately.

spurious proxy for past price in the regression model (compare Tables 4.2 to 4.4 with Tables 4.5 to 4.7).

[Please insert Tables 4.5 to 4.7 about here.]

To illustrate the increase in adjusted R^2 obtained by introducing the most recent prior period's equity price P_t as an additional explanatory variable, it can be noted that the pooled and fixed effect adjusted R^2s have all increased to a minimum of 0.946 in Tables 4.5 to 4.7 from a maximum of 0.797 in Tables 4.2 to 4.4. For time series comparisons, recall that three of the firms in Tables 4.2 to 4.4 have time series adjusted R^2 values close to zero, and the rest of the firms have adjusted R^2 values that range from 0.259 (for the firm BBA in Table 4.2) to 0.879 (for the firm HCSG in Table 4.3). There are no longer any time series model adjusted R^2s close to zero in Tables 4.5 to 4.7 (the minimum is now 0.552 in Table 4.6), and the average is now 0.756, much higher than in Jennings, LeClere, and Thompson (2001). All these results indicate that the inclusion of the most recent prior period's price P_t is highly value relevant, as predicted by the Ohlson (1995) model reformulation (see the discussion of equations (10) and (11)), and it greatly increases the explanatory power of the value relevance regression model.

The pooled and fixed effect coefficient estimate *t*-statistics are also much higher for the most recent prior period's price P_t than for the current trailing earnings and goodwill explanatory variables (EBG and EAG). The minimum *t*-statistic for the most recent period's price coefficient is 12.772 in the value relevance models (see the fixed firm row in Table 4.6) whereas the maximum *t*-statistic for any of the earnings explanatory variable coefficients is now 1.671 (see the fixed firm row in Table 4.5). In the pooled and fixed effect regressions, the earnings regression coefficient estimates are all no longer significant. In the time series regression analysis, the results for 90% of the sample firms indicate that the firms' current trailing earnings information has already been incorporated into the most recent prior period's equity price. Trailing earnings information thus does not appear to provide information to investors beyond what is already incorporated in the most recent prior period's price. The Table 4.5 to 4.7 results are therefore consistent with Marsh and Merton (1987), Ohlson (1995, 2001), and Beaver, Lambert, and Morse (1980), and indicate that the most recent prior period's equity price of a firm has already incorporated the firm's contemporaneous accounting information. The results are consistent with the earnings announcement event study literature which demonstrates that equity prices react to the unexpected components of earnings announcements, not the earnings level itself, since the expected level of earnings is already incorporated into the most recent equity price prior to the earnings announcement (see also footnote 17). The Table 4.5 to 4.7 results are also consistent with a random walk price change process, since the most recent period's price explains the subsequent price.

We have thus demonstrated that a missing variable effect is possible when the most recent prior period's price is missing from the regression analysis and is highly correlated with earnings, since misleading inference regarding the earnings regression coefficients appears to have occurred when the most recent prior period's price is not present in the regression model (see, e.g., Wooldridge, 2002). Earnings and equity prices are both non-stationary, so they move together over time, thus potentially creating a spuriously significant statistical relationship between current trailing earnings and next period's price when a non-autoregressive empirical model is used to explain prices.[22] Further, it can be noted from the Table 4.5 to 4.7 results that there is a unit root for prices in many of the time series regressions, since many of the past price coefficient estimates are close to one. In this situation, the most recent prior period price coefficient estimate is biased downwards (see Enders, 1995, page 213), thus suggesting that price change should be used as the dependent variable in value relevance studies. For both these econometric reasons we therefore subsequently use change in equity price as the dependent variable to explore the value relevance of current trailing earnings, thus further improving the value relevance model regression equation specification to avoid potentially spurious results.

Before moving on to explore value relevance regression model results with price change as the dependent variable, however, it is important to interpret the Table 4.5 to 4.7 results in relation to the regression scale effect literature (see Brown, Lo, and Lys, 1999). Brown, Lo, and Lys (1999) indicate that there is an increase in R^2s due to scale effects when levels regressions are performed. Thus, an equity price – accounting variable relationship, based on a higher R^2 value, is unreliable. They document that value relevance of accounting variables is a result of a scale effect, when levels variables are modelled. Because of this scale effect in levels variables in regression models, Brown, Lo, and Lys (1999) suggest that a proxy variable should be incorporated in regression models to control the scale effect. They indicate that there is only a weak relationship between equity price and accounting variables (particularly current trailing earnings and book value of equity) when controlling for the scale effect in levels variables regression models. The Table 4.5 to 4.7 results are consistent with the Brown, Lo, and Lys (1999) results, since the most recent prior period's price is an

[22] Earnings and prices could still be cointegrated, but prices would lead earnings, whereas earnings changes do not explain concurrent or subsequent price changes.

appropriate control variable for scale effects (see Brown, Lo, and Lys, 1999). When the most recent prior period's price is included as an additional explanatory variable then current trailing earnings are no longer value relevant (see Tables 4.5 to 4.7). Employing change in equity price as the value relevance study dependent variable is an even better control for scale effects (see Brown, Lo, and Lys, 1999), thus further justifying the use of price change (not price) in value relevance studies, as outlined below.

4.5.3 Value Relevance Regression Model Results with Price Change as the Dependent Variable

The pooled and time series results for the value relevance regression models where price change is the dependent variable, regression equations (21) to (23), indicate that current trailing earnings and goodwill amortisation explanatory variables do not explain or forecast subsequent three month price changes (see Tables 4.8 to 4.10).[23] The pooled and fixed firm effect adjusted R^2s in Tables 4.8 to 4.10 are all 1% or less (effectively zero), for instance, and although the fixed year effect adjusted R^2 is somewhat higher (0.099 in the fixed year row in Table 4.8, for instance), almost all of the explanatory power is due to the fixed year effects. All of the pooled and fixed firm or fixed year effect regression coefficients in Tables 4.8 to 4.10 are insignificantly different from zero, thus indicating a random walk of equity prices (for example, the *t*-statistics for the estimated accounting variable coefficients range from 0.029 in the fixed year row of Table 4.9 to 1.671 for the fixed firm row of Table 4.8).

[Please insert Table 4.8 to 4.10 about here.]

[23] Sensitivity analysis, reported in Appendices A and B (Tables 4.14 to 4.19), indicates the results remain unchanged when a 12 month rather than a three month change in price is employed as the dependent variable in regression equations (21) to (23).

Consistently, the time series regression coefficient results in Tables 4.8 to 4.10 also indicate that, for most firms, there is a random walk of equity prices. Only four firms reveal significant earnings coefficient estimates at the 5% level in any of the three tables (see the rows for COA, HCT, TBL, and SON in Tables 4.8 and 4.10, and HCT, TBL, and SON in Table 4.9). The goodwill amortisation per share (GAPS) coefficient estimates also indicate non-random walk behaviour for three firms (see the rows of MAS, ALOG, and SON in Table 4.9). The most recent prior period's price coefficient estimate is significant for five firms only (see the rows of COA, HCT, TBL, ALOG and DOW in Tables 4.8 and 4.10 and HCT, TBL, and DOW in Table 4.9). However, only three firms consistently reveal a non-random walk price process in all three tables (see the rows for HCT, TBL, and DOW in Tables 4.8 to 4.10), whereas the other firms reveal mixed (inconsistent) results. No additional information appears to be provided by current trailing earnings, since almost all of the estimated time series coefficients are insignificant at the 5% significance level, a result that is consistent with our earlier results (see Tables 4.8 to 4.10 and compare them to Tables 4.5 to 4.7, respectively).

The adjusted R^2s and estimated regression coefficients of the models imply that no significant relationship exists between next period's price change and the independent explanatory variables (the most recent prior period's equity price and the current trailing earnings explanatory variables). The results are similar when earnings before goodwill amortization (EBG in equation (21)) and earnings after goodwill amortisation (EAG in equation (23)) are used in the models (see Tables 4.8 and 4.10). Overall, the results indicate no role for current trailing earnings information and only a very limited role (if any) for the most recent prior period's price when explaining or predicting subsequent price changes. This implies that neither measure of current trailing earnings is informative, a conclusion that is sharply different from Jennings, LeClere, and Thompson (2001), and is due to improved implementation of regression analysis tests using the Ohlson (1995) value relevance model.

Also of note are the sharply lower adjusted R^2s (effectively zero) that are reported when the non-persistent price change dependent variable, rather than the persistent price level dependent variable, is used in the regression analysis (compare Tables 4.8 to 4.10 with Tables 4.2 to 4.7). This indicates, as already noted, that value relevance studies that have price as the dependent variable but do not include the most recent prior period's price as an explanatory variable are potentially subject to spurious results (see, e.g., Enders, 1995). The sharp decrease in the adjusted R^2 in the time series analysis due to switching from price to price change as the dependent variable is due to non-stationarity of equity prices in the time series analysis. The lower adjusted R^2 indicates that price change, not price, should be used as the dependent variable in value relevance studies, due to the effect of non-stationarity and the extreme persistence of the price process. When price change is the dependent variable, it is equivalent to having the most recent prior period's equity price as an additional explanatory variable, since subtracting the most recent prior period's price P_t from the left hand side of the regression equation (in regression equations (21) to (23)) is equivalent to adding it to the right hand side (as in regression equations (18) to (20)). Further, having price change rather than price as the dependent variable also avoids the spurious regression statistical problems caused by non-stationarity and autocorrelation.

For completeness, Tables 4.11 to 4.13 provide results for value relevance regression tests with price change as the dependent variable but without the most recent prior period's price as an explanatory variable. The results are roughly the same as in

Tables 4.8 to 4.10, and further indicate, in the pooled regressions and the vast majority of the individual firm time series regressions, that trailing earnings (EBG and EAG) do not explain price changes in value relevance studies. There is, however, one difference that is made by excluding versus including the most recent prior period's price as an explanatory variable in the price change regression models. Virtually no coefficient estimates are significant when only earnings variables are included in the regression model (see Tables 4.11 to 4.13) but, as noted already, the most recent prior period's price is sometimes significant in the time series regressions when it is included as an additional explanatory variable (see Tables 4.8 to 4.10). This further indicates that contemporaneous trailing earnings variables are unlikely to provide useful information in value relevance studies.

[Please insert Table 4.11 to 4.13 about here.]

4.6 CONCLUSION

We demonstrate that the Ohlson (1995) model directly incorporates the most recent prior period's price as a potentially important value relevance explanatory variable. Market efficiency considerations imply that equity prices provide investors with immediately available information, whereas end of period earnings are disclosed with a time lag. Equity prices can therefore provide investors with crucial and timely financial information with regard to a firm's future prospects, relative to current trailing earnings information. Our results show that the most recent prior period's equity price appears to efficiently incorporate current information regarding a firm's current and expected future earnings.

Our results highlight the benchmarking role of the most recent prior period's equity price for assessing the informativeness of current trailing earnings in value relevance models. The results are consistent with a random walk process of equity prices, and indicate that the ability of current trailing earnings to explain next period's price beyond the most recent prior period's equity price appears to be limited. This implies that current trailing earnings can act as a spurious proxy for the most recent prior period price if value relevance regression models attempt to explore the value relevance of earnings without incorporating the most recent prior period's price as an additional explanatory variable.

We further demonstrate that a value relevance model with price change as the dependent variable provides an improved regression model specification compared to a value relevance regression model that utilises the price level as the dependent variable. The benefits of using price change as the dependent variable in value relevance models can be attributed to price changes, but not the price level, following a stationary, non-persistent price process, thus reducing the possibility of spurious regression in the time series analysis.

Finally, the time series results indicate, overall, that current trailing earnings measures do not provide additional information, beyond the information already incorporated in the most recent prior period's equity price. The following chapter explores whether the same results are obtained using cross-sectional regression analysis.

Table 4.1
Descriptive Statistics

Panel A provide names of sample firms and Panel B provides summary statistics and percentiles of market equity value (MEV = market equity value per share multiplied by the number of shares outstanding at fiscal year end). Panel C provides summary statistics for the study's variables. P_{t+1} indicates next fiscal period's first quarter end equity price, P_t is price at time t, GWA is the goodwill amortization that is either directly reported or estimated, EAG is earnings after GWA per share, EBG is earnings before GWA per share, GAPS is GWA per share, and ΔP_{t+1} is change in price per share (P_{t+1} - P_t). The sample period is 1989-2004 for P_{t+1} and ΔP_{t+1} and 1988-2003 for the other variables. Panel D provides Pearson's correlation coefficient estimates for the study's variables on a per share basis.

Panel A: The sample 20 firms considered in analyses

	Symbol	Firm		Symbol	Firm
1.	THO	Thor Industries Inc.	11.	EFX	Equifax Inc.
2.	BBA	BBA Aviation ORD	12.	MAS	Masco Corp.
3.	HRB	H&R Block, Inc.	13.	FAJ	Frontier Adjusters of Amer.
4.	LAF	Lafarge North America Inc.	14.	TBL	Timberland Co.
5.	JCI	Johnson Controls Inc.	15.	ALOG	Analogic Corporation
6.	COA	Coachmen Industries Inc.	16.	SON	Sonoco Products Co.
7.	ALN	Allen Telecom Inc.	17.	ASAL	ASA International Ltd.
8.	HCSG	Healthcare Services Group Inc.	18.	SEH	Spartech Corp.
9.	GCI	Gannett Co., Inc.	19.	DOW	Dow Chemical Co.
10.	HCT	Hector Communications Corp.	20.	PFE	Pfizer Inc

Panel B: Percentiles of the market value of common equity (MEV) for the 20 sample firms

MEV	Mean	Minimum	Maximum	Percentile 5	10	25	50	75	90	95
in m$	7742.08	4.343	290444	9.983	14.263	119.628	663.355	3737.15	15805.03	23366.11

Panel C: Summary Statistics for the pooled data for the 20 sample firms

Measure	P_{t+1}	P_t	GWA (in m$)	EAG	EBG	GAPS	ΔP_{t+1}	MEV (in m$)
Mean	29.374	28.84732	18.86545	1.716981	1.870887	0.153902	0.526679	7742.078
Median	24.25	23.5	2.39	1.31	1.44	0.07	0.25	663.3552
Std. Deviation	23.82817	23.17136	35.47568	1.631942	1.734227	0.204553	5.50544	29733.23
Coeff. of Var.	0.811199	0.803241	1.880458	0.950472	0.926954	1.329116	10.45312	3.840472
Minimum	0.09	0.09	0	-0.21	0.005163	0	-19.62	4.343
Maximum	138.75	133.62	233.98	12.82	13.05	0.96	26.25	290444
Number of observations	**265**	**265**	**265**	**265**	**265**	**265**	**265**	**265**

Panel D: Pearson's correlation coefficient for the variables in regression equations (15) to (23) on a per share basis

Variable	P_{t+1}	P_t	EAG	EBG	GAPS	ΔP_{t+1}
P_{t+1}	1					
P_t	0.9729426	1				
EAG	0.7679966	0.769789	1			
EBG	0.7726052	0.774281	0.994415	1		
GAPS	0.4211166	0.420915	0.450835	0.542515	1	
ΔP_{t+1}	0.2331817	0.002195	0.084079	0.085119	0.051087	1

Table 4.2
Time series regression of next period's price (P_{t+1}) on earnings before goodwill amortisation (EBG)

This table provides the estimates of the intercept (β_0) and the coefficient (β_1) of fiscal year end earnings before goodwill amortization (EBG) in explaining the share price P_{t+1}, where P_{t+1} indicates next fiscal period's first quarter end equity price. The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using Newey-West heteroskedasticity autocorrelation consistent standard errors and covariance when the regression coefficients are estimated using time series analysis, whereas the *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled regression analysis. The intercepts of fixed year and firm effects are the averages of the coefficient values for each year and firm respectively. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance. Firms' names are provided in Table 4.1 Panel A.

$$P_{t+1} = \beta_0 + \beta_1\, EBG_t + \varepsilon_{t+1} \qquad (15)$$

Firm	β_0		β_1		Adjusted R^2	Sample
Pooled	9.51351	***	10.61555	***	0.595386	265
	5.355101		10.5331			
Fixed	8.893536		10.84303	***	0.603763	265
Year	2.524985		11.58829			
Fixed	15.74339	*	6.999829	***	0.791972	265
Firm	4.672991		6.070064			
1. THO	7.129234		8.197374	**	0.371551	12
	1.143311		2.351069			
2. BBA	5.300659		19.41249	**	0.258772	12
	1.368325		2.536128			
3. HRB	24.90142	**	8.466533	**	0.292813	12
	3.877991		2.41566			
4. LAF	14.29331	***	4.369043	**	0.313374	13
	4.624661		3.596642			
5. JCI	5.163831		10.5122	***	0.728098	14
	0.625895		5.041247			
6. COA	9.559683	***	5.593988	***	0.446837	12
	6.403744		6.314217			
7. ALN	6.774751	**	12.4183	**	0.647016	12
	2.587218		4.422054			
8.HCSG	-6.53324	**	25.01679	***	0.832534	14
	-2.73692		7.175714			
9. GCI	10.2743		14.02069	***	0.630909	14
	1.109395		6.21185			
10. HCT	6.777899	***	2.36362	***	0.518782	12
	16.04648		4.94467			
11. EFX	10.73685	**	11.69444	**	0.426733	15
	2.796452		3.814528			
12. MAS	9.850317		12.51493		0.334379	14
	0.80942		1.544528			
13. FAJ	1.91587	**	3.963115		0.017235	13
	3.669752		1.533913			
14. TBL	6.716373		12.92651	***	0.863967	14
	1.539673		8.115581			
15. ALOG	10.74114		10.48092	**	0.396516	13
	1.39698		2.821581			
16. SON	29.21607	**	0.139149		-0.0713	16
	4.035999		0.030727			
17. ASAL	0.988433	**	3.247117	**	0.460116	12
	2.739738		4.022003			
18. SEH	-3.13413		13.93775	***	0.494269	13
	-1.04047		7.169742			
19. DOW	46.25047	***	4.466674	**	0.318422	13
	5.740839		2.678044			
20. PFE	51.79621	**	6.647509		0.029426	15
	2.645493		1.310171			
Average	**12.43597**		**9.519457**		**0.415523**	
Measure	**2.969198**		**3.902503**			

Table 4.3
Time series regression of next period's price (P_{t+1}) on earnings before goodwill amortisation (EBG) and goodwill amortisation per share (GAPS)

The table provides the estimate of intercepts (β_0), and coefficients (β_1 and β_2) of fiscal year end earnings before goodwill amortisation (EBG) and goodwill amortisation per share (GAPS), respectively, in explaining the share price P_{t+1}, where P_{t+1} indicates next fiscal period's first quarter end equity price. The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using Newey-West heteroskedasticity autocorrelation consistent standard errors and covariance when the regression coefficients are estimated using time series analysis, whereas the *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled regression analysis. The intercepts of fixed year and firm effects are the averages of the coefficient values for each year and firm respectively. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance. Firms' names are provided in Table 4.1 Panel A.

$$P_{t+1} = \beta_0 + \beta_1\, EBG_t + \beta_2\, GAPS_t + \varepsilon_{t+1} \qquad (16)$$

Firm	β_0	β_1	β_2	Adjusted R^2	Sample
Pooled	9.502413 ***	10.59477 ***	0.324629	0.593847	265
	5.69222	7.86714	0.043523		
Fixed	8.934423	10.97116 ***	-1.93391	0.602356	265
Year	2.549262	8.61041	-0.26401		
Fixed	13.63064 **	6.711919 ***	17.39313 **	0.797367	265
Firm	4.263052	6.28906	2.717013		
1. THO	6.775442	8.116779 **	9.008012	0.306038	12
	1.026317	2.29803	0.44043		
2. BBA	3.774416	28.31905 *	-940.039	0.248151	12
	1.068023	2.131386	-1.13457		
3. HRB	25.07323 **	7.078005	21.11482	0.234567	12
	3.835466	1.42559	0.644533		
4. LAF	14.90666 ***	3.118387	18.86053	0.263965	13
	5.592134	1.08896	0.411563		
5. JCI	5.413225	10.56879 ***	-0.69184	0.703414	14
	0.513331	5.288346	-0.05597		
6. COA	10.08117 **	5.509147 ***	-43.5439	0.39378	12
	4.651699	5.376543	-0.66119		
7. ALN	3.249257	14.54242 **	14.51888	0.62365	12
	0.561767	3.078617	0.805099		
8.HCSG	-2.91308	18.58017 ***	25.95363 **	0.878925	14
	-1.38016	6.39449	3.006145		
9. GCI	9.676228	14.48776 ***	-2.45406	0.597757	14
	0.998227	5.196619	-0.19593		
10. HCT	6.749307 ***	2.09966 **	1.112541	0.470146	12
	18.7682	3.365118	0.356389		
11. EFX	10.41862 **	12.36458 **	-5.31438	0.380876	15
	2.307188	2.566713	-0.26015		
12. MAS	-7.84557	13.64126 **	94.57144 **	0.497245	14
	-0.85492	2.294853	3.800127		
13. FAJ	2.096672 **	3.939842	-218.799	0.054705	13
	3.960571	1.334326	-0.81911		
14. TBL	6.118573	12.71776 ***	14.5218	0.852653	14
	1.188734	7.199019	0.262533		
15. ALOG	17.03404 *	9.583244 **	-470.706 *	0.494196	13
	1.962739	2.802467	-2.07983		
16. SON	30.04127 **	0.088816	-7.15991	-0.151523	16
	3.747323	0.019002	-0.1901		
17. ASAL	1.050084 **	3.49754 **	-1.01493	0.423106	12
	2.628067	3.3442	-1.3157		
18. SEH	-3.26998	14.52458 **	-4.19033	0.444689	13
	-0.89005	2.28215	-0.10808		
19. DOW	14.4716	6.270763 **	55.41166	0.440035	13
	0.679042	2.96764	1.558069		
20. PFE	49.36525 **	-0.74259	450.576 *	0.079406	15
	2.782945	-0.12275	2.05214		
Average	**10.11332**	**9.415298**	**-49.4132**	**0.411789**	
Measure	**2.657332**	**3.016566**	**0.32582**		

Table 4.4
Time series regression of next period's price (P_{t+1}) on earnings after goodwill amortisation (EAG)

This table provides the estimates of the intercept (β_0) and the coefficient (β_1) of fiscal year end earnings after goodwill amortization (EAG) in explaining the share price P_{t+1}, where P_{t+1} indicates next fiscal period's first quarter end equity price. The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using Newey-West heteroskedasticity autocorrelation consistent standard errors and covariance when the regression coefficients are estimated using time series analysis, whereas the *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled regression analysis. The intercepts of fixed year and firm effects are the averages of the coefficient values for each year and firm respectively. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance. Firms' names are provided in Table 4.1 Panel A.

$$P_{t+1} = \beta_0 + \beta_1 \, EAG_t + \varepsilon_{t+1} \qquad (17)$$

Firm	β_0		β_1		Adjusted R^2	Sample
Pooled	10.12045	***	11.21361	***	0.588259	265
	5.25438		9.23256			
Fixed Year	9.32397	*	11.50674	***	0.598939	265
	2.570083		10.22605			
Fixed Firm	17.04094	**	6.861202	***	0.785927	265
	5.225341		5.682457			
1. THO	7.704303		8.13017	**	0.35838	12
	1.214916		2.239296			
2. BBA	5.220423		19.63508	**	0.26162	12
	1.359181		2.556483			
3. HRB	25.27888	**	8.805756	**	0.274054	12
	3.816802		2.307941			
4. LAF	14.27907	***	4.620887	**	0.303803	13
	4.598754		3.544238			
5. JCI	9.680348		11.34583	***	0.720399	14
	1.267802		5.160575			
6. COA	9.617633	***	5.581924	***	0.449318	12
	6.553457		6.336444			
7. ALN	9.595494	***	10.56539	**	0.618262	12
	4.699491		4.431243			
8.HCSG	-7.56308		28.00437	**	0.616778	14
	-1.26994		2.95201			
9. GCI	7.157083		16.95067	***	0.617515	14
	0.722595		6.43809			
10. HCT	7.063247	***	2.873361	***	0.461694	12
	10.39184		5.174716			
11. EFX	10.09686	**	13.25027	**	0.427454	15
	2.418862		3.806782			
12. MAS	13.37441		11.50223		0.281295	14
	1.240341		1.420656			
13. FAJ	1.91587	**	3.963115		0.017235	13
	3.669752		1.533913			
14. TBL	7.315887		13.09199	***	0.861269	14
	1.704857		8.340092			
15. ALOG	10.74218		10.56319	**	0.402264	13
	1.411089		2.845926			
16. SON	29.14589	***	0.194444		-0.071171	16
	4.271151		0.042531			
17. ASAL	1.39622	***	3.003944	**	0.351557	12
	5.725082		4.033331			
18. SEH	-3.33856		15.90064	***	0.485257	13
	-1.00474		6.396516			
19. DOW	49.6015	***	4.172784	**	0.290948	13
	6.900719		2.783983			
20. PFE	52.12404	**	6.644062		0.025909	15
	2.656225		1.283653			
Average Measure	**13.02038**		**9.940005**		**0.387692**	
	3.117411		**3.681421**			

Table 4.5
Time series regression of next period's price (P_{t+1}) on earnings before goodwill amortisation (EBG) and the most recent prior period's equity price (P_t)

The table provides the estimate of intercepts (β_0), and coefficients (β_1 and β_3) of earnings before goodwill amortisation (EBG) and equity price at time t (P_t), respectively, for explaining the share price P_{t+1}, where P_{t+1} indicates next period's end of quarter price. The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using Newey-West heteroskedasticity autocorrelation consistent standard errors and covariance when the regression coefficients are estimated using time series analysis, whereas the *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled regression analysis. The intercepts of fixed year and firm effects are the averages of the coefficient values for each year and firm respectively. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance. Firms' names are provided in Table 4.1 Panel A.

$$P_{t+1} = \beta_0 + \beta_1 \, EBG_t + \beta_3 \, P_t + \varepsilon_{t+1} \qquad (18)$$

Firm	β_0	β_1	β_3	Adjusted R^2	Sample
Pooled	0.379925	0.661251	0.962202 ***	0.947144	265
	0.689343	1.243386	19.35135		
Fixed Year	0.228872	0.734418	0.958308 ***	0.951918	265
	0.126839	1.387296	19.97636		
Fixed Firm	1.274002	1.087419 *	0.901229 ***	0.946378	265
	0.588306	1.67097	13.06805		
1. THO	-0.91096	-1.5674	1.157051 ***	0.810192	12
	-0.40221	-0.72469	7.033621		
2. BBA	2.200792	0.040489	0.930913 ***	0.819342	12
	1.771046	0.007295	19.11976		
3. HRB	-0.64945	4.467695	0.851549 ***	0.65319	12
	-0.11358	1.509811	9.197087		
4. LAF	4.996462	0.802581	0.733299 **	0.577014	13
	1.083016	1.148114	3.073928		
5. JCI	1.967136	1.588655	0.857967 ***	0.888911	14
	0.456356	0.82917	5.776984		
6. COA	4.021223	3.277093 **	0.481141 **	0.561778	12
	1.802561	2.470259	2.648877		
7. ALN	0.604996	4.69829	0.730332 **	0.717235	12
	0.212197	1.061994	2.521674		
8.HCSG	-4.97509 *	11.15995	0.748022 **	0.880043	14
	-1.92469	1.67955	2.787895		
9. GCI	0.715589	4.060323 *	0.755909 ***	0.828581	14
	0.116591	2.064314	5.058566		
10. HCT	2.479939 ***	0.926768 **	0.63204 ***	0.895883	12
	4.801261	2.921638	8.360711		
11. EFX	0.787231	3.699097	0.809357 ***	0.780843	15
	0.430083	1.089154	5.576866		
12. MAS	-0.84781	-0.18311	1.070009 ***	0.790043	14
	-0.11813	-0.07497	4.879164		
13. FAJ	0.835067	4.146582	0.382616	0.091354	13
	0.626871	1.046756	1.329109		
14. TBL	3.952282	9.400891 ***	0.318731 **	0.895331	14
	1.115621	6.395245	2.328304		
15. ALOG	1.644679	1.235932	0.792724 ***	0.946698	13
	1.351865	1.27705	10.45893		
16. SON	4.145251	-2.33284 **	1.002345 ***	0.863683	16
	1.612612	-2.36549	15.11896		
17. ASAL	0.38817	1.452148	0.646812 **	0.615354	12
	1.417091	1.292788	2.800765		
18. SEH	-0.13665	1.278181	0.95603 ***	0.92645	13
	-0.20258	0.685375	7.198202		
19. DOW	9.604427	1.130273	0.775841 ***	0.889887	13
	2.0864 *	1.674452	11.08815		
20. PFE	-7.39184	0.61399	1.115846 ***	0.805151	15
	-1.6503	0.253519	11.71978		
Average Measure	**1.171572**	**2.494779**	**0.787427**	**0.761848**	
	0.723604	**1.212067**	**6.903867**		

Table 4.6
Time series regression of next period's price (P_{t+1}) on earnings before goodwill amortisation (EBG), goodwill amortisation per share (GAPS) and the most recent prior period's equity price (P_t)

The table provides the estimate of intercepts (β_0), and coefficients (β_1, β_2 and β_3) of earnings before goodwill amortisation (EBG), goodwill amortisation per share (GAPS), and equity price at time t (P_t), respectively, for explaining the share price P_{t+1}, where P_{t+1} indicates next period's end of quarter price. The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using Newey-West heteroskedasticity autocorrelation consistent standard errors and covariance when the regression coefficients are estimated using time series analysis, whereas the *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled regression analysis. The intercepts of fixed year and firm effects are the averages of the coefficient values for each year and firm respectively. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance. Firms' names are provided in Table 4.1 Panel A.

$$P_{t+1} = \beta_0 + \beta_1 EBG_t + \beta_2 GAPS_t + \beta_3 P_t + \varepsilon_{t+1} \qquad (19)$$

Firm	β_0		β_1		β_2		β_3		Adjusted R^2	Sample
Pooled	0.373383 0.679136		0.648976 1.194304		0.192403 0.084415		0.962198 19.30183	***	0.946944	265
Fixed Year	0.227318 0.124936		0.729885 1.330539		0.065406 0.029298		0.958327 19.97883	***	0.951723	265
Fixed Firm	1.111327 0.470904		1.079895 1.6586	*	1.781891 0.560384		0.89788 12.77229	***	0.94622	265
1. THO	-0.90044 -0.34539		-1.5676 -0.68239		-0.33496 -0.02121		1.157429 6.592983	***	0.786472	12
2. BBA	1.637545 1.05246		4.379035 0.4286		-400.512 -0.76113		0.90478 13.03893	***	0.81084	12
3. HRB	-0.274 -0.04015		3.880521 1.077468		9.635865 0.451043		0.84165 6.880434	***	0.614535	12
4. LAF	3.107671 0.714745		1.788163 1.252227		-21.7063 -0.64753		0.826601 3.122117	**	0.552373	13
5. JCI	2.133154 0.317617		1.626666 0.920074		-0.46018 -0.05702		0.857932 5.523988	***	0.877819	14
6. COA	4.510365 1.923566	*	2.772582 1.684597		-101.911 -2.27151	*	0.544675 2.340827	**	0.555338	12
7. ALN	1.078433 0.213478		4.050447 0.479716		-2.75526 -0.13888		0.753486 1.870318	*	0.682408	12
8.HCSG	-2.75331 -1.47642		10.14436 2.124595	*	18.88541 1.913145	*	0.550011 1.73989		0.899099	14
9. GCI	-0.21938 -0.0297		4.765321 1.549517		-3.77977 -0.40554		0.757001 4.632556	***	0.812488	14
10. HCT	2.477501 4.572771	**	0.951361 2.911848	**	-0.11111 -0.11128		0.632818 7.783831	***	0.882921	12
11. EFX	0.948568 0.373765		3.204443 0.552915		3.58345 0.193783		0.813688 4.791734	***	0.761857	15
12. MAS	-10.2226 -1.98244	*	1.987201 1.095232		56.82597 3.736642	**	0.944156 4.57787	**	0.849909	14
13. FAJ	1.201021 0.780458		4.087758 1.052185		-97.2414 -0.27175		0.28151 0.656384		0.00681	13
14. TBL	1.595338 0.324985		8.189339 3.25444	**	47.06682 1.021643		0.367093 2.098988	*	0.895914	14
15. ALOG	-1.68898 -1.63943		0.498684 0.522265		171.0838 4.755623	**	0.883917 13.77972	***	0.954994	13
16. SON	1.313174 0.606833		-2.2477 -3.34845	**	19.81009 2.631285	**	1.024291 16.5331	***	0.869908	16
17. ASAL	0.383291 1.243563		1.435037 1.202535		0.038718 0.040662		0.649535 2.615285	**	0.567307	12
18. SEH	-0.14427 -0.19611		1.311091 0.760803		-0.22553 -0.03704		0.95593 6.922419	***	0.918281	13
19. DOW	9.366709 0.997678		1.16182 1.063238		0.62745 0.042451		0.773256 8.75911	***	0.877672	13
20. PFE	-7.56099 -1.62742		0.774407 0.300193		-11.2078 -0.19724		1.120175 11.51834	***	0.787511	15
Average Measure	**0.299441** **0.289243**		**2.659647** **0.91008**		**-15.6344** **0.493307**		**0.781997** **6.288941**		**0.748223**	

Table 4.7
Time series regression of next period's price (P_{t+1}) on earnings after goodwill amortisation (EAG), and the most recent prior period's equity price (P_t)

The table provides the estimate of intercepts (β_0), and coefficients (β_1 and β_3) of earnings after goodwill amortisation (EAG) and equity price at time t (P_t), respectively, for explaining the share price P_{t+1}, where P_{t+1} indicates next period's end of quarter price. The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using Newey-West heteroskedasticity autocorrelation consistent standard errors and covariance when the regression coefficients are estimated using time series analysis, whereas the *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled regression analysis. The intercepts of fixed year and firm effects are the averages of the coefficient values for each year and firm respectively. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance. Firms' names are provided in Table 4.1 Panel A.

$$P_{t+1} = \beta_0 + \beta_1 \, EAG_t + \beta_3 \, P_t + \varepsilon_{t+1} \qquad (20)$$

Firm	β_0	β_1	β_3	Adjusted R^2	Sample
Pooled	0.407258 0.73021	0.682201 1.237676	0.963535 *** 19.92852	0.947106	265
Fixed Year	0.251258 0.148349	0.764971 1.382737	0.959406 *** 20.59813	0.951881	265
Fixed Firm	1.389487 0.696658	1.051522 1.640668	0.905151 *** 13.49423	0.94628	265
1. THO	-0.95908 -0.43467	-1.54933 -0.74487	1.153849 *** 7.012169	0.810183	12
2. BBA	2.187869 1.745195	0.091765 0.016253	0.929981 *** 18.94317	0.819346	12
3. HRB	-0.77815 -0.13577	4.611839 1.434624	0.861579 *** 10.02158	0.648144	12
4. LAF	4.910296 1.072296	0.923849 1.400568	0.729671 ** 3.037383	0.578687	13
5. JCI	2.604472 0.644723	1.672822 0.924817	0.861987 *** 6.118103	0.888801	14
6. COA	4.042899 1.813839	3.291692 ** 2.543687	0.480223 ** 2.664301	0.564946	12
7. ALN	1.240263 0.414877	3.775444 1.187436	0.76452 ** 2.935696	0.71767	12
8.HCSG	-4.01061 -1.45586	4.450228 1.19522	1.108587 *** 7.317456	0.852704	14
9. GCI	-0.47283 -0.07531	4.915269 * 2.004523	0.760567 *** 4.927836	0.829476	14
10. HCT	2.430881 *** 5.608089	1.10456 ** 2.905672	0.650947 *** 10.21856	0.891599	12
11. EFX	0.666909 0.335654	4.061108 0.958857	0.812131 *** 5.201475	0.778381	15
12. MAS	-0.67789 -0.09832	-0.93657 -0.43834	1.099674 *** 4.771797	0.79145	14
13. FAJ	0.835067 0.626871	4.146582 1.046756	0.382616 1.329109	0.091354	13
14. TBL	4.472976 1.247517	9.526221 *** 6.484249	0.315887 ** 2.210582	0.890678	14
15. ALOG	1.672778 1.373223	1.217895 1.25834	0.793078 *** 10.33855	0.946503	13
16. SON	3.904892 1.627883	-2.4204 ** -2.68116	1.006855 *** 15.36052	0.867153	16
17. ASAL	0.459789 1.320909	0.841632 1.286549	0.753743 ** 3.520906	0.570061	12
18. SEH	-0.14491 -0.20907	1.42563 0.735106	0.957906 *** 7.734606	0.926338	13
19. DOW	10.01605 * 2.135068	1.072004 1.704014	0.780545 *** 11.57679	0.889778	13
20. PFE	-7.40336 -1.64474	0.624974 0.254633	1.116042 *** 11.81679	0.805157	15
Average Measure	**1.249916** **0.79562**	**2.142361** **1.173847**	**0.816019** **7.352869**	**0.75792**	

Table 4.8
Time series regression of next period's price change (ΔP_{t+1}) on earnings before goodwill amortisation (EBG), and the most recent prior period's equity price (P_t)

The table provides the estimate of intercepts (β_0), and coefficients (β_1 and β_3) of earnings before goodwill amortisation (EBG) and equity price at time t (P_t)), respectively, for explaining the share price change ΔP_{t+1} (= $P_{t+1} - P_t$, where P_{t+1} indicates next period's end of quarter price). The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using Newey-West heteroskedasticity autocorrelation consistent standard errors and covariance when the regression coefficients are estimated using time series analysis, whereas the *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled regression analysis. The intercepts of fixed year and firm effects are the averages of the coefficient values for each year and firm respectively. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance. Firms' names are provided in Table 4.1 Panel A.

$$\Delta P_{t+1} = \beta_0 + \beta_1 \, EBG_t + \beta_3 \, P_t + \varepsilon_{t+1} \qquad (21)$$

Firm	β_0	β_1	β_3	Adjusted R^2	Sample
Pooled	0.379925 0.689343	0.661251 1.243386	-0.0378 -0.76018	0.00988	265
Fixed Year	0.228872 0.126839	0.734418 1.387296	-0.04169 -0.86909	0.099302	265
Fixed Firm	1.274002 0.588306	1.087419 * 1.67097	-0.09877 -1.43221	-0.004478	265
1. THO	-0.91096 -0.40221	-1.5674 -0.72469	0.157051 0.954699	-0.162074	12
2. BBA	2.200792 1.771046	0.040489 0.007295	-0.06909 -1.41895	-0.185436	12
3. HRB	-0.64945 -0.11358	4.467695 1.509811	-0.14845 -1.60333	0.051123	12
4. LAF	4.996462 1.083016	0.802581 1.148114	-0.2667 -1.11799	-0.073932	13
5. JCI	1.967136 0.456356	1.588655 0.82917	-0.14203 -0.95636	-0.129127	14
6. COA	4.021223 1.802561	3.277093 ** 2.470259	-0.51886 ** -2.85653	0.182454	12
7. ALN	0.604996 0.212197	4.69829 1.061994	-0.26967 -0.9311	-0.093462	12
8.HCSG	-4.97509 * -1.92469	11.15995 1.67955	-0.25198 -0.93913	0.270607	14
9. GCI	0.715589 0.116591	4.060323 * 2.064314	-0.24409 -1.63346	-0.021342	14
10. HCT	2.479939 *** 4.801261	0.926768 ** 2.921638	-0.36796 *** -4.86743	0.493119	12
11. EFX	0.787231 0.430083	3.699097 1.089154	-0.19064 -1.31363	-0.004218	15
12. MAS	-0.84781 -0.11813	-0.18311 -0.07497	0.070009 0.319235	-0.16282	14
13. FAJ	0.835067 0.626871	4.146582 1.046756	-0.61738 * -2.14463	0.276456	13
14. TBL	3.952282 1.115621	9.400891 *** 6.395245	-0.68127 *** -4.97662	0.620517	14
15. ALOG	1.644679 1.351865	1.235932 1.27705	-0.20728 ** -2.73474	0.372027	13
16. SON	4.145251 1.612612	-2.33284 ** -2.36549	0.002345 0.035368	0.102106	16
17. ASAL	0.38817 1.417091	1.452148 1.292788	-0.35319 -1.52934	-0.017649	12
18. SEH	-0.13665 -0.20258	1.278181 0.685375	-0.04397 -0.33106	-0.158632	13
19. DOW	9.604427 2.0864 *	1.130273 1.674452	-0.22416 ** -3.20362	0.194938	13
20. PFE	-7.39184 -1.6503	0.61399 0.253519	0.115846 1.21674	-0.092413	15
Average Measure	**1.171572** **0.723604**	**2.494779** **1.212067**	**-0.21257** **-1.50159**	**0.073112**	

Table 4.9
Time series regression of next period's price change (ΔP_{t+1}) on earnings before goodwill amortisation (EBG), goodwill amortisation per share (GAPS) and the most recent prior period's equity price (P_t)

The table provides the estimate of intercepts (β_0), and coefficients (β_1, β_2 and β_3) of earnings before goodwill amortisation (EBG), goodwill amortisation per share (GAPS), and equity price at time t (P_t)), respectively, for explaining the share price change ΔP_{t+1} (= $P_{t+1} - P_t$, where P_{t+1} indicates next period's end of quarter price). The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using Newey-West heteroskedasticity autocorrelation consistent standard errors and covariance when the regression coefficients are estimated using time series analysis, whereas the *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled regression analysis. The intercepts of fixed year and firm effects are the averages of the coefficient values for each year and firm respectively. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance. Firms' names are provided in Table 4.1 Panel A.

$$\Delta P_{t+1} = \beta_0 + \beta_1 \, EBG_t + \beta_2 \, GAPS_t + \beta_3 \, P_t + \varepsilon_{t+1} \qquad (22)$$

Firm	β_0	β_1	β_2	β_3	Adjusted R^2	Sample
Pooled	0.373383 0.679136	0.648976 1.194304	0.192403 0.084415	-0.037802 -0.758306	0.006123	265
Fixed Year	0.227318 0.124936	0.729885 1.330539	0.065406 0.029298	-0.041673 -0.868787	0.095644	265
Fixed Firm	1.111327 0.470904	1.079895 * 1.6586	1.781891 0.560384	-0.10212 -1.452657	-0.007435	265
1. THO	-0.90044 -0.34539	-1.5676 -0.68239	-0.33496 -0.02121	0.157429 0.896754	-0.307292	12
2. BBA	1.637545 1.05246	4.379035 0.4286	-400.512 -0.76113	-0.09522 -1.372234	-0.241226	12
3. HRB	-0.274 -0.04015	3.880521 1.077468	9.635865 0.451043	-0.15835 -1.294506	-0.054637	12
4. LAF	3.107671 0.714745	1.788163 1.252227	-21.7063 -0.64753	-0.173399 -0.654937	-0.136493	13
5. JCI	2.133154 0.317617	1.626666 0.920074	-0.46018 -0.05702	-0.142068 -0.91474	-0.24187	14
6. COA	4.510365 * 1.923566	2.772582 1.684597	-101.911 * -2.27151	-0.455325 * -1.956829	0.17044	12
7. ALN	1.078433 0.213478	4.050447 0.479716	-2.75526 -0.13888	-0.246514 -0.611903	-0.22814	12
8.HCSG	-2.75331 -1.47642	10.14436 * 2.124595	18.88541 * 1.913145	-0.449989 -1.42348	0.386477	14
9. GCI	-0.21938 -0.0297	4.765321 1.549517	-3.77977 -0.40554	-0.242999 -1.48706	-0.117229	14
10. HCT	2.477501 ** 4.572771	0.951361 ** 2.911848	-0.11111 -0.11128	-0.367182 ** -4.516437	0.430019	12
11. EFX	0.948568 0.373765	3.204443 0.552915	3.58345 0.193783	-0.186312 -1.097176	-0.091215	15
12. MAS	-10.2226 * -1.98244	1.987201 1.095232	56.82597 ** 3.736642	-0.055844 -0.270769	0.168738	14
13. FAJ	1.201021 0.780458	4.087758 1.052185	-97.2414 -0.27175	-0.71849 -1.675266	0.209135	13
14. TBL	1.595338 0.324985	8.189339 ** 3.25444	47.06682 1.021643	-0.632907 ** -3.618878	0.62263	14
15. ALOG	-1.68898 -1.63943	0.498684 0.522265	171.0838 ** 4.755623	-0.116083 -1.809671	0.469767	13
16. SON	1.313174 0.606833	-2.2477 ** -3.34845	19.81009 ** 2.631285	0.024291 0.392077	0.14311	16
17. ASAL	0.383291 1.243563	1.435037 1.202535	0.038718 0.040662	-0.350465 -1.41111	-0.144767	12
18. SEH	-0.14427 -0.19611	1.311091 0.760803	-0.22553 -0.03704	-0.04407 -0.319135	-0.287319	13
19. DOW	9.366709 0.997678	1.16182 1.063238	0.62745 0.042451	-0.226744 ** -2.568462	0.105627	13
20. PFE	-7.56099 -1.62742	0.774407 0.300193	-11.2078 -0.19724	0.120175 1.235718	-0.191307	15
Average Measure	**0.299441** **0.289243**	**2.659647** **0.91008**	**-15.6344** **0.493307**	**-0.218003** **-1.223902**	**0.033222**	

Table 4.10
Time series regression of next period's price change (ΔP_{t+1}) on earnings after goodwill amortisation (EAG), and the most recent prior period's equity price (P_t)

The table provides the estimate of intercepts (β_0), and coefficients (β_1 and β_3) of earnings after goodwill amortisation (EAG) and equity price at time t (P_t)), respectively, for explaining the share price change ΔP_{t+1} (= $P_{t+1} - P_t$, where P_{t+1} indicates next period's end of quarter price). The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using Newey-West heteroskedasticity autocorrelation consistent standard errors and covariance when the regression coefficients are estimated using time series analysis, whereas the *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled regression analysis. The intercepts of fixed year and firm effects are the averages of the coefficient values for each year and firm respectively. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance. Firms' names are provided in Table 4.1 Panel A.

$$\Delta P_{t+1} = \beta_0 + \beta_1 \, EAG_t + \beta_3 \, P_t + \varepsilon_{t+1} \qquad (23)$$

Firm	β_0	β_1	β_3	Adjusted R^2	Sample
Pooled	0.407258 0.73021	0.682201 1.237676	-0.03646 -0.75419	0.009159	265
Fixed Year	0.251258 0.148349	0.764971 1.382737	-0.04059 -0.87153	0.098602	265
Fixed Firm	1.389487 0.696658	1.051522 1.640668	-0.09485 -1.41403	-0.006308	265
1. THO	-0.95908 -0.43467	-1.54933 -0.74487	0.153849 0.93497	-0.162129	12
2. BBA	2.187869 1.745195	0.091765 0.016253	-0.07002 -1.42624	-0.185408	12
3. HRB	-0.77815 -0.13577	4.611839 1.434624	-0.13842 -1.61006	0.037318	12
4. LAF	4.910296 1.072296	0.923849 1.400568	-0.27033 -1.12529	-0.069685	13
5. JCI	2.604472 0.644723	1.672822 0.924817	-0.13801 -0.97957	-0.13025	14
6. COA	4.042899 1.813839	3.291692 ** 2.543687	-0.51978 ** -2.88375	0.188364	12
7. ALN	1.240263 0.414877	3.775444 1.187436	-0.23548 -0.90422	-0.091782	12
8.HCSG	-4.01061 -1.45586	4.450228 1.19522	0.108587 0.716748	0.104371	14
9. GCI	-0.47283 -0.07531	4.915269 * 2.004523	-0.23943 -1.55132	-0.016011	14
10. HCT	2.430881 *** 5.608089	1.10456 ** 2.905672	-0.34905 *** -5.47944	0.472266	12
11. EFX	0.666909 0.335654	4.061108 0.958857	-0.18787 -1.20325	-0.015501	15
12. MAS	-0.67789 -0.09832	-0.93657 -0.43834	0.099674 0.432513	-0.155026	14
13. FAJ	0.835067 0.626871	4.146582 1.046756	-0.61738 * -2.14463	0.276456	13
14. TBL	4.472976 1.247517	9.526221 *** 6.484249	-0.68411 *** -4.78743	0.603648	14
15. ALOG	1.672778 1.373223	1.217895 1.25834	-0.20692 ** -2.69743	0.369733	13
16. SON	3.904892 1.627883	-2.4204 ** -2.68116	0.006855 0.104575	0.124965	16
17. ASAL	0.459789 1.320909	0.841632 1.286549	-0.24626 -1.15032	-0.137481	12
18. SEH	-0.14491 -0.20907	1.42563 0.735106	-0.04209 -0.33989	-0.1604	13
19. DOW	10.01605 * 2.135068	1.072004 1.704014	-0.21945 ** -3.25488	0.194138	13
20. PFE	-7.40336 -1.64474	0.624974 0.254633	0.116042 1.228669	-0.092379	15
Average Measure	**1.249916** **0.79562**	**2.142361** **1.173847**	**-0.18398** **-1.40601**	**0.05776**	

Table 4.11
Time series regression of next period's price change (ΔP_{t+1}) on earnings before goodwill amortisation (EBG)

This table provides the estimates of the intercept (β_0) and the coefficient (β_1) of earnings before goodwill amortization (EBG) for period t for explaining the share price change ΔP_{t+1} (= $P_{t+1} - P_t$, where P_{t+1} indicates next period's end of quarter equity price and P_t is price at time t). The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using Newey-West heteroskedasticity autocorrelation consistent standard errors and covariance when the regression coefficients are estimated using time series analysis, whereas the *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled regression analysis. The intercepts of fixed year and firm effects are the averages of the coefficient values for each year and firm respectively. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance. Firms' names are provided in Table 4.1 Panel A.

$$\Delta P_{t+1} = \beta_0 + \beta_1 \, EBG_t + \varepsilon_{t+1}$$

Firm	β_0	β_1	Adjusted R^2	Sample
Pooled	0.021132 0.051486	0.270218 1.155107	0.003471	265
Fixed Year	-0.14809 -0.14056	0.294633 1.180245	0.090582	265
Fixed Firm	-0.31179 -0.27839	0.439442 1.10589	-0.035153	265
1. THO	0.180361 0.073164	-0.24199 -0.15852	-0.097484	12
2. BBA	1.970738 1.712206	-1.39719 -0.31712	-0.087805	12
3. HRB	-5.10374 -0.97073	3.770577 1.385793	0.113161	12
4. LAF	1.615203 0.734665	-0.49454 -0.44801	-0.077758	13
5. JCI	1.437936 0.373413	0.111398 0.109804	-0.082407	14
6. COA	-1.95142 -1.31485	0.778566 0.588184	-0.080238	12
7. ALN	-1.67313 -0.77652	1.847752 0.650679	-0.036045	12
8.HCSG	-4.45022 * -1.956	6.492154 * 2.119577	0.291712	14
9. GCI	-2.37102 -0.43537	0.844018 0.40912	-0.067912	14
10. HCT	-0.02224 -0.07429	0.090262 0.278462	-0.095607	12
11. EFX	-1.5564 -0.50318	1.815798 0.774864	-0.021284	15
12. MAS	-0.14785 -0.02556	0.647699 0.189805	-0.077137	14
13. FAJ	-0.9089 -0.75574	4.442623 0.748623	0.017303	13
14. TBL	-1.95581 -0.50104	1.865063 1.053169	-0.011837	14
15. ALOG	-0.73381 -0.38078	-1.18139 ** -2.28168	-0.017948	13
16. SON	4.2039 ** 2.578322	-2.32706 ** -2.43989	0.166207	16
17. ASAL	0.0604 0.465604	0.472015 0.706614	-0.068687	12
18. SEH	0.001212 0.001696	0.69594 0.887909	-0.067926	13
19. DOW	-0.98347 -0.33081	0.166309 0.621566	-0.08676	13
20. PFE	-1.24697 -0.16216	1.240386 0.603996	-0.056164	15
Average Measure	**-0.68176** **-0.1124**	**0.98192** **0.274147**	**-0.022231**	

Table 4.12
Time series regression of next period's price change (ΔP_{t+1}) on earnings before goodwill amortisation (EBG) and goodwill amortisation per share (GAPS)

The table provides the estimate of intercepts (β_0), and coefficients (β_1 and β_2) of earnings before goodwill amortisation (EBG) and goodwill amortisation per share (GAPS) for period t, respectively, for explaining the share price change ΔP_{t+1} (= $P_{t+1} - P_t$, where P_{t+1} indicates next period's end of quarter equity price and P_t is price at time t). The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using Newey-West heteroskedasticity autocorrelation consistent standard errors and covariance when the regression coefficients are estimated using time series analysis, whereas the *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled regression analysis. The intercepts of fixed year and firm effects are the averages of the coefficient values for each year and firm respectively. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance. Firms' names are provided in Table 4.1 Panel A.

$$\Delta P_{t+1} = \beta_0 + \beta_1 \, EBG_t + \beta_2 \, GAPS_t + \varepsilon_{t+1}$$

Firm	β_0	β_1	β_2	Adjusted R^2	Sample
Pooled	0.014733	0.258238	0.187208	-0.000299	265
	0.034312	1.024	0.10787		
Fixed	-0.15131	0.284539	0.152346	0.086923	265
Year	-0.14206	0.874909	0.06747		
Fixed	-0.31256	0.439337	0.006346	-0.039413	265
Firm	-0.27007	1.093733	0.001831		
1. THO	0.143606	-0.25037	0.935839	-0.219142	12
	0.050549	-0.16139	0.066256		
2. BBA	1.412658	1.859557	-343.731	-0.145734	12
	0.907072	0.240757	-0.79632		
3. HRB	-5.0429	3.278937	7.47618	0.021597	12
	-0.95626	0.968941	0.391853		
4. LAF	0.632557	1.509118	-30.2162	-0.060067	13
	0.61525	1.419115	-1.02948		
5. JCI	1.589993	0.145903	-0.42182	-0.180678	14
	0.271713	0.143321	-0.04895		
6. COA	-0.14658	0.484934	-150.703 **	-0.012426	12
	-0.09386	0.413296	-2.69442		
7. ALN	0.368215	0.617836	-8.40676	-0.130607	12
	0.070637	0.136732	-0.58575		
8.HCSG	-2.62259	3.242654	13.10259	0.32281	14
	-1.44124	1.23877	1.704364		
9. GCI	-3.39589	1.644398	-4.20533	-0.157961	14
	-0.47192	0.462585	-0.4108		
10. HCT	-0.00114	0.285079	-0.82112	-0.204524	12
	-0.00367	1.029724	-0.37586		
11. EFX	-1.21982	1.107022	5.62081	-0.096574	15
	-0.30518	0.262551	0.336258		
12. MAS	-10.3632 **	1.297893	54.59342 **	0.23721	14
	-2.38975	0.602078	3.358625		
13. FAJ	-1.08492	4.46528	213.006	0.021479	13
	-0.903	0.7566	1.510774		
14. TBL	-6.2032	0.381862	103.1779 *	0.088736	14
	-1.34134	0.241473	1.92978		
15. ALOG	-4.14785 *	-0.69438	255.3691 **	0.428243	13
	-2.18486	-1.20347	3.232993		
16. SON	1.994452	-2.19229 **	19.17051 **	0.205204	16
	1.59085	-3.09724	2.527063		
17. ASAL	0.023515	0.322188	0.607229	-0.165669	12
	0.141931	0.70532	0.581568		
18. SEH	-0.00017	0.701927	-0.04275	-0.174717	13
	-0.0002	0.514872	-0.00782		
19. DOW	7.869784	-0.33629	-15.4371	-0.087752	13
	0.894047	-0.51767	-1.09963		
20. PFE	-1.45379	0.61166	38.33358	-0.138867	15
	-0.18717	0.22183	0.576067		
Average	**-1.08236**	**0.924146**	**7.870368**	**-0.022472**	
Measure	**-0.28682**	**0.21891**	**0.458328**		

Table 4.13
Time series regression of next period's price change (ΔP_{t+1}) on earnings after goodwill amortisation (EAG)

This table provides the estimates of the intercept (β_0) and the coefficient (β_1) of earnings after goodwill amortization (EAG) for period t for explaining the share price change ΔP_{t+1} (= P_{t+1} – P_t, where P_{t+1} indicates next period's end of quarter equity price and P_t is price at time t). The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using Newey-West heteroskedasticity autocorrelation consistent standard errors and covariance when the regression coefficients are estimated using time series analysis, whereas the *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled regression analysis. The intercepts of fixed year and firm effects are the averages of the coefficient values for each year and firm respectively. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance. Firms' names are provided in Table 4.1 Panel A.

$$\Delta P_{t+1} = \beta_0 + \beta_1 \, EAG_t + \varepsilon_{t+1}$$

Firm	β_0	β_1	Adjusted R^2	Sample
Pooled	0.039667 0.100604	0.283645 1.148063	0.003294	265
Fixed Year	-0.13262 -0.12359	0.310474 1.139595	0.090394	265
Fixed Firm	-0.25059 -0.22266	0.442739 1.101514	-0.035213	265
1. THO	0.196053 0.084047	-0.25871 -0.17302	-0.097158	12
2. BBA	1.959546 1.676859	-1.37966 -0.30836	-0.088285	12
3. HRB	-4.96445 -0.92205	3.938047 1.332896	0.104683	12
4. LAF	1.439344 0.703812	-0.44583 -0.40176	-0.08158	13
5. JCI	1.471552 0.440326	0.124075 0.116444	-0.082356	14
6. COA	-1.991 -1.37079	0.812823 0.623005	-0.07827	12
7. ALN	-1.33323 -0.81181	1.684071 0.696379	-0.029431	12
8.HCSG	-4.35858 -1.40268	6.757368 1.456398	0.164527	14
9. GCI	-2.87479 -0.4649	1.126427 0.438465	-0.064893	14
10. HCT	-0.05311 -0.17687	0.156085 0.494938	-0.091931	12
11. EFX	-1.51451 -0.43633	1.935388 0.678694	-0.027615	15
12. MAS	0.595802 0.120784	0.190879 0.058414	-0.082777	14
13. FAJ	-0.9089 -0.75574	4.442623 0.748623	0.017303	13
14. TBL	-1.68388 -0.44264	1.803876 0.989703	-0.018317	14
15. ALOG	-0.69352 -0.36236	-1.22039 ** -2.31111	-0.013355	13
16. SON	4.076733 ** 2.931902	-2.4026 ** -2.70204	0.187178	16
17. ASAL	0.153846 1.318211	0.13518 0.432356	-0.097581	12
18. SEH	-0.00457 -0.00578	0.789548 0.822094	-0.06853	13
19. DOW	-1.11361 -0.37008	0.200202 0.770447	-0.084483	13
20. PFE	-1.21391 -0.15761	1.250818 0.596968	-0.05649	15
Average Measure	**-0.64076** **-0.02018**	**0.982011** **0.217977**	**-0.029468**	

Appendix 4A

Table 4.14

Time series regression of four quarter subsequent price change (ΔP) on earnings before goodwill amortisation (EBG) and the most recent prior period's price (P_t)

The table provides the estimate of intercepts (β_0), and coefficients (β_1 and β_3) of earnings before goodwill amortisation (EBG) and equity price at time t (P_t), respectively, for explaining the share price change $\Delta P = P_{t+4} - P_t$, where P_t indicates end of fiscal year price and P_{t+4} indicates end of quarter t+4 price. The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using Newey-West heteroskedasticity autocorrelation consistent standard errors and covariance when the regression coefficients are estimated using time series analysis, whereas the *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled regression analysis. The intercepts of fixed year and firm effects are the averages of the coefficient values for each year and firm respectively. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance. Firms' names are provided in Table 4.1 Panel A.

$$\Delta P = \beta_0 + \beta_1 \, EBG_t + \beta_3 \, P_t + \varepsilon_{t+1} \qquad (21)$$

Firm	β_0		β_1		β_3		Adjusted R^2	Sample
Pooled	4.674625	**	2.565588		-0.31348	**	0.12508354	245
	2.502139		1.523499		-2.014545			
Fixed Year	4.588841		2.753763		-0.321867	**	0.12526161	245
	1.580984		1.590735		-2.064631			
Fixed Firm	15.78189	**	2.866316	*	-0.732704	***	0.26983599	245
	3.602182		1.69007		-3.790044			
1. THO	7.835944	**	7.412439	**	-0.908926	***	0.37807901	11
	2.800079		4.56022		-6.816194			
2. BBA	-0.31278		27.0613	**	-1.08131	***	0.56175295	11
	-0.14444		2.519912		-9.374498			
3. HRB	41.4855	***	-0.65227		-1.011343	**	0.49022812	11
	5.710064		-0.22702		-3.548977			
4. LAF	11.60299	**	2.645557		-0.689661	**	0.15264407	12
	2.546658		1.79537		-2.867962			
5. JCI	12.21435		10.70889	**	-1.143043	**	0.27440501	13
	0.816209		3.895154		-3.877881			
6. COA	12.70873	***	0.969659		-0.738863	**	0.26715183	11
	6.470697		0.295306		-3.418336			
7. ALN	15.06238	**	7.968206		-1.239321	**	0.25989692	11
	3.227421		1.459625		-2.583199			
8. HCSG	13.13598	**	-24.2598		0.4440673		0.4153721	13
	2.80423		-1.26096		0.4810527			
9. GCI	18.70511		4.791501		-0.566448	*	0.11961289	13
	1.665711		0.836114		-2.002235			
10. HCT	6.302857	**	1.528624	*	-0.818946	**	0.21376947	11
	4.091971		1.957614		-4.024569			
11. EFX	12.05909	**	-2.94748		-0.349225		0.12221974	14
	2.648416		-0.70099		-1.193373			
12. MAS	20.73159	**	-3.47782		-0.537358	*	0.21176742	13
	3.95003		-1.41005		-2.156819			
13. FAJ	4.124579	**	-0.10089		-1.458259	**	0.48557564	12
	2.497115		-0.03099		-2.870796			
14. TBL	14.09342		7.362403	*	-0.867777	**	0.23906089	13
	1.369531		2.11926		-2.954833			
15. ALOG	6.428603		-2.15023		-0.025415		-0.1869666	12
	1.185593		-0.35347		-0.16041			
16. SON	15.66755	**	3.242893		-0.742833	**	0.29831268	15
	2.401414		1.198496		-2.81011			
17. ASAL	1.100344	***	-1.60047		-0.390465		0.0473147	11
	7.03469		-1.21554		-1.323242			
18. SEH	3.59904		0.138695		-0.248764		-0.0807068	12
	1.132672		0.024215		-0.608463			
19. DOW	61.39506	**	1.010734		-0.944101	*	0.27491031	12
	2.479853		0.446003		-2.184731			
20. PFE	45.9034	*	6.75547		-0.945874	**	0.36660291	14
	1.889228		1.733127		-3.321381			
Average Measure	**16.05714**		**2.380871**		**-0.69367**		**0.27238919**	
	2.415161		**0.882204**		**-2.814686**			

Appendix 4A (continued)

Table 4.15

Time series regression of four quarter subsequent price change (ΔP) on earnings before goodwill amortisation (EBG), goodwill amortisation per share (GAPS), and the most recent prior period's price (P_t)

The table provides the estimate of intercepts (β_0), and coefficients (β_1, β_2 and β_3) of earnings before goodwill amortisation (EBG), goodwill amortisation per share (GAPS), and equity price at time t (P_t), respectively, for explaining the share price change $\Delta P = P_{t+4} - P_t$, where P_t indicates end of fiscal year price and P_{t+4} indicates end of quarter t+4 price. The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using Newey-West heteroskedasticity autocorrelation consistent standard errors and covariance when the regression coefficients are estimated using time series analysis, whereas the *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled regression analysis. The intercepts of fixed year and firm effects are the averages of the coefficient values for each year and firm respectively. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance. Firms' names are provided in Table 4.1 Panel A.

$$\Delta P = \beta_0 + \beta_1 EBG_t + \beta_2 GAPS_t + \beta_3 P_t + \varepsilon_{t+1} \quad (22)$$

Firm	β_0		β_1		β_2		β_3		Adjusted R^2	Sample
Pooled	4.579928	**	2.411352		2.4976617		-0.3133026	**	0.1224662	245
	2.398334		1.393613		0.4407289		-2.0129163			
Fixed Year	4.514006		2.598595		2.2874775		-0.3208757	**	0.1222733	245
	1.544767		1.45767		0.4049755		-2.0541367			
Fixed Firm	15.34408	*	2.861568	*	4.4492644		-0.7404251	***	0.2677405	245
	3.281677		1.707501		0.5737894		-3.8612414			
1. THO	7.027016	*	7.992716	**	37.100722	**	-1.021282	**	0.48937	11
	2.13795		4.667559		2.9828418		-3.7496672			
2. BBA	-1.74939		39.00227	*	-1110.289		-1.1549719	***	0.5992538	11
	-0.64625		2.350006		-1.302795		-8.3963016			
3. HRB	42.02718	***	-1.34341		17.932758		-1.0403408	**	0.4276632	11
	5.825964		-0.36136		0.7160375		-3.7445961			
4. LAF	9.699379		3.677165		-23.92986		-0.5921604		0.0794914	12
	1.654623		1.417368		-0.395751		-1.5630429			
5. JCI	8.17523		9.510193	**	13.267578		-1.1510667	**	0.2123585	13
	0.461724		3.502272		0.7522182		-3.2442948			
6. COA	12.91311	***	0.647856		-33.95666		-0.7055381	*	0.1665559	11
	5.472263		0.144423		-0.253931		-2.2471625			
7. ALN	23.9268	***	-6.31745		-61.34305	**	-0.6536754		0.4575146	11
	6.523718		-0.8822		-5.012248		-1.7684308			
8. HCSG	11.81492	**	-23.8486		-11.69467		0.57981858		0.3658997	13
	3.057396		-1.25844		-0.8874		0.56202462			
9. GCI	17.01009		6.711793		-12.08181		-0.5710973		0.0300178	13
	1.746801		1.164792		-0.331358		-1.8240418			
10. HCT	6.143204	**	-0.28815		7.3356184		-0.7986352	**	0.2569154	11
	4.765357		-0.20773		1.0912432		-4.4018347			
11. EFX	12.92571	**	-5.10344		16.960197		-0.3393268		0.0585562	14
	2.801634		-0.83203		0.5402701		-1.1197588			
12. MAS	18.92345	**	-3.07411		10.805491		-0.5601467	*	0.127276	13
	2.769489		-0.97312		0.3561032		-1.8631972			
13. FAJ	4.23541	**	-0.11966		-112.2698		-1.4725034	**	0.4267117	12
	2.433671		-0.03529		-0.703893		-2.7027089			
14. TBL	6.720283		3.771386		137.82776		-0.7268582	*	0.2527872	13
	0.60588		0.814673		1.7717319		-2.1528614			
15. ALOG	3.802791		-2.63156		131.16781		0.04348263		-0.291994	12
	0.963952		-0.38024		0.6962675		0.18985604			
16. SON	13.36511		3.533553		11.601499		-0.7248816	**	0.2369468	15
	1.217302		1.743656		0.2343257		-2.4057788			
17. ASAL	1.065646	**	-1.69828		0.2263838		-0.372435		0.3351764	11
	2.776983		-1.15054		0.1514149		-1.0694273			
18. SEH	2.668829		3.799576		-23.26155		-0.2852492		-0.149087	12
	1.142304		1.050767		-1.045721		-0.751558			
19. DOW	110.5792	**	-4.23214		-95.88992		-0.6582941	*	0.3476047	12
	2.556418		-1.36768		-1.620621		-2.1115805			
20. PFE	51.37627	**	-1.35467		576.42824	**	-1.1339852	***	0.4959907	14
	2.691959		-0.40183		3.0036743		-5.8564193			
Average Measure	**18.13251**		**1.431751**		**-26.20313**		**-0.6669573**		**0.2462504**	
	2.547957		**0.450253**		**0.0371205**		**-2.5110391**			

Appendix 4A (continued)

Table 4.16

Time series regression of four quarter subsequent price change (ΔP) on earnings after goodwill amortisation (EAG), and the most recent prior period's price (P_t)

The table provides the estimate of intercepts (β_0), and coefficients (β_1 and β_3) of earnings after goodwill amortisation (EAG) and equity price at time t (P_t), respectively, for explaining the share price change $\Delta P = P_{t+4} - P_t$, where P_t indicates end of fiscal year price and P_{t+4} indicates end of quarter t+4 price. The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using Newey-West heteroskedasticity autocorrelation consistent standard errors and covariance when the regression coefficients are estimated using time series analysis, whereas the *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled regression analysis. The intercepts of fixed year and firm effects are the averages of the coefficient values for each year and firm respectively. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance. Firms' names are provided in Table 4.1 Panel A.

$$\Delta P = \beta_0 + \beta_1 \, EAG_t + \beta_3 \, P_t + \varepsilon_{t+1} \qquad (23)$$

Firm	β_0	β_1	β_3	Adjusted R^2	Sample
Pooled	4.799773 **	2.601152	-0.306533 *	0.1217364	245
	2.542155	1.451796	-1.969779		
Fixed Year	4.709446	2.814189	-0.31563 **	0.1216841	245
	1.604992	1.521439	-2.02029		
Fixed Firm	16.11125 **	2.772147	-0.723602 ***	0.2678327	245
	3.735531	1.620804	-3.774584		
1. THO	8.063433 **	6.538756 **	-0.828589 ***	0.30601	11
	2.878443	2.903885	-5.147311		
2. BBA	-0.4074	27.45853 **	-1.085918 ***	0.5666133	11
	-0.18774	2.558233	-9.564909		
3. HRB	41.5566 ***	-0.80787	-1.008055 **	0.4909569	11
	5.78191	-0.26114	-3.569468		
4. LAF	11.3666 **	2.84218 *	-0.684882 **	0.1590688	12
	2.519361	1.962904	-2.936907		
5. JCI	16.28216	10.70521 **	-1.066962 **	0.2341132	13
	1.103039	3.329917	-3.515164		
6. COA	12.7156 ***	0.96271	-0.73826 **	0.2672346	11
	6.490842	0.299654	-3.47483		
7. ALN	16.8396 **	7.867567 *	-1.285252 **	0.3184692	11
	3.820028	2.110062	-3.503413		
8. HCSG	13.56032 *	-17.2289	-0.109077	0.3280635	13
	2.075985	-1.06049	-0.19625		
9. GCI	17.79358	5.845724	-0.574445 *	0.1249967	13
	1.560397	0.900311	-2.043373		
10. HCT	6.068643 **	1.297224	-0.720999 **	0.1453725	11
	3.633718	1.023187	-3.137578		
11. EFX	12.35114 **	-3.81553	-0.33168	0.1305343	14
	2.745675	-0.77627	-1.09797		
12. MAS	20.19216 **	-3.45594	-0.540195 **	0.2132437	13
	3.658166	-1.56038	-2.232464		
13. FAJ	4.124579 **	-0.10089	-1.458259 **	0.4855756	12
	2.497115	-0.03099	-2.870796		
14. TBL	14.56275	7.30242 *	-0.860828 **	0.2292667	13
	1.409723	2.038644	-2.867625		
15. ALOG	6.505462	-2.31096	-0.021973	-0.185313	12
	1.210928	-0.37023	-0.134563		
16. SON	16.35798 **	3.11856	-0.747361 **	0.2970558	15
	2.506541	1.136121	-2.811312		
17. ASAL	0.945959 **	-1.19587	-0.449589	0.3602854	11
	2.41369	-0.8278	-1.162342		
18. SEH	3.013254	1.135889	-0.284069	-0.077412	12
	1.014211	0.197588	-0.742537		
19. DOW	61.6348 **	1.123132	-0.950837 *	0.2780448	12
	2.485412	0.505833	-2.242364		
20. PFE	46.04783 *	6.715842	-0.941541 **	0.3624547	14
	1.872109	1.684315	-3.271942		
Average Measure	**16.47875**	**2.699888**	**-0.734438**	**0.2517317**	
	2.574478	**0.788168**	**-2.826156**		

Appendix 4B

Table 4.17

Time series regression of four quarter price change (ΔP) on earnings before goodwill amortisation (EBG), and the most recent prior period's price (P_t)

The table provides the estimate of intercepts (β_0), and coefficients (β_1 and β_3) of earnings before goodwill amortisation (EBG) and equity price at time t (P_t), respectively, for explaining the share price change $\Delta P = P_{t+5} - P_{t+1}$, where P_{t+5} and P_{t+1} are end of fifth quarter t+5 price and end of first quarter t+1 price, respectively. The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using Newey-West heteroskedasticity autocorrelation consistent standard errors and covariance when the regression coefficients are estimated using time series analysis, whereas the *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled regression analysis. The intercepts of fixed year and firm effects are the averages of the coefficient values for each year and firm respectively. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance. Firms' names are provided in Table 4.1 Panel A.

$$\Delta P = \beta_0 + \beta_1 \, EBG_t + \beta_3 \, P_t + \varepsilon_{t+1} \qquad (21)$$

Firm	β_0	β_1	β_3	Adjusted R^2	Sample
Pooled	4.668817 2.614341 **	1.678215 0.899207	-0.256531 -1.504239	0.0903046	245
Fixed Year	4.672846 1.554196	1.780757 0.941481	-0.258062 -1.532731	0.1035153	245
Fixed Firm	15.54568 3.386156 **	1.516304 0.797536	-0.63671 -3.060143 **	0.2057832	245
1. THO	9.933669 2.29874 *	8.75919 3.756599 **	-1.095848 -3.692823 **	0.2551893	11
2. BBA	-0.22965 -0.08864	23.33387 2.455555 **	-0.918895 -10.82296 ***	0.5532809	11
3. HRB	41.54272 3.07658 **	3.170742 1.093164	-1.18327 -2.727105 **	0.3316014	11
4. LAF	13.8543 2.491051 **	4.071715 2.14972 *	-0.93376 -2.816566 **	0.3322682	12
5. JCI	14.50911 0.803031	6.861268 1.037052	-0.84553 -2.017155 *	0.0487349	13
6. COA	6.918682 1.590331	-2.91078 -1.06581	-0.120561 -0.302635	-0.036099	11
7. ALN	23.30296 3.034522 **	13.92904 1.896003 *	-2.005118 -2.694292 **	0.4477808	11
8. HCSG	17.01845 2.479953 **	-38.5647 -1.2188	1.0117318 0.6408309	0.2757493	13
9. GCI	13.38863 1.157314	4.745699 1.068466	-0.473761 -2.149863 *	0.0456188	13
10. HCT	4.985702 2.417567 **	0.57304 0.606091	-0.569976 -2.179216 *	0.0216503	11
11. EFX	8.206963 1.797264 *	-6.77576 -0.63181	-0.011308 -0.022434	-0.031589	14
12. MAS	21.35401 2.380442 **	-3.76593 -1.76219	-0.550008 -1.624901	0.1071928	13
13. FAJ	1.027491 0.760368	2.305703 0.515796	-0.541953 -1.992359 *	-0.040339	12
14. TBL	13.00911 2.17057 *	-2.81459 -1.09805	-0.126857 -0.70493	0.1576184	13
15. ALOG	13.89978 2.434277 **	-12.1905 -2.08577 *	0.1291992 1.1025838	0.1526746	12
16. SON	9.169684 1.645347	8.823172 6.825605 ***	-0.843934 -3.925905 **	0.6109219	15
17. ASAL	0.970957 2.50433 **	-3.21915 -1.67009	-0.051986 -0.14097	0.2965787	11
18. SEH	4.967637 1.383228	-3.00368 -0.57659	-0.041144 -0.136057	-0.007779	12
19. DOW	58.51354 2.704619 **	-0.46253 -0.27271	-0.793444 -2.226314 *	0.3814469	12
20. PFE	52.60106 1.87287 *	5.199528 0.89262	-0.981409 -2.789238 **	0.2251392	14
Average Measure	**16.44724 1.945688**	**0.40327 0.595742**	**-0.547392 -2.061116**	**0.206382**	

Appendix 4B (continued)

Table 4.18

Time series regression of four quarter price change (ΔP) on earnings before goodwill amortisation (EBG), goodwill amortisation per share (GAPS) and the most recent prior period's price (P_t)

The table provides the estimate of intercepts (β_0), and coefficients (β_1, β_2 and β_3) of earnings before goodwill amortisation (EBG), goodwill amortisation per share (GAPS), and equity price at time t (P_t), respectively, for explaining the share price change $\Delta P = P_{t+5} - P_{t+1}$, where P_{t+5} and P_{t+1} are end of fifth quarter t+5 price and end of first quarter t+1 price, respectively. The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using Newey-West heteroskedasticity autocorrelation consistent standard errors and covariance when the regression coefficients are estimated using time series analysis, whereas the *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled regression analysis. The intercepts of fixed year and firm effects are the averages of the coefficient values for each year and firm respectively. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance. Firms' names are provided in Table 4.1 Panel A.

$$\Delta P = \beta_0 + \beta_1 EBG_t + \beta_2 GAPS_t + \beta_3 P_t + \varepsilon_{t+1} \qquad (22)$$

Firm	β_0	β_1	β_2	β_3	Adjusted R^2	Sample
Pooled	4.460946 **	1.339647	5.4826589	-0.2561411	0.0913435	245
	2.468987	0.727754	0.9244891	-1.5065061		
Fixed	4.478396	1.377568	5.9437719	-0.2554865	0.1053259	245
Year	1.495331	0.738499	0.9990664	-1.5219829		
Fixed	14.7615 *	1.507799	7.9692307	-0.6505395 **	0.2059815	245
Firm	3.026049	0.810872	1.0188635	-3.1062094		
1. THO	9.899132 *	8.783965 **	1.5840107	-1.1006455 **	0.1489893	11
	2.194328	3.305059	0.0436866	-2.9177024		
2. BBA	-2.56296	42.72818 ***	-1803.313 ***	-1.0385359 ***	0.8496577	11
	-1.21444	10.50468	-9.757105	-23.726938		
3. HRB	44.06042 **	-0.04165	83.349859 *	-1.3180497 **	0.3926826	11
	4.100321	-0.01271	2.1542888	-3.6957205		
4. LAF	15.64825 **	3.099534	22.551339	-1.0256434 **	0.272766	12
	3.079355	1.427429	0.8479878	-3.4233168		
5. JCI	7.546567	4.79497	22.870391	-0.8593606 *	-0.007946	13
	0.447177	0.652573	1.1987691	-1.8522256		
6. COA	7.302934	-3.51582	-63.84338	-0.0579053	-0.169714	11
	1.733898	-1.0705	-0.366038	-0.1260566		
7. ALN	33.40273 **	-2.34748	-69.89189 *	-1.3378567 **	0.5884063	11
	4.260926	-0.26637	-2.357722	-2.3798888		
8. HCSG	14.15711 **	-37.674	-25.32994	1.3057608	0.2280335	13
	3.928205	-1.25154	-0.932866	0.71396289		
9. GCI	9.488148	9.164559	-27.80193	-0.4844599 *	-0.008069	13
	0.901732	1.159703	-0.480952	-1.8684212		
10. HCT	4.78481 **	-1.71302	9.2304808	-0.5444187 **	0.1280514	11
	3.709555	-1.67671	1.7418973	-2.6763963		
11. EFX	8.666974	-7.92016	9.0026302	-0.0060538	-0.130479	14
	1.296118	-0.52374	0.1703881	-0.0114608		
12. MAS	23.45687 **	-4.23544	-12.56676	-0.5235043	0.0108841	13
	2.306267	-1.4481	-0.30156	-1.3475057		
13. FAJ	1.269198	2.264763	-244.8442 *	-0.5730186	-0.13327	12
	0.854573	0.495648	-2.16448	-1.7705408		
14. TBL	4.589437	-6.91531	157.39089	0.03406386	0.3812313	13
	0.798756	-1.71069	1.755189	0.15380348		
15. ALOG	10.33886 **	-12.8432 *	177.87925	0.2226328	0.1230101	12
	2.634043	-2.02519	1.0174014	1.22218381		
16. SON	4.195725	9.451083 ***	25.06269	-0.8051538 **	0.5860818	15
	0.407217	6.956736	0.6537345	-3.2964429		
17. ASAL	0.956517 *	-3.25985	0.0942106	-0.0444831	0.1962422	11
	1.961566	-1.87424	0.0662773	-0.1216232		
18. SEH	3.934163	1.063589	-25.8438	-0.0816801	0.0497105	12
	1.46307	0.360437	-1.606854	-0.3110261		
19. DOW	91.48139 **	-3.9768	-64.27443	-0.6018688 *	0.4092968	12
	2.434205	-1.62953	-1.140905	-2.1010436		
20. PFE	60.53741 **	-6.56118	835.89284 **	-1.2541936 ***	0.4363975	14
	2.737697	-1.58484	3.3733787	-5.3377396		
Average	**17.65768**	**-0.48267**	**-49.64004**	**-0.5047187**	**0.2175982**	
Measure	**2.001729**	**0.489404**	**-0.304274**	**-2.743705**		

Appendix 4B (continued)

Table 4.19

Time series regression of four quarter price change (ΔP) on earnings after goodwill amortisation (EAG), and the most recent prior period's price (P_t)

The table provides the estimate of intercepts (β_0), and coefficients (β_1 and β_3) of earnings after goodwill amortisation (EAG) and equity price at time t (P_t)), respectively, for explaining the share price change $\Delta P = P_{t+5} - P_{t+1}$, where P_{t+5} and P_{t+1} are end of fifth quarter t+5 price and end of first quarter t+1 price, respectively. The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using Newey-West heteroskedasticity autocorrelation consistent standard errors and covariance when the regression coefficients are estimated using time series analysis, whereas the *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled regression analysis. The intercepts of fixed year and firm effects are the averages of the coefficient values for each year and firm respectively. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance. Firms' names are provided in Table 4.1 Panel A.

$$\Delta P = \beta_0 + \beta_1 \, EAG_t + \beta_3 \, P_t + \varepsilon_{t+1} \qquad (23)$$

Firm	β_0		β_1		β_3		Adjusted R^2	Sample
Pooled	4.767876	**	1.604324		-0.246807		0.0868622	245
	2.612571		0.820956		-1.456242			
Fixed Year	4.771551		1.701918		-0.247733		0.0994965	245
	1.566888		0.854554		-1.473205			
Fixed Firm	15.7566	**	1.392881		-0.62878	**	0.2042832	245
	3.46188		0.742666		-3.06343			
1. THO	10.12935	**	8.466206	**	-1.057447	**	0.2492299	11
	2.456129		3.520273		-4.10414			
2. BBA	-0.35461		23.83535	**	-0.92568	***	0.5641491	11
	-0.13896		2.553068		-11.51866			
3. HRB	41.69728	**	2.647717		-1.155919	**	0.321657	11
	3.035209		0.80668		-2.614991			
4. LAF	13.53665	**	4.157078	*	-0.908208	**	0.3235813	12
	2.507082		2.015653		-2.768643			
5. JCI	17.39306		6.246412		-0.757209		0.0181637	13
	1.033988		0.79046		-1.653401			
6. COA	6.897608		-2.85777		-0.124865		-0.03706	11
	1.572779		-1.06481		-0.315631			
7. ALN	25.8353	**	12.79657	**	-2.01212	**	0.508479	11
	3.594223		2.868685		-3.435149			
8. HCSG	17.1522	*	-25.7744		0.0819814		0.1584239	13
	1.924586		-1.06423		0.086544			
9. GCI	12.20736		6.158748		-0.496079	*	0.0635015	13
	1.039678		1.22107		-2.17897			
10. HCT	4.705276	*	-0.02192		-0.461605		0.0044302	11
	2.148113		-0.01627		-1.724204			
11. EFX	8.614518		-7.80258		-0.005356		-0.02778	14
	1.699341		-0.6302		-0.01053			
12. MAS	20.69966	**	-3.40565		-0.566865		0.1055317	13
	2.27362		-1.69983		-1.686777			
13. FAJ	1.027491		2.305703		-0.541953	*	-0.040339	12
	0.760368		0.515796		-1.992359			
14. TBL	12.92352	*	-3.16293		-0.108304		0.1684922	13
	2.170209		-1.18036		-0.579847			
15. ALOG	13.83618	**	-12.431	*	0.137809		0.1637234	12
	2.491787		-2.0869		1.1317186			
16. SON	11.03673	*	8.494692	***	-0.85639	**	0.6030606	15
	1.968109		6.536827		-3.991046			
17. ASAL	0.703722		-2.15039		-0.215419		0.1299547	11
	1.244265		-1.71612		-0.471628			
18. SEH	4.372707		-2.32799		-0.080178		-0.046989	12
	1.242234		-0.42633		-0.277			
19. DOW	58.11695	**	-0.32622		-0.801289	**	0.3803313	12
	2.678787		-0.19405		-2.276543			
20. PFE	52.85309	*	5.077552		-0.976664	**	0.2218785	14
	1.858545		0.859113		-2.749989			
Average Measure	**16.6692**		**0.996256**		**-0.591588**		**0.191621**	
	1.878004		**0.580426**		**-2.156562**			

CHAPTER 5

THE ROLE OF THE MOST RECENT PRIOR PERIOD'S PRICE IN OHLSON (1995) VALUE RELEVANCE MODEL CROSS-SECTION ANALYSIS TESTS

5.1 INTRODUCTION

This chapter demonstrates the importance of incorporating the most recent prior period's equity price as an additional explanatory variable in regression models for cross-sectionally testing the value relevance of earnings related accounting variables such as earnings and goodwill amortisation within the Ohlson (1995) value relevance model framework. Ohlson (1995) considers a firm's closing book value of equity and future abnormal earnings as explanatory variables, and conceptualises the current equity price as being determined by book value, current earnings, and other information related to future abnormal earnings. The Ohlson (1995) model is rearranged to demonstrate why the most recent prior period's price plays a potentially important explanatory role in the model and can be used to greatly improve the regression model empirical specification of cross-sectional value relevance tests. The chapter therefore builds on the previous time series analysis chapter (Chapter 4) which demonstrates the importance of including the most recent prior period's price as an important explanatory variable in time series value relevance tests. We also demonstrate that including the most recent prior period's price as an additional explanatory variable eliminates the scale problem in value relevance models whereby the scale (or size) of dependent and independent variables in value relevance studies affects the apparent explanatory power of the models (see Brown, Lo, and Lys, 1999).

The chapter's results indicate that the most recent prior period's price plays a much more important role than current trailing earnings as well as goodwill amortisation when explaining or forecasting next period's price. More importantly, the analysis also indicates that change in price (or returns), not the price level, should be used as the dependent variable in value relevance studies. We illustrate these points by revisiting the Jennings, LeClere, and Thompson (2001) empirical specification used to study whether goodwill amortisation is value relevant and potentially informative with respect to future earnings.

Numerous value relevance studies utilise Ohlson's (1995) equity valuation model to explain concurrent or future equity prices with end of period earnings measures as well as potential forward looking earnings information such as goodwill amortisation. Examples are Jennings, LeClere, and Thompson (2001), Collins, Pincus, and Xie (1999), and Collins, Maydew, and Weiss (1997). Many studies that implement Ohlson's (1995) modelling framework have equity price as the dependent variable but do not include the most recent prior period's price as an additional independent variable in the value relevance model. We demonstrate that the Ohlson (1995) model directly incorporates the most recent prior period's price as a potentially important value relevance explanatory variable. Since current and future earnings are related to the most recent period's equity price, current trailing earnings alone are not sufficient for explaining next period's equity price, so the most recent period's equity price should be accommodated as a value relevance benchmark in earnings-based value relevance models for explaining next period's equity price.

Efficient market theory implies that equity prices should incorporate all relevant information. Since market efficiency considerations and the random walk model of share prices imply that the most recent prior period's price is important for explaining the current period's equity price, the information contained in the most recent period's price should have important value relevance. Consistently, Marsh and Merton (1987) and Beaver, Lambert, and Morse (1980) find that prior period share prices incorporate information about future permanent earnings and dividends. Ohlson (1995) values firms using expected future earnings, so if the most recent period's price contains information on future earnings, then the most recent prior period's price will also be a proxy for future as well as contemporaneous earnings. These studies have motivated us to consider the most recent prior period equity price as a highly informative variable in value relevance models, especially since one of the objectives of value relevance studies is to identify the most appropriate variables for explaining the equity price of a firm. Ohlson (1995) notes that equity prices should be explained with a variable that contains current and future earnings information. The most recent prior period's price contains such earnings information, as indicated by Marsh and Merton (1987). Hence, we show that the empirical specification of an earnings-based value relevance model such as Jennings, LeClere, and Thompson (2001) can be greatly improved, using the Ohlson (1995) model reformulation, by including the most recent prior period's equity price as an additional explanatory variable in the regression model framework.

Our study examines a 16 year period when goodwill amortization was potentially reported. The results indicate that, once the most recent prior period's price is incorporated as a value relevant cross-sectional explanatory variable, the value relevance and usefulness of current trailing earnings is limited for explaining next period's price, especially when compared to the explanatory power of the most recent prior period's equity price. This finding is explained by noting that the most recent prior period's prices consist of current and future earnings information (Ohlson, 1995; Marsh and Merton, 1987), so the role of the most recent prior period's price will be much more important than current trailing earnings for explaining next period's equity price. It can further be noted that equity prices react to the unexpected component of earnings announcements, not the earnings level itself, since the expected level of earnings is already incorporated into the most recent equity price prior to the earnings announcement.

It is not surprising that past price is important for explaining subsequent prices, since it is well-known that the level of equity prices follows an autoregressive, non-stationary process (e.g., Aggarwal and Kyaw, 2004). The first difference in equity price appears to follow a stationary, non-persistent process, however, as noted by Jeon and Jang (2004), so the chapter's analysis therefore implies that value relevance studies should examine change in equity price (or returns), not the price level, as the dependent variable (see also chapter 4). We therefore subsequently use change in equity price as the dependent variable, for econometric reasons, to explore the value relevance of earnings, thus further improving the model specification. We extend the Jennings, LeClere, and Thompson (2001) approach to examine the value relevance of earnings and goodwill amortisation when change in price is the dependent variable, and demonstrate the theoretical and empirical connection between price and price change within the Ohlson (1995) framework. The results indicate that when change in equity price is the dependent variable, both the current trailing earnings explanatory variables (earnings before goodwill amortisation and earnings after goodwill amortisation) as well as the most recent prior period's price are value relevant, but the most recent prior period's price plays a much more important role in explaining price changes.

We conclude that (a) the most recent prior period's equity price is more useful than current trailing earnings for explaining next period's equity price; (b) incorporating the most recent prior period's price into the regression analysis greatly improves the empirical specification of value relevance models; and (c) the most recent prior period's equity price provides a benchmark for evaluating the additional informativeness of accounting variables such as current trailing earnings and goodwill amortisation for explaining next period's equity price. The chapter's results also imply, much more strongly than prior studies, that systematic goodwill amortisation should not be deducted from earnings in accounting statements because the presence of goodwill amortisation is significantly positively (not negatively) related to equity prices. This effect is eliminated when the most recent prior period's price is included as an additional explanatory variable in the regression analysis, thus indicating that goodwill amortisation information as well as current trailing earnings information have already been incorporated into the most recent prior period's price.

The following sections are presented as: literature review, Ohlson (1995) value relevance model reformulation, data, cross-section regression analysis results, and conclusion.

5.2 LITERATURE REVIEW

5.2.1 Ohlson (1995) and the Most Recent Prior Period Equity Price as a Value Relevant Explanatory Variable

Ohlson (1995) relates equity valuation models to the residual income valuation model under the assumption of a clean surplus, i.e., the assumption that change in book value equals earnings less dividends.[1] Kothari (2001) subsequently explores the residual income valuation model as a transformation of the dividend discount model and indicates the fundamental role of earnings information as a determinant of equity prices (see also Frankel and Lee, 1998; and Dechow, Hutton, and Sloan, 1999). Hence, Ohlson (1995) has gained significant credit for revitalizing the residual income valuation model for equity valuation. Ohlson (1995) conceptualises the current equity price as being determined by book value, current earnings, and other information related to future abnormal earnings.

Ohlson's (1995) model can be rearranged to reveal a potentially important role for the most recent prior period's price when explaining the current or future equity price, an explanatory role that is emphasized by Marsh and Merton (1987). Marsh and Merton (1987) demonstrate that past prices are a source of information about permanent earnings in an efficient market. The most recent prior period's price is therefore useful for predicting next period's price, as happens with a random walk model of equity prices. Marsh and Merton (1987) assert that past prices contain more information about future earnings than past earnings provide, so stock prices are predictors of future permanent earnings. As the stock price in an efficient market equals the present value of

[1] Residual income valuation models explain the equity price as a function of the present value of expected future residual income.

future permanent earnings, and since permanent earnings are positively related to next period's dividend, current stock price changes can therefore provide information about next period's dividends. Marsh and Merton (1987) show that changes in lagged stock prices are predictors of changes in dividends and, by implication, changes in earnings.

Beaver, Lambert, and Morse (1980) argue that the information contained in past equity prices is important for inferring the earnings process, so equity prices provide a base for predicting future earnings. This implies that earnings information is already incorporated in past or current prices, and further highlights the importance of employing the most recent prior period's equity prices as an additional explanatory variable to assess the informativeness of current trailing earnings in value relevance models. It will be shown below that the most recent prior period's equity price provides important information in Ohlson's (1995) model, consistent with Marsh and Merton (1987) and Beaver, Lambert, and Morse (1980), once earnings-based value relevance models are summarised immediately below.

5.2.2 Earnings-Based Value Relevance Models

Some value relevance investigations focus on earnings, and have devised exclusively earnings-based models for assessing the value relevance of earnings (e.g. Collins, Pincus, and Xie, 1999; Collins, Maydew, and Weiss, 1997). These studies generally find that current trailing earnings are value relevant.

Goodwill amortisation can be extracted from earnings and directly examined to determine if it provides additional value relevant information and is informative with respect to future earnings. Studies therefore examine, for example, the value relevance of goodwill amortisation for its additional contribution to explaining equity prices (e.g., Smith, 2003; Jennings, LeClere, and Thompson, 2001). These studies have separated goodwill amortisation from earnings and examine how goodwill amortisation improves the informativeness of earnings. They conclude that goodwill amortisation has no incremental value relevance. These value relevance investigations have examined the value relevance of accounting variables without incorporating the information role of past prices. We revisit the empirical set-up of goodwill amortisation studies in this chapter in order to demonstrate why value relevance studies should contain the most recent prior period's price as an additional explanatory variable, as we explore whether goodwill amortisation provides forward-looking earnings related information.

5.3 OHLSON (1995) VALUE RELEVANCE MODEL REFORMULATION

5.3.1 The Ohlson (1995) Model

Ohlson (1995) conceptualises how the equity price of a firm can be modelled using the dividend discount model as well as a clean surplus relationship among accounting variables. Ohlson's (1995) model explains the market value of a firm using current abnormal earnings, book value, dividends, and future abnormal earnings, and is thus known as the earnings, book values, and dividends (EBD) model (Ohlson, 2001). The model examines the value relevance of book value, current abnormal earnings, and expected future abnormal earnings.[2]

[2] Abnormal earnings, also known as residual income, equal earnings minus a capital contribution, as defined below.

The Ohlson (1995) model starts with the dividend discount model (equation (A1) on page 666 of Ohlson, 1995):

$$P_t = \sum_{\tau=1}^{\infty} (1+r)^{-\tau} E_t(d_{t+\tau}) \,, \qquad (1)$$

where

t = a particular point in time,

P_t = the end of period equity price,

r = risk free rate of interest,

$E_t(.)$ = expectations operator at time t,

d_t = dividends for period t,

and the clean surplus relation (equation (A2a) on page 666 of Ohlson, 1995),

$$y_{t-1} = y_t + d_t - x_t \,, \qquad (2)$$

where

y_t = book value of equity at time t

and

x_t = trailing earnings for period t.

From these relationships, Ohlson (1995) derives the reformulated dividend discount model (equation (1) on page 667 of Ohlson, 1995)

$$P_t = y_t + \sum_{\tau=1}^{\infty} (1+r)^{-\tau} E_t(x^a_{t+\tau}) \qquad (3)$$

where

$$x^a_t \equiv (x_t - r.y_{t-1}) \qquad (4)$$

represents abnormal earnings for period t. Equation (3) indicates that a firm's future abnormal earnings determine the firm's market value, along with current book value and current abnormal earnings.

Ohlson (1995) considers AR(1) dynamics for earnings within the earnings, book values, and dividends model. For this, he postulates that next period's future abnormal earnings (x^a_{t+1}) are determined by current abnormal earning and other forward looking earnings related information (v_t). In this context, his assumptions (equations (2a) and (2b) on page 668 of Ohlson, 1995) are given as:

$$x^a_{t+1} = \omega x^a_t + v_t + \varepsilon_{1,t+1} \qquad (5)$$

and

$$v_{t+1} = \gamma v_t + \varepsilon_{2,t+1} \ , \qquad (6)$$

where ω and γ are persistence parameters that are identifiable by market participants. Using the combination of residual income, clean surplus relations among accounting variables, and these assumptions, Ohlson (1995) shows (equation (5) on page 669 of Ohlson, 1995) that

$$P_t = y_t + \alpha_1 x^a_t + \alpha_2 v_t \ , \qquad (7)$$

where

$$\alpha_1 = \left(\frac{\omega}{1 + r - \omega} \right)$$

and

$$\alpha_2 = \left(\frac{1 + r}{(1 + r - \omega)(1 + r - \gamma)} \right).$$

Ohlson (1995) indicates that equation (7) is a simplified form of the primary model (equation (3) above), where v_t is future value relevant information that affects future but not current trailing earnings (i.e., information not related to abnormal earnings at time t).[3] In the simplified model (equation (7)), the closing book value (y_t), current abnormal earnings (x_t^a), and future value relevant earnings related information (v_t) explain the time t equity price (P_t). According to Ohlson (2001), the empirical nature of the earnings, book values, and dividends model very much depends on future value relevant earnings information. He argues that any value relevant variable could represent future earnings related information (v in equation (7)). More importantly, he further argues that eliminating or leaving out appropriate future value relevant earnings related information from the earnings, book values, and dividends model can have a drastic effect (Ohlson, 2001).[4]

Ohlson (1995) notes that considering $v_t = 0$ allows the current share price to be related to current abnormal earnings and book value only (see equation (7)). This simplifying assumption has been used by researchers to implement a simplified version of equation (7) where $v_t = 0$, but can potentially create a missing variable problem when additional information is important for explaining future expected abnormal earnings (i.e. when v_t does not equal zero). To further illustrate this point, consider the price change version of the Ohlson (1995) valuation model, obtained using the period t and period t+1 versions of equation (7), that is outlined at the top of page 683 of Ohlson (1995):

$$P_{t+1} + d_{t+1} - (1+r)P_t = y_{t+1} + d_{t+1} + \alpha_1 x_{t+1}^a + \alpha_2 v_{t+1} - (1+r)(y_t + \alpha_1 x_t^a + \alpha_2 v_t)\,. \quad (8)$$

Equation (8) simplifies to the price change equation

[3] Ohlson (1995) does not give specific examples of future earnings related value relevant information, but an example would be research and development expenditures which do not increase current earnings but are expected to increase next period's earnings.
[4] Ohlson (2001) does not give examples of future earnings related value relevant information (see also footnote 4), but implies that it can be inferred from the empirical relationship between current and future earnings (see equation (5)).

$$P_{t+1} - P_t = r\,P_t + y_{t+1} - (1+r)y_t + \alpha_1[x^a_{t+1} - (1+r)x^a_t] + \alpha_2[v_{t+1} - (1+r)v_t]. \quad (9)$$

Equations (8) and (9) indicate that the most recent prior period's price (P_t) as well as changes in future earnings related value relevant information ($v_{t+1} - (1+r)v_t$) can play a very important role in the Ohlson (1995) model for explaining price and price changes, so the inclusion of these variables in value relevance studies could be crucial.

5.3.2 The Ohlson (1995) Value Relevance Model Reformulation

To obtain the Ohlson (1995) value relevance model reformulation, equation (9) can be further rearranged to

$$P_{t+1} = (1+r)P_t + y_{t+1} - (1+r)y_t + \alpha_1[x^a_{t+1} - (1+r)x^a_t] + \alpha_2[v_{t+1} - (1+r)v_t]. \quad (10)$$

Equations (9) and (10), derived directly from the Ohlson (1995) model price change equation (page 683 of Ohlson, 1995), reveal an important random walk feature of the Ohlson (1995) model. In particular, the time t+1 price (P_{t+1}) is equal to the future value of the most recent prior period price ($(1+r)P_t$) plus adjustments representing innovations in book value ($y_{t+1} - (1+r)y_t$), innovations in current abnormal earnings ($x_{t+1} - (1+r)\,x_t$), and innovations in future earnings related value relevant information ($v_{t+1} - (1+r)v_t$). The most recent prior period's price is therefore seen to be a crucial component of the Ohlson (1995) model.

To see this even more clearly, book value (y) can be all but eliminated from equation (10) by substituting in the book value identity (2) as well as the abnormal earnings definition (4). The resulting price equation is

$$P_{t+1} = (1+r)P_t - d_{t+1} + (1+\alpha_1)x^a_{t+1} - \alpha_1(1+r)x^a_t + \alpha_2[v_{t+1} - (1+r)v_t]. \quad (11)$$

The random walk characteristic of the Ohlson (1995) model is further revealed, since in equation (11) next period's dividend adjusted price (P_{t+1} + d_{t+1}) equals the future value of the current price ((1+r)P_t) plus innovations in current abnormal earnings and future earnings related information (x^a and v). As we have already argued, market efficiency implies that the current price (P_t) will incorporate expected future earnings related information. Leaving the most recent prior period's price out of the Ohlson (1995) model in an empirical set-up will therefore be doubly problematic when other future value relevant variables (v) related to future earnings are left out as well, since both important indicators of expected future abnormal earnings are likely to be highly correlated and will be absent from the model (see also Ohlson, 2001). This can give rise to a missing variable problem, and potentially misleading inferences concerning the value relevance role of current trailing earnings (x_t), if current trailing earnings are also correlated with the most recent prior period's price P_t (see, e.g., Wooldridge, 2002).

The random walk characteristic of the Ohlson (1995) model, revealed by equation (11), further implies that price change (or return), not price, should be the dependent variable in value relevance studies that use Ohlson (1995), since changes in random walk series are stationary whereas the level of the series is not.[5] This is an especially important consideration when past price is left out of the value relevance model framework, as is usually the case in value relevance studies, since in a random walk price change process the immediate past price is a crucial determinant of the current price.

[5] Aggarwal and Kyaw (2004) demonstrate, for instance, that the level of equity prices follows an autoregressive, non-stationary process.

Rearrangement of equation (11) leads to a simplified version of the Ohlson (1995) price change equation (see page 683 of Ohlson, 1995):

$$P_{t+1} - P_t = r\,P_t - d_{t+1} + (1+\alpha_1)x^a_{t+1} - \alpha_1(1+r)x^a_t + \alpha_2[v_{t+1} - (1+r)v_t]. \qquad (12)$$

The most recent prior period's price variable (rP_t) on the right hand side of equation (12) represents the proportionate drift aspect of a random walk price change process and thus represents a potentially important role for past price in the Ohlson (1995) framework even when price change is the dependent variable.

Equations (11) and (12) can be used to derive simplified regression equations for the Ohlson (1995) model that incorporate the potentially important informational role played by the most recent prior period's price (P_t), current trailing earnings (x), and future earnings related information (v) in value relevance studies. Three simplifications are required to make the Ohlson (1995) model equations directly comparable with Jennings, LeClere, and Thompson (2001). First, the level of current trailing earnings (x) and future value relevant information (v) are examined, not innovations in the level (see equations (11) and (12)). Secondly, only information that is already available at time t+1 is utilised in the regression model equations. Thirdly, the current abnormal earnings variable (x^a_t) is simplified to current trailing earnings (x_t), and the regression equations are further simplified by using the ex-dividend share price P_{t+1}, thus deleting the dividend term d_{t+1} from the regression equation.[6] These simplifications of equations (11) and (12) lead to the following cross-sectional regression equations for price P_{t+1} and price change ΔP:

$$P_{i,t+1} = \beta_0 + \beta_1 P_{i,t} + \beta_2 x_{i,t} + \beta_3 v_{i,t+1} + \varepsilon_{i,t+1} \qquad (13)$$

and

[6] The dividend term could easily be incorporated in the regression equations.

$$\Delta \boldsymbol{P}_{i,t+1} = \boldsymbol{\theta}_0 + \boldsymbol{\theta}_1 \boldsymbol{P}_{i,t} + \boldsymbol{\theta}_2 \boldsymbol{x}_{i,t} + \boldsymbol{\theta}_3 \boldsymbol{v}_{i,t+1} + \boldsymbol{\varepsilon}_{i,t+1} \ , \quad (14)$$

where i indicates firm i, and β and θ are the coefficients of regression equations (13) and (14), respectively. Equations (13) and (14) explore the incremental role of current trailing earnings ($x_{i,t}$) for explaining subsequent share prices and share price changes, respectively, above and beyond the role played by the most recent prior period's share price ($P_{i,t}$) as well as by other forward looking earnings related information ($v_{i,t+1}$). This provides a benchmark to evaluate the information dynamics of current trailing earnings information. When the most recent prior period's price $P_{i,t}$ and forward looking information $v_{i,t+1}$ are important and are correlated, their inclusion together can greatly improve the value relevance model regression equation specification (see value relevance regression equations (13) and (14)).

Earnings ($x_{i,t}$) represent aggregated earnings, but it is also possible to disaggregate the earnings by extracting goodwill amortisation to directly assess the informativeness of goodwill amortisation. Goodwill is the excess amount beyond the stated value of a firm's underlying assets. In other words, goodwill can reflect the value of unidentifiable intangibles within the firm (Jennings, LeClere, and Thompson, 2001). Goodwill amortisation is the amount by which goodwill is reduced each year to represent the declining value of intangible assets in a fiscal period. As we intend to assess the additional informativeness of goodwill amortisation, we consider two measures of current trailing earnings, earnings before goodwill amortisation ($\boldsymbol{X}_{i,t}$=$EBG_{i,t}$) and earnings after goodwill amortisation ($\boldsymbol{X}_{i,t}$=$EAG_{i,t}$), as well as goodwill amortisation per share ($v_{i,t+1}$ = $GAPS_{i,t}$). We employ these earnings variables from Jennings, LeClere, and Thompson (2001) to examine their price value relevance using regression models (13) and (14).

5.3.3 Method

We begin our investigation by first replicating the Jennings, LeClere, and Thompson's (2001) regression models which incorporate various combinations of earnings before and after goodwill amortisation. The Jennings, LeClere, and Thompson's (2001) regression models do not include the most recent prior period's price P_t, but are otherwise similar to or identical to value relevance model regression equation (13) above:

$$P_{i,t+1} = \beta_0 + \beta_1 \, EBG_{i,t} + \varepsilon_{i,t+1} , \qquad (15)$$

$$P_{i,t+1} = \beta_0 + \beta_1 \, EBG_{i,t} + \beta_2 \, GAPS_{i,t} + \varepsilon_{i,t+1} , \qquad (16)$$

and

$$P_{i,t+1} = \beta_0 + \beta_1 \, EAG_{i,t} + \varepsilon_{i,t+1} , \qquad (17)$$

where

$P_{i,t+1}$ = next period's end of quarter price,

β_0 = intercept of the model,

β_1 = coefficient estimate of earnings,

β_2 = coefficient estimate of goodwill amortization per share (GAPS),

$EBG_{i,t}$ = annual trailing earnings per share before GAPS for period t,

$GAPS_{i,t}$ = goodwill amortization per share for period t,

$EAG_{i,t}$ = annual trailing earnings per share after GAPS for period t,

and

$\varepsilon_{i,t+1}$ = error term.

Regression models (15) to (17) explore the value relevance relationships between current trailing earnings and subsequent equity prices. Firms cannot disclose accounting information immediately at fiscal year end, so three months duration is assumed to be the information delay required for the release of a firm's annual financial statements, as assumed in many studies (e.g., Jennings, LeClere, and Thompson, 2001; Collins, Maydew, and Weiss, 1997), thus explaining why the time t+1 share price is explained by time t trailing earnings information. Trailing twelve months earnings are used in regression equations (15) to (17), as is standard, to avoid the problem of quarterly earnings seasonality. Jennings, LeClere, and Thompson (2001) examine the value relevance of goodwill amortisation for explaining next period's equity prices in a pooled cross-section over time. Our first step is to replicate their findings with a much larger data set.[7]

The second step to implement regression equations (13) and (14), derived from Ohlson (1995), is to incorporate the most recent prior period's equity price as an additional value relevance model explanatory variable. Thus, we utilize value relevance regression equation (13) to accommodate the most recent prior period's equity price $P_{i,t}$ as an additional explanatory variable by adding it to regression equations (15), (16), and (17) to obtain regression equations (18) to (20). We also utilize value relevance regression equation (14) to modify regression equations (18) to (20) so that they contain price change as the dependent variable in regression equations (21) to (23). The resulting regression equations are as follows:

$$P_{i,t+1} = \beta_0 + \beta_1 EBG_{i,t} + \beta_3 P_{i,t} + \varepsilon_{i,t+1}, \qquad (18)$$

[7] Firm size is a frequent control variable in corporate finance studies, but we do not control for firm size in the regression analysis so that the results can be directly compared to Jennings, LeClere, and Thompson (2001).

$$P_{i,t+1} = \beta_0 + \beta_1\ EBG_{i,t} + \beta_2\ GAPS_{i,t} + \beta_3\ P_{i,t} + \varepsilon_{i,t+1}\ , \quad (19)$$

$$P_{i,t+1} = \beta_0 + \beta_1\ EAG_{i,t} + \beta_3\ P_{i,t} + \varepsilon_{i,t+1}\ , \quad (20)$$

where

$P_{i,t}$ = equity price at time t

and

β_3 = estimate of the time t equity price coefficient,

$$\Delta P_{i,t+1} = \beta_0 + \beta_1\ EBG_{i,t} + \beta_3\ P_{i,t} + \varepsilon_{i,t+1}\ , \quad (21)$$

$$\Delta P_{i,t+1} = \beta_0 + \beta_1\ EBG_{i,t} + \beta_2\ GAPS_{i,t} + \beta_3\ P_{i,t} + \varepsilon_{i,t+1}\ , \quad (22)$$

and

$$\Delta P_{i,t+1} = \beta_0 + \beta_1\ EAG_{i,t} + \beta_3\ P_{i,t} + \varepsilon_{i,t+1}\ , \quad (23)$$

where

$\Delta P_{i,t+1}$ = change in equity price (i.e., $P_{i,t+1} - P_{i,t}$).

A three month change in price is utilised in the regression analysis so that the results of regression equations (21) to (23) can be directly compared to the results of regression equations (18) to (20) and (15) to (17).

5.3.4 Hypotheses

Accounting principles imply goodwill amortisation is expected to provide information on the consumed or declining value of unidentifiable intangibles. If goodwill amortisation per share ($GAPS_{i,t}$) negatively explains price $P_{i,t+1}$, then goodwill amortisation per share ($GAPS_{i,t}$) is value relevant because it provides information on the declining value of unidentifiable intangibles that represents a decline, all else being equal, in share value over time. Hence, our hypothesis is:

H_1 : Goodwill contains information on unidentifiable intangibles and goodwill amortisation per share ($GAPS_{i,t}$) provides value relevant information on those intangibles beyond the information already incorporated in earnings.

As mentioned already, Marsh and Merton (1987) and Ohlson (1995) can be used to demonstrate that future earnings expectations and current earnings information should already be incorporated into the most recent prior period's equity price, so the value relevant state of current trailing earnings alone is not sufficient for explaining next period's price. The additional informativeness of current trailing earnings (EBG and EAG) for explaining share price ($P_{i,t+1}$) should therefore be assessed relative to the information incorporated in the most recent prior period's equity prices. We therefore explore whether the most recent prior period's price provides a benchmark for assessing the additional informativeness of current trailing earnings when explaining next period's price. Our second hypothesis is thus:

H_2 : The most recent prior period's price ($P_{i,t}$) explains the subsequent period's price ($P_{i,t+1}$) and already incorporates current trailing earnings related information.

5.3.5 Regression Model Estimation

Cross section analysis of regression models (16) to (24) is conducted using Ordinary Least Squares (OLS) pooled regression estimation. The coefficient standard error estimates are based on White's heteroskedasticity-consistent standard errors to overcome the problem of non-constant variance of the cross-sectional error terms. We also obtain coefficient estimates using fixed time effects and individual year regression estimates.[8] For comparison purposes with Jennings, LeClere, and Thompson (2001), each estimated regression equation is assessed using adjusted R^2, in addition to assessing the statistical significance of the coefficient estimates.[9] Our hypotheses are tested using the significance of the regression coefficient estimates related to the respective hypotheses.

5.4 DATA

The data set is obtained from the United States COMPUSTAT database. The data set consists of quarterly equity price data (DATA14) and annual earnings-based data for 1989 to 2003, the years when goodwill amortisation was directly reported. Annual variables are earnings per share before extraordinary items (DATA58), intangible assets (DATA33), amortisation of intangibles (DATA65), goodwill (DATA204), amortisation of goodwill (DATA394), and number of common shares outstanding (DATA25).

The earnings per share data are manipulated to satisfy the data requirements for our study, as in Jennings, LeClere, and Thompson (2001). Firstly, goodwill amortisation is estimated when it is not directly reported.[10] Goodwill amortisation per share (GAPS)

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[8] The pooled samples do not contain the same number of observations each year because of missing observations. Details for the fixed effect coefficient estimation are provided in the results tables.

[9] Note that according to Brown, Lo, and Lys (1999), adjusted R^2 is not an appropriate measure for assessing the explanatory power of value relevance regression models, due to scale effects whereby the scale (or size) of dependent and independent variables in value relevance studies affects the apparent explanatory power of the models.

[10] The Financial accounting Standard Board has implemented two new accounting standards for goodwill accounting (SFAS 141: Business Combination, and SFAS 142: Goodwill and Other Intangible Assets) effective from financial year 2002. Under the new standards, firms no longer account for goodwill

is determined as goodwill amortisation (DATA394) divided by shares outstanding (DATA25).[11] Earnings per share are then adjusted to obtain earnings per share before goodwill amortisation (EBG) and earnings per share after goodwill amortisation (EAG).[12] The quarterly and annual datasets are merged based on classifications common to both datasets.

As with Jennings, LeClere, and Thompson (2001), we eliminate negative earnings observations because negative earnings are a poor indicator of a firm's future earnings potential as well as current share value (Jennings, LeClere, and Thompson, 2001). We also delete observations with share prices in excess of $ 10,000 per share because sensitivity analysis indicates they would otherwise completely dominate the results (but only when the most recent prior period's price is not included as an additional explanatory variable in the regression analysis). Unlike Jennings, LeClere, and Thompson (2001), we include zero goodwill amortisation observations because they provide additional information on the relationship between current trailing earnings and share price. Our study considers all available goodwill amortisation observations since they are, as mentioned, potentially informative, and we also do not delete outliers (other than observations with extremely high prices). Studenmund (2006) indicates that

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amortisation in their financial statements. Firms are allowed, however, to provide goodwill amortisation information separately with other financial information.

[11] Goodwill amortisation is estimated in accordance with the method devised by Jennings, LeClere, and Thompson (2001): (1) directly reported amortisation of goodwill (GWA) is directly used. Otherwise, (2) if current year goodwill (GW) equals current year intangible assets (IA) then the amortisation of goodwill (GWA) equals amortisation of intangibles (IAA), i.e., if GW=IA then GWA = IAA; (3) if GW≥0, IAA≥0, and IA=0 or missing (" "), then GWA = IAA; (4) if GW>0.9*IA (i.e., >90% of GW), then GWA = (IAA*GW)/IA; and (5) if GW<0.9*IA and 0.9*GWL<GW<GWL, then GWA = GWL-GW, where GWL = last (previous) year goodwill.

[12] Because of new accounting rules (SFAS 141: Business Combination, and SFAS 142: Goodwill and Other Intangible Assets) introduced by the Financial Accounting Standards Board (FASB), DATA58 (EPS – earnings per share) is reported in COMPUSTAT in two ways: before 2002 as after goodwill amortisation, and from 2002 as before goodwill amortisation. For the years 2002 onwards, we then adjust DATA58 (earnings per share) to include goodwill amortisation in order to obtain earnings after goodwill amortisation (EAG). For the years before 2002, DATA58 is adjusted to exclude goodwill amortisation in order to determine earnings before goodwill amortisation (EBG).

dropping outliers is not a good practice even in rare circumstances. Rather, the better approach is to include all available data in the regression analysis. In this context, our dataset differs from Jennings, LeClere, and Thompson (2001), who delete a large number of observations as being unduly influential. We do, however, check the sensitivity of the results to the exclusion of outliers and to the exclusion of zero goodwill amortisation observations. Our study examines a 16 year period (1988-2003) when goodwill amortisation was potentially reported, and in this period 36,785 observations are available that have non-negative earnings before goodwill amortisation (EBG) and zero or positive goodwill amortisation per share (GAPS).[13]

Summary statistics for the data set as well as a correlation table for the data set variables are provided in Table 5.1. The pooled descriptive and percentile measures for market equity value (MEV) are also reported to indicate that the sample represents both small and large firms (see Panel B of Table 5.1). Panel C of Table 5.1 reveals that the most recent prior period's equity price ($P_{i,t}$) is highly correlated with current trailing earnings per share (EBG or EAG), thus revealing that current trailing earnings could act as a proxy for the most recent prior period's price if the prior period's price is not included in value relevance regression analysis.[14]

[Please insert Table 5.1 about here.]

[13] We do not restrict the analysis to certain industries since, unlike in other corporate finance studies, there is no a priori reason why the relationship between share price (or price change), earnings, and goodwill amortisation should differ between industries.
[14] A missing variable effect can occur when an important regression variable is not included in the regression model, but is correlated with an included explanatory variable (see, e.g., Wooldridge, 2001).

5.5 CROSS-SECTION REGRESSION ANALYSIS RESULTS

5.5.1 Replicating the Jennings, LeClere, and Thompson (2001) Study

Pooled, fixed year effect, and yearly regression results for equations (15) to (17) are reported in Tables 5.2 to 5.4 to replicate Jennings, LeClere, and Thompson (2001). The results fairly closely replicate the Jennings, LeClere, and Thompson (2001) findings with regard to the earnings variables (EBG and EAG) but, unlike Jennings, LeClere, and Thompson (2001), the results indicate that both current trailing earnings measures (EBG and EAG) are only marginally related to the share price dependent variable.

A difference between our results and the Jennings, LeClere, and Thompson (2001) results is the much lower adjusted R^2s for regression models (15) to (17) in the Table 5.2 to 5.4 results relative to the Jennings, LeClere, and Thompson (2001) results (0.157, 0.162, and 0.148 for the fixed year effect regression results in Tables 5.2 to 5.4, respectively, versus 0.604, 0.604, and 0.584, respectively, for the Jennings, LeClere, and Thompson, 2001 fixed year effect results). A further difference is the finding that the most informative model, based on adjusted R^2, is now the second model (equation (16)) with an adjusted R^2 of 0.162 for the fixed year effect results whereas Jennings, LeClere, and Thompson (2001) find the first model (equation (15)) to be the most informative using the adjusted R^2 criteria (in our results the equation (15) adjusted R^2 is relatively lower at 0.158). Further analysis indicates that these differences in results are not due to the inclusion of zero goodwill amortisation observations in the Tables 5.2 to 5.4 regressions (see Tables 5.5 to 5.7 which take account of zero goodwill amortisation observations). They are instead due to censoring of the data (see Appendix 5A, Tables 5.21 to 5.23), since in Tables 5.21 to 5.23 in Appendix 5A we report regression results for censored data that are very close to the Jennings, LeClere, and Thompson (2001) results.[15] The similarity of the Table 5.2 to 5.4 results with the Jennings, LeClere, and Thompson (2001) results therefore indicate that subsequent findings in this study are not likely to be due to differences in the much larger sample used in this study versus the Jennings, LeClere, and Thompson (2001) sample.

[Please insert Tables 5.2 to 5.7 about here.]

Jennings, LeClere, and Thompson (2001) report significant earnings coefficient estimates for all years, whereas we find that the reported *t*-statistics and the respective p-values of the coefficient estimates indicate that the earnings (EBG and EAG) coefficient estimates for the year 2003 are not significant (see row 2003 in Table 5.2 to 5.4). The current trailing earnings (EBG and EAG) coefficient estimates are also somewhat volatile across years, especially at the end of the sample where they fall sharply, and this leads to lower overall earnings coefficient estimates (the fixed year effect earnings coefficient estimates in Tables 5.2 to 5.4 are 2.369, 2.302, and 2.326, respectively, compared to 12.54, 12.42, and 13.23 in Jennings, LeClere, and Thompson (2001), respectively). Jennings, LeClere, and Thompson (2001) did not include the years 1988 to 1992 and 1999 to 2003 in their study. For the year by year results, the minimum adjusted R^2 is 0.030 for the year 2000 (see Table 5.4) for regression equation (17) and the maximum adjusted R^2 is 0.653 for the year 1990 (see Table 5.3) for regression equation (16).

[15] We exclude the top 5% and bottom 5% of earnings before goodwill amortisation (EBG) observations and price ($P_{i,t+1}$) observations in Appendix 5A. The coefficient estimate for goodwill amortisation is actually significantly negative in Table 5.22, but the adjusted R^2s in Tables 5.21 to 5.23 are all roughly equal, and are very similar to (but slightly lower than) those reported in Jennings, LeClere, and Thompson (2001).

The overall findings are roughly consistent with Jennings, LeClere, and Thompson (2001), even though Jennings, LeClere, and Thompson (2001) consider a six year sample period (1993-1998), whereas we focus on a much longer time period (1988 to 2003) and do not exclude zero goodwill amortisation observations plus we do not censor the observations. Our study considers not only a longer period (16 years), but also years before 1993 as well as after 1998, the endpoints of the Jennings, LeClere, and Thompson (2001) sample period.

The Table 5.5 to 5.7 results, which take account of the influence of zero goodwill amortisation observations, are interesting in their own right because they indicate that the presence (versus non-presence) of goodwill amortisation in a firm is value relevant. Tables 5.5 to 5.7 take account of zero goodwill amortisation by adding to regression equations (15) to (17) a goodwill amortisation dummy ($GAD_{i,t}$) that equals one if goodwill amortisation is positive, and zero otherwise. The regression intercept therefore represents the share price of a firm with zero earnings and no goodwill amortisation whereas the goodwill amortisation dummy ($GAD_{i,t}$) represents the increase in price due to the presence of goodwill amortisation (e.g., roughly two dollars per share in Table 5.5). The goodwill amortisation dummy ($GAD_{i,t}$) coefficient estimate is highly significant, thus indicating that the presence of positive goodwill amortisation is value relevant. Goodwill amortisation therefore appears to be value relevant, but not in the expected manner, since it is positively, not negatively, related to share prices. This implies, much more strongly than prior studies, that systematic goodwill amortisation should not be deducted from earnings in accounting statements because goodwill amortisation is significantly positively (not negatively) related to equity price.

The results in Tables 5.2 to 5.7 lead to the conclusion that the presence but not the level of goodwill amortisation contributes to an accounting difference between earnings before goodwill amortization (EBG) and earnings after goodwill amortisation (EAG), whereas Jennings, LeClere, and Thompson (2001) conclude that goodwill amortisation is completely non-value relevant. Jennings, LeClere, and Thompson (2001) interpret their results as indicating that goodwill amortisation is a noisy measure of goodwill impairment, and support the changes made by the Financial Accounting Standard Board (FASB) for accounting of goodwill, SFAS 141 (Business Combinations) and SFAS 142 (Goodwill and Other Intangible Assets).[16] We will provide a different interpretation, that the (already marginal) role of current trailing earnings is limited and not very informative relative to the most recent prior period's price, when we incorporate the most recent prior period's price in the regression model or utilize change in price as the value relevant dependent variable (see Tables 5.8 to 5.10 and Tables 5.14 to 5.16), as indicated below.

5.5.2 Value Relevance Regression Model Results with Price as the Dependent Variable

The value relevance regression model results for price as the dependent variable, regression equations (18) to (20)), reveal that the introduction of the most recent prior period's equity price as an additional explanatory variable greatly increases the adjusted R^2 values of the models (see Tables 5.8 to 5.10). The increase in explanatory power that

[16] Many studies question the compatibility of accounting principles with the concept of goodwill amortisation (e.g., Smith, 2003; Jennings, LeClere, and Thompson, 2001; Jennings, Robinson, Thompson, and Duall, 1996; Duvall, Jennings, Robnson, and Thompson II, 1992). Due to dissatisfaction with systematic goodwill amortisation (APB 16, Business Combinations, and APB 17, Intangible Assets), the Financial Accounting Standard Board has superseded APB 16 and APB 17 with new rules (SFAS 141 and SFAS 142 respectively). The new rules state that, from 2002 onwards, firms no longer account for goodwill amortisation in their financial statements, but can report it separately.

is obtained using regression equations (18) to (20) is as predicted, since prices follow a high persistent process, so using the most recent prior period's equity price ($P_{i,t}$) as an additional explanatory variable rather than using a non-autoregressive regression equation to explain prices is very important.

[Please insert Tables 5.8 to 5.10 about here.]

To illustrate the increase in adjusted R^2 obtained by introducing the most recent prior period's equity price as an additional explanatory variable, it can be noted that the pooled and fixed effect adjusted R^2s have all increased to a minimum of 0.930 in Tables 5.8 to 5.10 from a maximum of 0.162 in Tables 5.2 to 5.4. For the yearly comparisons, recall that the maximum adjusted R^2 for the years 1988-2003 in Tables 5.2 to 5.4 is 0.653 (for the year 1990 in Table 5.3), whereas for regression equations (18) to (20) even the minimum adjusted R^2 is considerably higher at 0.853 (for year 1999 in Table 5.10). All these results indicate that the inclusion of the most recent prior period's equity price is highly value relevant, as predicted by the Ohlson (1995) model reformulation (see the discussion of equations (10) and (11)), and it greatly increases the explanatory power of the value relevance regression model.

Importantly, the results also indicate that the coefficient estimates of the current trailing earnings variables (EBG and EAG) are greatly reduced when the most recent prior period's equity price is included as an explanatory variable in the regression model (the fixed year effect coefficient estimates fall from 2.372 and 2.330 in Tables 5.2 and 5.4 to 0.162 and 0.163 in Tables 5.8 and 5.10 for earnings before goodwill amortisation (EBG) and earnings after goodwill amortisation (EAG), respectively). The considerable reduction in the current trailing earnings coefficient estimates in Tables 5.8 to 5.10 indicates that the exclusion of the most recent prior period's price in value relevance studies can lead to a potential missing variable problem, since earnings appears to be a spurious proxy for past price in the regression models (compare Tables 5.8 to 5.10 with Tables 5.2 to 5.4; see, e.g., Wooldridge, 2001).

It is important to interpret the Table 5.8 to 5.10 results in relation to the regression scale effect literature (see Brown, Lo, and Lys, 1999). Brown, Lo, and Lys (1999) indicate that relevance of accounting variables is a result of a scale effect, when levels variables are modeled for a relationship. Because of this scale effect in levels variables in regression models, Brown, Lo, and Lys (1999) suggest that a proxy variable should be incorporated in regression models for controlling the scale effect. They indicate that there is only a weak relationship between equity price and accounting variables (particularly earnings and book value of equity) when controlling for the scale effect in levels variables regression models. The Table 5.8 to 5.10 results are consistent with the Brown, Lo, and Lys (1999) results, since the most recent prior period's price is an appropriate control variable for scale effects (see Brown, Lo, and Lys, 1999), and when the most recent prior period's price is included as an additional explanatory variable then trailing earnings are no longer value relevant (see Tables 5.8 to 5.10).

The pooled and fixed effect coefficient estimate *t*-statistics are also much higher for the most recent prior period's price than for the earnings and goodwill explanatory variables. The minimum pooled regression *t*-statistic for the most recent prior period's price coefficient is 86.247 in the value relevance models (see the fixed year effect row in Table 5.8) whereas the maximum *t*-statistic for any of the earnings explanatory variable coefficient estimates is only 2.609 (see the fixed year effect row in Table 5.8). In the yearly cross-sectional regression analysis, the results for ten of the years indicate that trailing earnings information is statistically insignificant and has thus already been incorporated into the most recent prior period's equity price. Interestingly, the goodwill amortisation dummy variable ($GAD_{i,t}$) coefficient estimate is also no longer statistically significant when the most recent prior period's price $P_{i,t}$ is included as an additional explanatory variable in the regression analysis (see the pooled and fixed year effect rows of Tables 5.11 to 5.13 and compare them to Tables 5.5 to 5.7). We therefore reject hypothesis H_1 that goodwill amortisation has information value for explaining share prices, since the information appears to already be incorporated into the most recent prior period's price.

[Please insert Tables 5.11 to 5.13 about here.]

Trailing earnings related information does not appear to provide very much information to investors beyond what is already incorporated in the most recent prior period's price. The Tables 5.8 to 5.13 results are thus consistent with Marsh and Merton (1987), Ohlson (1995, 2001), and Beaver, Lambert, and Morse (1980) and indicate that the most recent prior period's price of a firm has already incorporated the firm's contemporaneous accounting information. Thus, we do not reject hypothesis H_2 that the most recent prior period's price ($P_{i,t}$) explains the subsequent period's price ($P_{i,t+1}$) and already incorporates current trailing earnings related information. The results are also consistent with the earnings announcement event study literature which demonstrates that equity prices react to the unexpected components of earnings announcement, not the earnings level itself, since the expected level of earnings is already incorporated into the most recent equity price prior to the earnings announcement.

We have thus demonstrated that a missing variable effect is possible when the most recent prior period's price is missing from the regression analysis and it is highly correlated with earnings, since misleading inference regarding the magnitude of the current trailing earnings regression coefficients appears to have occurred when the most recent prior period's price is not present in the regression model (see, e.g., Wooldridge, 2001). Since the scale (or size) of dependent and independent variables in value relevance studies affects the apparent explanatory power of the models (see Brown, Lo, and Lys, 1999), including the most recent prior period's price as an additional explanatory variable eliminates the scale problem in the models. We therefore subsequently use change in equity price as the dependent variable, for econometric reasons, to explore the value relevance of earnings and goodwill amortisation, thus further improving the value relevance model regression equation specification to avoid potentially spurious results.

5.5.3 Value Relevance Regression Model Results with Price Change as the Dependent Variable

The pooled and cross-sectional yearly results for the value relevance regression models where price change is the dependent variable, regression equations (21) to (23), are presented in Tables 5.14 to 5.16. The pooled and fixed year effect adjusted R^2s in Tables 5.14 to 5.16 fall sharply to 0.035 or less (recall that the pooled and fixed year effect adjusted R^2s are all at least 0.930 when price is the dependent variable in Tables 5.8 to 5.10). The yearly adjusted R^2s are also highly volatile (see the results), with at least ten of the yearly cross-sectional results displaying insignificant current trailing earnings (EBG and EAG) and past price $P_{i,t}$ coefficient estimates in each table (the years 1988, 1989, 1993-1994, 1996, 1998-1999, and 2001-2003 consistently display insignificant *t*-statistics in Tables 5.14 to 5.16). In these years, no additional information appears to be provided by current trailing earnings (EBG and EAG) and the most recent prior period's price $P_{i,t}$ with respect to subsequent price changes ($\Delta P_{i,t+1}$).

[Please insert Table 5.14 to 5.16 about here.]

Interestingly, the pooled and fixed year effect price change results indicate a value effect, since the subsequent price change ($\Delta P_{i,t+1}$) is higher when the most recent prior period's price $P_{i,t}$ is lower, and when current trailing earnings (EBG and EAG) are higher (with the former effect being much stronger than the latter). Overall, the results indicate only a limited role for current trailing earnings and the most recent prior period's price when explaining or predicting subsequent price changes. This implies that neither measure of current trailing earnings (earnings before or after goodwill amortisation) is consistently informative, a conclusion that is very different from Jennings, LeClere, and Thompson (2001), and is due to improved implementation of regression analysis tests using the Ohlson (1995) value relevance model.

For completeness, Tables 5.17 to 5.19 provide results for value relevance regression tests with price change as the dependent variable but without prior period's price as an explanatory variable. The results are roughly the same as in Table 5.14 to 5.16 but are even more marginal and indicate, in the pooled regressions and the majority of the individual year cross-sectional regressions, that current trailing earnings (EBG and EAG) only marginally explain price changes.

[Please insert Table 5.17 to 5.19 about here.]

5.6 CONCLUSION

We demonstrate that the Ohlson (1995) model directly incorporates the most recent prior period's price as a potentially important value relevance explanatory variable. Market efficiency considerations imply that equity prices provide investors with immediately available information, whereas end of period earnings are disclosed with a time lag. Equity prices can therefore provide investors with crucial and timely financial information with regard to a firm's future prospects, relative to current trailing earnings information. Our results show that the most recent prior period's equity price appears to efficiently incorporate more information than a firm's current trailing earnings.

Our results highlight the benchmarking role of the most recent prior period's equity price for assessing the informativeness of current trailing earnings in value relevance models. The results indicate that current trailing earnings as well as the most recent prior period's price are value relevant, but the most recent prior period's price plays a much more important role in explaining next period's price. The chapter's cross-sectional results indicate that the ability of current trailing earnings to explain prices beyond the most recent prior period's equity prices appears to be limited. The chapter demonstrates that current trailing earnings can act as a spurious proxy for the most recent prior period price if value relevance regression models attempt to explore the value relevance of earnings without incorporating the most recent prior period's price as an additional explanatory variable.

Finally, the chapter's results also imply, much more strongly than prior studies, that systematic goodwill amortisation should not be deducted from earnings in accounting statements because the presence of goodwill amortisation is significantly positively (not negatively) related to equity prices. This effect is eliminated when the most recent prior period's price is included as an additional explanatory variable in the regression analysis, thus indicating that goodwill amortisation information as well as current trailing earnings information has already been incorporated into the most recent prior period's price.

Table 5.1
Descriptive Statistics

Panel A provides summary statistics and percentiles of market equity value (MEV = market equity value per share multiplied by the number of shares outstanding at fiscal year end). Panel B provides summary statistics for the study's variables. For firm *i*, $P_{i,t+1}$ indicates next fiscal period's first quarter end equity price, $P_{i,t}$ is price at time t, GWA is the goodwill amortization that is either directly reported or estimated, EAG is earnings after GWA per share, EBG is earnings before GWA per share, GAPS is GWA per share, and $\Delta P_{i,t+1}$ is change in price per share ($P_{i,t+1} - P_{i,t}$). The sample period is 1989-2004 for $P_{i,t+1}$ and $\Delta P_{i,t+1}$ and 1988-2003 for the other variables. Panel C provides Pearson's correlation coefficient estimates for the study's variables on a per share basis.

Panel A: Percentiles of the market value of common equity for the pooled data

MEV	Mean	Minimum	Maximum	Percentile						
				5	10	25	50	75	90	95
in m$	1691.6	0.002	460730	3.523	7.544	12.446	26.96	120.36	598.29	6467.04

Panel B: Summary Statistics for the pooled data

Measure	$P_{i,t+1}$	$P_{i,t}$	GWA (in m$)	EAG	EBG	GAPS	$\Delta P_{i,t+1}$	MEV (in m$)
Mean	18.35463	18.14018	6.150719	1.187323	1.254411	0.066796	0.214446	1691.6
Median	13	12.75	0	0.73	0.77	0	0.12	120.36
Std. Dev.	23.92168	23.88743	106.2438	3.864727	3.922411	0.552702	6.397566	9381.65
Minimum	0.0001	0.0001	0	-22.27	0	0	-273.24	0.002
Maximum	1100	1207	14246.16	584.19	584.19	54.54	273	460730
Observations	**36785**	**36785**	**36785**	**36785**	**36785**	**36785**	**36785**	**36785**

Panel C: Pearson's correlation coefficient for the variables in regression equations (15) to (23) on a per share basis

	$P_{i,t+1}$	$P_{i,t}$	EAG	EBG	GAPS	$\Delta P_{i,t+1}$
$P_{i,t+1}$	1					
$P_{i,t}$	0.964188	1				
EAG	0.376413	0.366753	1			
EBG	0.389005	0.3799	0.99003	1		
GAPS	0.128388	0.131291	0.033495	0.173937	1	
$DP_{i,t+1}$	0.139069	-0.12855	0.038084	0.036079	-0.01016	1

Table 5.2
Cross-section regression of next period's price (P_{t+1}) on earnings before goodwill amortisation (EBG)

This table provides estimates of the intercept (β_0) and the coefficient (β_1) of firm *i*'s fiscal year end earnings before goodwill amortization (EBG) in explaining the share price $P_{i,t+1}$, where $P_{i,t+1}$ indicates next fiscal period's first quarter end equity price. The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled and yearly regression analyses. The intercepts of fixed year effect are the averages of the coefficient values for each year. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance.

$$P_{i,t+1} = \beta_0 + \beta_1 \, EBG_{i,t} + \varepsilon_{i,t+1} \qquad (15)$$

Duration	β_0		β_1		Adjusted R^2	Sample
Pooled	**15.37862**	***	**2.372433**	*	**0.151302**	**36785**
	9.185998		**1.73474**			
Fixed year	**15.38077**	***	**2.368676**	*	**0.157896**	**36785**
	8.89198		**1.735911**			
1988	6.233576	***	7.182901	***	0.576971	1754
	4.718016		6.288929			
1989	6.082333	***	7.639259	***	0.521838	2018
	4.023616		5.513182			
1990	4.107187	***	9.58807	***	0.635509	1981
	3.460613		8.10463			
1991	5.455248	***	11.05221	***	0.613695	1994
	5.558381		10.2021			
1992	7.537134	***	9.353628	***	0.497365	2147
	3.832469		4.408215			
1993	8.254498	**	8.915702	***	0.429196	2409
	3.240793		3.440433			
1994	6.546353	***	9.635859	***	0.523513	2554
	13.05306		18.78756			
1995	8.930807	***	8.728251	***	0.543859	2802
	6.483876		7.048858			
1996	11.57418	***	6.18292	***	0.491541	2974
	6.689085		4.181639			
1997	15.53041	***	5.170466	**	0.381111	2800
	7.911855		3.103628			
1998	8.552593	***	7.690689	***	0.493292	2455
	5.107174		5.298998			
1999	13.77843	***	4.715561	**	0.136919	2388
	6.28553		2.482527			
2000	16.31934	***	0.284672	**	0.0312	2217
	36.12193		1.973721			
2001	12.35106	***	5.671002	***	0.287943	2170
	8.636676		4.402271			
2002	12.07073	***	5.150148	**	0.37074	3405
	4.578474		2.514908			
2003	20.57761	***	2.164451		0.111627	717
	10.24024		1.496034			
Average Measure	**10.24384**		**6.820362**		**0.415395**	
	8.121362		**5.577977**			

Table 5.3
Cross-section regression of next period's price (P_{t+1}) on earnings before goodwill amortisation (EBG) and goodwill amortisation per share (GAPS)

The table provides estimates of intercept (β_0), and coefficients (β_1 and β_2) of firm *i*'s fiscal year end earnings before goodwill amortisation (EBG) and goodwill amortisation per share (GAPS), respectively, in explaining the share price $P_{i,t+1}$, where $P_{i,t+1}$ indicates next fiscal period's first quarter end equity price. The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled and yearly regression analyses. The intercepts of fixed year effect are the averages of the coefficient values for each year. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance.

$$P_{i,t+1} = \beta_0 + \beta_1 EBG_{i,t} + \beta_2 GAPS_{i,t} + \varepsilon_{i,t+1} \qquad (16)$$

Duration	β_0		β_1		β_2		Adjusted R^2	Sample
Pooled	**15.28091**	***	**2.306006**	*	**2.710266**		**0.155082**	**36785**
	9.723666		**1.68923**		**1.105807**			
Fixed year	**15.29275**	***	**2.302855**	*	**2.696063**		**0.161629**	**36785**
	9.358608		**1.690807**		**1.100043**			
1988	6.266467	***	6.922564	***	13.77899		0.587572	1754
	5.048183		6.382759		0.917208			
1989	6.068278	***	7.293469	***	14.33394		0.535905	2018
	4.490022		6.507202		1.092074			
1990	3.737667	**	10.23924	***	-7.73652	***	0.652588	1981
	3.170219		8.946301		-3.46945			
1991	5.316797	***	11.33905	***	-3.25193	*	0.619087	1994
	5.371876		10.5255		-1.65933			
1992	6.72338	**	10.54594	***	-5.75456	**	0.535988	2147
	3.132391		4.408882		-3.27839			
1993	7.987429	**	9.414191	***	-4.64498		0.436867	2409
	2.974929		3.349945		-1.1709			
1994	6.557181	***	9.853412	***	-5.59351	**	0.532451	2554
	13.83242		19.90701		-2.89037			
1995	7.616917	***	10.19715	***	-7.38975	***	0.629862	2802
	21.5023		31.29734		-19.6808			
1996	11.60441	***	6.242599	***	-1.97967		0.492673	2974
	6.715758		4.08119		-0.84538			
1997	15.15163	***	5.080041	**	10.00036		0.388561	2800
	8.215022		3.05019		1.528496			
1998	8.59321	***	7.751889	***	-1.64057		0.493505	2455
	5.288445		5.048249		-0.33345			
1999	13.78311	***	4.690305	**	0.275715		0.136593	2388
	6.225626		2.285381		0.056556			
2000	16.17732	***	0.275018	**	1.343487		0.033017	2217
	36.2776		2.009433		1.322893			
2001	12.44033	***	5.91761	***	-3.65781	*	0.295527	2170
	8.711207		4.273757		-1.68616			
2002	11.74936	***	4.437019	**	12.65047		0.424469	3405
	5.473246		2.590657		1.447811			
2003	20.75199	***	2.178777		-7.21811		0.112322	717
	10.51673		1.49198		-1.45644			
Average Measure	**10.03284**		**7.023642**		**0.219722**		**0.431687**	
	9.184124		**7.259736**		**-1.8816**			

Table 5.4
Cross-section regression of next period's price (P_{t+1}) on earnings after goodwill amortisation (EAG)

This table provides estimates of the intercept (β_0) and the coefficient (β_1) of firm *i*'s fiscal year end earnings after goodwill amortization (EAG) in explaining the share price $P_{i,t+1}$, where $P_{i,t+1}$ indicates next fiscal period's first quarter end equity price. The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled and yearly regression analyses. The intercepts of fixed year effect are the averages of the coefficient values for each year. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance.

$$P_{i,t+1} = \beta_0 + \beta_1 EAG_{i,t} + \varepsilon_{i,t+1} \qquad (17)$$

Duration	β_0		β_1		Adjusted R^2	Sample
Pooled	**15.58828**	***	**2.3299**	*	**0.141663**	**36785**
	9.75209		**1.688134**			
Fixed year	**15.58264**	***	**2.326266**	*	**0.148335**	**36785**
	9.390047		**1.689345**			
1988	6.358751	***	7.210211	***	0.562517	1754
	4.773691		6.134482			
1989	6.302626	***	7.648774	***	0.502217	2018
	4.200827		5.386581			
1990	3.742893	**	10.34043	***	0.650715	1981
	3.108982		8.290042			
1991	5.886975	***	11.12739	***	0.582409	1994
	5.205679		8.722571			
1992	7.282432	***	10.30584	***	0.503931	2147
	3.462139		4.282908			
1993	8.101304	**	9.568776	**	0.427445	2409
	2.970616		3.278781			
1994	6.817196	***	9.791423	***	0.527198	2554
	13.8665		19.31026			
1995	8.027847	***	9.997023	***	0.615567	2802
	17.78754		26.1453			
1996	11.8119	***	6.25765	***	0.486584	2974
	6.926967		4.112518			
1997	15.83367	***	5.134773	**	0.371105	2800
	8.336368		3.057158			
1998	8.898121	***	7.863353	***	0.487537	2455
	5.373141		5.166834			
1999	14.22622	***	4.725816	**	0.123986	2388
	6.431299		2.295322			
2000	16.35783	***	0.281458	**	0.030146	2217
	36.7123		1.968335			
2001	12.69832	***	5.91026	***	0.292618	2170
	9.007399		4.267461			
2002	12.85993	***	4.98034	**	0.316949	3405
	4.898092		2.243657			
2003	20.61988	***	2.176514		0.112622	717
	10.38117		1.49383			
Average	**10.36412**		**7.082502**		**0.412097**	
Measure	**8.965169**		**6.634752**			

Table 5.5
Cross-section regression of next period's price (P_{t+1}) on earnings before goodwill amortisation (EBG) and goodwill amortisation dummy (GAD)

This table provides estimates of the intercept (β_0) and the coefficients (β_1 and β_2) of firm *i*'s earnings before goodwill amortization (EBG) for period t and goodwill amortisation dummy (GAD) for explaining the next period's share price ($P_{i,t+1}$). The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled and yearly regression analyses. The intercepts of fixed year effect are the averages of the coefficient values for each year. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance.

$$P_{i,t+1} = \beta_0 + \beta_1 \, EBG_{i,t} + \beta_2 \, GAD_{i,t} + \varepsilon_{i,t+1}$$

Duration	β_0		β_1		β_2		Adjusted R^2	Sample
Pooled	**14.73922**	***	**2.367193**	*	**2.0007**	***	**0.152808**	**36785**
	9.345698		**1.734678**		**5.199858**			
Fixed	**14.78978**	***	**2.36425**	*	**1.941076**	***	**0.159264**	**36785**
year	**8.998845**		**1.736096**		**5.212428**			
1988	6.099254	***	7.180677	***	0.623724		0.576884	1754
	4.600219		6.290533		0.813683			
1989	5.98195	***	7.636608	***	0.425924		0.521679	2018
	3.853107		5.518112		0.579395			
1990	4.079541	**	9.58664	***	0.111613		0.635331	1981
	3.264752		8.12125		0.183207			
1991	5.067279	***	11.03672	***	1.447048	**	0.614666	1994
	4.99935		10.24023		2.439427			
1992	7.542114	***	9.353894	***	-0.0174		0.49713	2147
	3.864249		4.404135		-0.02472			
1993	7.970524	**	8.899083	***	1.00811		0.429395	2409
	3.192613		3.433284		1.260597			
1994	6.8275	***	9.651366	***	-1.04195	**	0.524095	2554
	13.45532		18.84428		-2.14185			
1995	9.292289	***	8.739927	***	-1.37801	**	0.544295	2802
	6.468825		7.085508		-2.0737			
1996	11.35458	***	6.176112	***	0.792743		0.491603	2974
	6.72068		4.171613		1.116214			
1997	14.73747	***	5.170176	**	2.495862	**	0.382445	2800
	7.950424		3.106458		2.942634			
1998	8.390087	***	7.688299	***	0.457117		0.493156	2455
	5.34191		5.288978		0.555625			
1999	13.43674	***	4.699972	**	1.01473		0.136845	2388
	6.910187		2.460987		0.717308			
2000	15.45848	***	0.284763	**	2.312959	**	0.03371	2217
	27.23348		1.992062		2.683527			
2001	11.29878	***	5.646088	***	3.063445	**	0.291407	2170
	8.583861		4.392782		3.262264			
2002	9.85751	***	5.119825	**	4.103779	***	0.375383	3405
	4.110595		2.498739		4.677102			
2003	21.15778	***	2.142087		-3.54142	**	0.113029	717
	10.05475		1.483982		-1.96836			
Average	**9.909492**		**6.813265**		**0.742392**		**0.416316**	
Measure	**7.53777**		**5.583308**		**0.938897**			

Table 5.6
Cross-section regression of next period's price (P_{t+1}) on earnings before goodwill amortisation (EBG), goodwill amortisation per share (GAPS) and goodwill amortisation dummy (GAD)

The table provides estimate of intercept (β_0), and coefficients (β_1, β_2 and β_3) of firm i's earnings before goodwill amortisation (EBG) and goodwill amortisation per share (GAPS) for period t, and goodwill amortisation (GAD), respectively, for explaining the next period's price ($P_{i,t+1}$). The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled and yearly regression analyses. The intercepts of fixed year effect are the averages of the coefficient values for each year. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance.

$$P_{i,t+1} = \beta_0 + \beta_1 \, EBG_{i,t} + \beta_2 \, GAPS_{i,t} + \beta_3 \, GAD_{i,t} + \varepsilon_{i,t+1}$$

Duration	β_0		β_1		β_2		β_3		Adjusted R^2	Sample
Pooled	**14.81047**	***	**2.307566**	*	**2.486653**		**1.497259**	***	**0.155889**	**36785**
	9.377546		**1.689708**		**1.01227**		**4.088028**			
Fixed year	**14.86103**	***	**2.304629**	*	**2.488883**		**1.440161**	***	**0.16235**	**36785**
	9.033583		**1.691313**		**1.011793**		**3.827926**			
1988	6.444947	***	6.914573	***	14.35717		-0.82236		0.587587	1754
	5.213503		6.372156		0.902775		-0.64275			
1989	6.413135	***	7.275595	***	15.45356		-1.46789		0.536522	2018
	5.327048		6.546338		1.097493		-1.08544			
1990	3.362551	**	10.25595	***	-8.15328	***	1.434054	**	0.653425	1981
	2.810944		8.955934		-3.79249		2.730879			
1991	4.76516	***	11.34662	***	-3.58107	*	2.005234	***	0.621076	1994
	4.771059		10.5705		-1.89104		3.670389			
1992	6.388852	**	10.54798	***	-5.84744	***	1.122915	*	0.536389	2147
	2.951373		4.414142		-3.36959		1.930647			
1993	7.443382	**	9.423065	***	-5.01281		1.856297	**	0.438063	2409
	2.770241		3.354304		-1.28402		2.80149			
1994	6.606492	***	9.85345	***	-5.52437	**	-0.18325		0.53229	2554
	13.66666		19.90826		-2.74929		-0.35877			
1995	7.590161	***	10.1971	***	-7.39372	***	0.099305		0.629733	2802
	18.88421		31.29003		-19.9657		0.172181			
1996	11.28026	***	6.239456	***	-2.21242		1.183008	*	0.493003	2974
	6.450841		4.074381		-0.95519		1.739327			
1997	14.85169	***	5.084575	**	9.486031		1.005411		0.388575	2800
	7.999841		3.051261		1.387158		1.001837			
1998	8.301761	***	7.760783	***	-1.9974		0.844673		0.493521	2455
	4.990822		5.05		-0.38644		0.905521			
1999	13.45006	***	4.688194	**	0.134081		0.981931		0.136491	2388
	6.434584		2.284071		0.027312		0.701318			
2000	15.47146	***	0.277079	**	1.067552		1.974885	**	0.034635	2217
	27.34983		2.01188		1.085699		2.232732			
2001	10.9371	***	5.943149	***	-4.57238	**	4.441221	***	0.302683	2170
	7.75368		4.303561		-2.20445		5.087434			
2002	10.68761	***	4.438691	**	12.36097		1.982347		0.425398	3405
	5.377193		2.587106		1.398145		1.336859			
2003	21.13357	***	2.155852		-4.40042		-2.74475		0.112373	717
	9.906724		1.474753		-0.70139		-1.26426			
Average Measure	**9.695512**		**7.025132**		**0.260253**		**0.857065**		**0.43261**	
	8.29116		**7.265542**		**-1.96256**		**1.309962**			

Table 5.7
Cross-section regression of next period's price (P_{t+1}) on earnings after goodwill amortisation (EAG) and goodwill amortisation dummy (GAD)

This table provides estimates of the intercept (β_0) and the coefficients (β_1 and β_2) of firm i's earnings after goodwill amortization (EAG) for period t and goodwill amortisation dummy (GAD) for explaining the next period's share price ($P_{i,t+1}$). The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled and yearly regression analyses. The intercepts of fixed year effect are the averages of the coefficient values for each year. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance.

$$P_{i,t+1} = \beta_0 + \beta_1 EAG_{i,t} + \beta_2 GAD_{i,t} + \varepsilon_{i,t+1}$$

Duration	β_0		β_1		β_2		Adjusted R^2	Sample
Pooled	**14.78275** **9.263206**	***	**2.330756** **1.689142**	*	**2.491705** **9.906858**	***	**0.144012**	**36785**
Fixed year	**14.8354** **8.929329**	***	**2.32764** **1.690461**	*	**2.425888** **9.813891**	***	**0.150486**	**36785**
1988	6.060792 4.44228	***	7.210283 6.143784	***	1.353512 1.665894	*	0.562998	1754
1989	5.967741 3.75983	***	7.648505 5.400895	***	1.377694 1.676807	*	0.502793	2018
1990	3.271347 2.510235	**	10.34109 8.326314	***	1.797168 2.688511	**	0.652211	1981
1991	4.953837 4.165963	***	11.15308 8.86264	***	3.258431 4.747155	***	0.588108	1994
1992	6.610475 3.027389	**	10.31851 4.298893	***	2.186529 2.887942	**	0.506084	2147
1993	7.300999 2.617435	**	9.564595 3.288592	**	2.688099 3.311334	***	0.430319	2409
1994	6.671479 13.38998	***	9.794028 19.32493	***	0.498584 1.053114		0.527189	2554
1995	7.82184 16.81068	***	9.998759 26.18636	***	0.748179 1.205007		0.615607	2802
1996	11.26653 6.471082	***	6.251155 4.099155	***	1.92199 2.764591	**	0.487784	2974
1997	14.773 7.886331	***	5.143545 3.063268	**	3.301417 4.216585	***	0.373601	2800
1998	8.169518 4.957136	***	7.869308 5.171979	***	1.992435 2.667831	**	0.488676	2455
1999	13.4159 6.401064	***	4.718403 2.293087	**	2.30055 1.902678	*	0.125107	2388
2000	15.46207 27.24531	***	0.282636 1.981801	**	2.402193 2.796369	**	0.032886	2217
2001	10.93934 7.755724	***	5.941312 4.302953	***	4.867315 6.005223	***	0.301873	2170
2002	10.04999 3.859646	***	4.961889 2.239198	**	5.154875 6.872609	***	0.324381	3405
2003	21.14114 9.960292	***	2.151547 1.47872		-3.13413 -1.66362	*	0.113446	717
Average Measure	**9.61725** **7.828773**		**7.084291** **6.653911**		**2.044678** **2.799877**		**0.414566**	

Table 5.8
Cross-section regression of next period's price (P_{t+1}) on earnings before goodwill amortisation (EBG) and the most recent prior period's equity price (P_t)

The table provides estimates of intercept (β_0), and coefficients (β_1 and β_3) of firm i's earnings before goodwill amortisation (EBG) and equity price at time t ($P_{i,t}$), respectively, for explaining the share price $P_{i,t+1}$, where $P_{i,t+1}$ indicates next period's end of quarter price. The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled and yearly regression analyses. The intercepts of fixed year effect are the averages of the coefficient values for each year. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance.

$$P_{i,t+1} = \beta_0 + \beta_1 \, EBG_{i,t} + \beta_3 \, P_{i,t} + \varepsilon_{i,t+1} \quad (18)$$

Duration	β_0		β_1		β_3		Adjusted R^2	Sample
Pooled	**0.819123**	***	**0.161862**	**	**0.955474**	***	**0.930258**	**36785**
	4.714117		**2.58497**		**86.24707**			
Fixed year	**0.860724**		**0.164611**	**	**0.955181**	***	**0.930969**	**36785**
	4.017584		**2.609295**		**85.98636**			
1988	0.797485	**	0.36804		0.941163	***	0.944544	1754
	2.218652		1.524834		23.60248			
1989	1.606191	*	0.640319		0.824171	***	0.898118	2018
	1.732175		1.049067		7.45728			
1990	0.603575	***	1.1182	***	0.951387	***	0.94838	1981
	4.520205		3.88872		37.04333			
1991	0.652031	***	1.038991	***	0.909966	***	0.94848	1994
	4.523892		4.653314		51.67952			
1992	-0.10291		0.619763	**	1.009307	***	0.954248	2147
	-0.41507		2.250236		49.43462			
1993	-0.27184		0.131315		0.98346	***	0.949001	2409
	-0.39629		0.889332		25.32445			
1994	-0.20679		0.975909		0.993365	***	0.926803	2554
	-0.40636		1.345986		38.21443			
1995	0.229943		0.643284	**	0.981065	***	0.951542	2802
	0.868572		2.523451		51.75914			
1996	0.218178		0.483703	*	0.951588	***	0.937865	2974
	0.848624		1.936305		36.08302			
1997	0.335907		0.317064	**	1.020177	***	0.938995	2800
	0.423889		2.015503		23.74226			
1998	0.681319		-0.03142		0.936683	***	0.929719	2455
	1.593571		-0.12715		38.15511			
1999	2.004235	***	0.241243		0.876067	***	0.852988	2388
	5.443167		1.107871		26.98854			
2000	1.707964	**	0.098585	***	0.843172	***	0.866337	2217
	2.950665		6.331537		21.6068			
2001	0.075551		0.520497	*	1.008036	***	0.954175	2170
	0.1796		1.844526		53.00943			
2002	1.017809	***	0.061375		0.929942	***	0.983973	3405
	4.402535		0.980094		83.82403			
2003	1.34584		0.261818		0.963468	***	0.925942	717
	1.474449		1.403421		20.2495			
Average Measure	**0.668405**		**0.468043**		**0.945189**		**0.931944**	
	1.872642		**2.101066**		**36.76087**			

Table 5.9

Cross-section regression of next period's price (P_{t+1}) on earnings before goodwill amortisation (EBG), goodwill amortisation per share (GAPS) and the most recent prior period's equity price (P_t)

The table provides estimates of intercept (β_0), and coefficients (β_1, β_2 and β_3) of firm *i*'s earnings before goodwill amortisation (EBG), goodwill amortisation per share (GAPS), and equity price at time t ($P_{i,t}$), respectively, for explaining the share price $P_{i,t+1}$, where $P_{i,t+1}$ indicates next period's end of quarter price. The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled and yearly regression analyses. The intercepts of fixed year effect are the averages of the coefficient values for each year. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance.

$$P_{i,t+1} = \beta_0 + \beta_1 EBG_{i,t} + \beta_2 GAPS_{i,t} + \beta_3 P_{i,t} + \varepsilon_{i,t+1} \qquad (19)$$

Duration	β_0	β_1	β_2	β_3	Adjusted R^2	Sample
Pooled	**0.819739** ***	**0.163231** **	**-0.06705**	**0.955592** ***	**0.930258**	**36785**
	4.728166	**2.534716**	**-0.49929**	**86.39724**		
Fixed year	**0.861017**	**0.165603** **	**-0.04869**	**0.955266** ***	**0.930968**	**36785**
	4.023655	**2.562094**	**-0.36185**	**86.14659**		
1988	0.839439 **	0.335492	3.890202 *	0.935508 ***	0.945364	1754
	2.44972	1.409632	1.840316	24.20518		
1989	1.619403 *	0.630532	1.347698	0.821495 ***	0.89819	2018
	1.710249	1.072037	0.419237	7.106955		
1990	0.570288 ***	1.286973 ***	-1.24849 ***	0.944233 ***	0.948786	1981
	4.742077	4.438835	-4.14422	37.63616		
1991	0.646669 ***	1.075372 ***	-0.26875	0.908814 ***	0.948492	1994
	4.421459	4.593605	-1.04766	51.04954		
1992	-0.107	0.663783 *	-0.132	1.007381 ***	0.954245	2147
	-0.42526	1.809293	-0.47195	43.70279		
1993	-0.25914	0.065402	0.474325	0.985141 ***	0.949061	2409
	-0.38597	0.449862	1.047713	24.97807		
1994	-0.18246	1.043342	-0.99495	0.990069 ***	0.927059	2554
	-0.37026	1.384765	-1.64077	36.48353		
1995	0.262119	0.886642 ***	-0.58645 **	0.96568 ***	0.951967	2802
	1.128462	3.732886	-3.01846	55.17625		
1996	0.20157	0.464969 *	0.462536	0.952388 ***	0.937915	2974
	0.779574	1.864404	1.065654	36.07196		
1997	0.296644	0.31027 **	1.880215 *	1.018031 ***	0.939242	2800
	0.376673	2.044101	1.910525	23.17042		
1998	0.68516 *	-0.02593	-0.13246	0.936616 ***	0.929693	2455
	1.656713	-0.0989	-0.19528	38.39734		
1999	2.009985 ***	0.209024	0.350868	0.876082 ***	0.852985	2388
	5.528742	0.939712	0.592386	27.07872		
2000	1.711224 **	0.098879 ***	-0.04322	0.843248 ***	0.866279	2217
	2.986866	6.458271	-0.2113	21.5259		
2001	0.117184	0.580292 *	-0.74024 **	1.006101 ***	0.954476	2170
	0.280827	1.908856	-1.9833	51.51191		
2002	0.978081 ***	0.075166	-0.71811	0.934819 ***	0.984126	3405
	4.961902	1.346523	-1.5391	92.18555		
2003	1.290637	0.257056	1.725076 *	0.964146 ***	0.925949	717
	1.407459	1.391455	1.777987	20.22966		
Average	**0.667488**	**0.497329**	**0.329141**	**0.943109**	**0.932114**	
Measure	**1.953077**	**2.171583**	**-0.34989**	**36.90687**		

Table 5.10
Cross-section regression of next period's price (P_{t+1}) on earnings after goodwill amortisation (EAG), and the most recent prior period's equity price (P_t)

The table provides estimates of intercept (β_0), and coefficients (β_1 and β_3) of firm i's earnings after goodwill amortisation (EAG) and equity price at time t ($P_{i,t}$), respectively, for explaining the share price $P_{i,t+1}$, where $P_{i,t+1}$ indicates next period's end of quarter price. The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled and yearly regression analyses. The intercepts of fixed year effect are the averages of the coefficient values for each year. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance.

$$P_{i,t+1} = \beta_0 + \beta_1 EAG_{i,t} + \beta_3 P_{i,t} + \varepsilon_{i,t+1} \quad (20)$$

Duration	β_0	β_1	β_3	Adjusted R^2	Sample
Pooled	**0.820915** ***	**0.163016** **	**0.955898** ***	**0.930255**	**36785**
	4.751977	**2.540084**	**86.84196**		
Fixed year	**0.862084**	**0.165318** **	**0.955638** ***	**0.930963**	**36785**
	4.038501	**2.568302**	**86.63111**		
1988	0.798066 **	0.31931	0.945787 ***	0.944386	1754
	2.204513	1.327712	23.82613		
1989	1.607179 *	0.612522	0.827433 ***	0.897977	2018
	1.711921	1.093181	7.783095		
1990	0.569737 ***	1.287723 ***	0.944326 ***	0.948812	1981
	4.751959	4.417684	38.25843		
1991	0.655783 ***	0.961334 ***	0.917195 ***	0.948181	1994
	4.248022	4.222249	52.69409		
1992	-0.09738	0.567488 *	1.014623 ***	0.953891	2147
	-0.3793	1.684073	47.10076		
1993	-0.26154	0.065183	0.986977 ***	0.94896	2409
	-0.38375	0.449052	24.19778		
1994	-0.18085	1.041426	0.990217 ***	0.927087	2554
	-0.37232	1.399195	37.28643		
1995	0.274215	0.827611 ***	0.969664 ***	0.951825	2802
	1.157396	3.520736	56.73025		
1996	0.219465	0.454481 *	0.954648 ***	0.937642	2974
	0.845162	1.875271	36.58246		
1997	0.335687	0.299482 **	1.021994 ***	0.9389	2800
	0.424655	1.990332	24.08751		
1998	0.680259	-0.02592	0.936271 ***	0.929718	2455
	1.60296	-0.09879	39.42677		
1999	2.03826 ***	0.204987	0.877646 ***	0.852884	2388
	5.595477	0.92526	26.96908		
2000	1.715488 **	0.099075 ***	0.843359 ***	0.866335	2217
	2.962553	6.324839	21.63713		
2001	0.103395	0.582784 *	1.00573 ***	0.954481	2170
	0.252444	1.924903	51.06455		
2002	1.011586 ***	0.085424	0.929003 ***	0.984004	3405
	4.350917	1.551709	81.33886		
2003	1.35626	0.258995	0.963538 ***	0.925905	717
	1.486068	1.393209	20.23912		
Average Measure	**0.676601**	**0.477619**	**0.945526**	**0.931937**	
	1.903667	**2.125039**	**36.8264**		

Table 5.11
Cross-section regression of next period's price (P_{t+1}) on earnings before goodwill amortisation (EBG), goodwill amortisation dummy (GAD), the most recent prior period's price (P_t)

This table provides estimates of the intercept (β_0) and the coefficients (β_1, β_2 and β_3) of firm *i*'s earnings before goodwill amortization (EBG) for period t, goodwill amortisation dummy (GAD), and price at time t for explaining the next period's share price ($P_{i,t+1}$). The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled and yearly regression analyses. The intercepts of fixed year effect are the averages of the coefficient values for each year. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance.

$$P_{i,t+1} = \beta_0 + \beta_1\ EBG_{i,t} + \beta_2\ GAD_{i,t} + \beta_3\ P_{i,t} + \varepsilon_{i,t+1}$$

Duration	β_0		β_1		β_2		β_3		Adjusted R^2	Sample
Pooled	**0.82064**	***	**0.16186**	**	**-0.005**		**0.9555**	***	**0.9303**	**36785**
	4.95657		**2.5848**		**-0.0646**		**86.033**			
Fixed year	**0.83577**		**0.16458**	**	**0.08558**		**0.9551**	***	**0.931**	**36785**
	4.01251		**2.61111**		**1.11809**		**85.816**			
1988	0.73512	**	0.36771		0.29226		0.9411	***	0.9445	1754
	2.07179		1.52514		1.07201		23.622			
1989	1.65134	*	0.64056		-0.1942		0.8243	***	0.8981	2018
	1.90485		1.04934		-0.5496		7.4428			
1990	0.45922	**	1.10707	***	0.57654	**	0.9518	***	0.9485	1981
	3.20979		3.82833		2.61693		36.929			
1991	0.57458	***	1.0415	***	0.29911		0.9094	***	0.9485	1994
	3.63291		4.66304		1.32617		51.709			
1992	-0.0084		0.62387	**	-0.3334		1.0094	***	0.9543	2147
	-0.0349		2.25537		-1.6266		49.264			
1993	-0.3149		0.1297		0.15626		0.9834	***	0.949	2409
	-0.4561		0.88198		0.72886		25.307			
1994	-0.057		0.98811		-0.5433	**	0.9929	***	0.927	2554
	-0.1196		1.36191		-2.4053		38.179			
1995	0.28905		0.64673	**	-0.2188		0.9809	***	0.9515	2802
	1.13627		2.53833		-0.9887		51.849			
1996	0.04994		0.47898	*	0.6111	**	0.9515	***	0.938	2974
	0.18965		1.9226		2.58416		36.131			
1997	0.12906		0.31966	**	0.67745	**	1.0196	***	0.9391	2800
	0.17195		2.0351		2.27284		23.622			
1998	0.79855	**	-0.0313		-0.3343		0.9369	***	0.9297	2455
	1.99691		-0.1268		-1.1412		38.074			
1999	1.93056	***	0.23815		0.22121		0.876	***	0.8529	2388
	4.76481		1.09462		0.43666		27.008			
2000	1.56593	**	0.09869	***	0.4015		0.8427	***	0.8664	2217
	3.03613		6.36581		1.13022		21.457			
2001	0.03854		0.52062	*	0.11509		1.0078	***	0.9542	2170
	0.0893		1.84535		0.47336		52.818			
2002	1.24622	***	0.05986		-0.4428	**	0.9308	***	0.984	3405
	5.84845		0.93814		-3.2542		81.67			
2003	1.03921		0.26794		1.6186	**	0.9655	***	0.9264	717
	1.1091		1.42576		3.21315		20.261			
Average	**0.63294**		**0.46862**		**0.18139**		**0.9453**		**0.932**	
Measure	**0.82064**		**0.16186**		**-0.005**		**0.9555**			

Table 5.12
Cross-section regression of next period's price (P_{t+1}) on earnings before goodwill amortisation (EBG), goodwill amortisation per share (GAPS) and goodwill amortisation dummy (GAD), the most recent prior period's price (P_t)

The table provides estimates of intercept (β_0), and coefficients (β_1, β_2, β_3 and β_4) of firm *i*'s earnings before goodwill amortisation (EBG) and goodwill amortisation per share (GAPS) for period t, goodwill amortisation (GAD), and price at time t ($P_{i,t}$), respectively, for explaining the next period's share price ($P_{i,t+1}$). The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled and yearly regression analyses. The intercepts of fixed year effect are the averages of the coefficient values for each year. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance.

$$P_{i,t+1} = \beta_0 + \beta_1\, EBG_{i,t} + \beta_2\, GAPS_{i,t} + \beta_3\, GAD_{i,t} + \beta_4\, P_{i,t} + \varepsilon_{i,t+1}$$

Duration	β_0	β_1	β_2	β_3	β_4	Adjusted R^2	Sample
Pooled	**0.8171** ***	**0.163** **	**-0.068**	**0.009**	**0.9556** ***	**0.93026**	**36785**
	4.956	**2.534**	**-0.505**	**0.113**	**86.224**		
Fixed year	**0.8325**	**0.166** **	**-0.063**	**0.098**	**0.9552** ***	**0.93101**	**36785**
	4.0062	**2.56**	**-0.463**	**1.287**	**86.008**		
1988	0.8627 **	0.335	3.9649 *	-0.105	0.9354 ***	0.94534	1754
	2.471	1.405	1.7783	-0.349	24.209		
1989	1.7141 *	0.629	1.6546	-0.395	0.8211 ***	0.8982	2018
	1.7722	1.07	0.4989	-1.529	7.1004		
1990	0.36 **	1.304 ***	-1.491 ***	0.814 ***	0.9434 ***	0.94909	1981
	2.773	4.47	-5.002	3.657	37.559		
1991	0.5542 ***	1.087 ***	-0.329	0.352	0.9079 ***	0.94853	1994
	3.44	4.652	-1.352	1.579	51.082		
1992	-0.017	0.658 *	-0.103	-0.313	1.0079 ***	0.95427	2147
	-0.07	1.797	-0.367	-1.575	43.671		
1993	-0.281	0.067	0.4585	0.077	0.985 ***	0.94904	2409
	-0.424	0.456	1.0091	0.363	24.909		
1994	-0.072	1.042	-0.838	-0.414 **	0.9902 ***	0.92714	2554
	-0.15	1.385	-1.446	-2.151	36.546		
1995	0.2944	0.886 ***	-0.581 **	-0.121	0.9657 ***	0.95195	2802
	1.2883	3.735	-2.983	-0.555	55.165		
1996	0.0545	0.465 *	0.3539	0.549 **	0.9521 ***	0.938	2974
	0.207	1.858	0.8441	2.273	36.04		
1997	0.1733	0.313 **	1.6669 *	0.419	1.0179 ***	0.93926	2800
	0.2242	2.05	1.7043	1.56	23.155		
1998	0.7989 *	-0.032	0.01	-0.336	0.9369 ***	0.9297	2455
	1.9096	-0.12	0.0148	-1.221	38.269		
1999	1.9629 ***	0.209	0.3306	0.14	0.876 ***	0.85293	2388
	4.9992	0.94	0.549	0.267	27.082		
2000	1.5623 **	0.099 ***	-0.103	0.434	0.8429 ***	0.86632	2217
	3.0191	6.382	-0.541	1.242	21.419		
2001	0.0028	0.587 *	-0.819 **	0.369	1.0052 ***	0.95451	2170
	0.0064	1.918	-2.128	1.461	50.78		
2002	1.1605 ***	0.073	-0.673	-0.349 **	0.9352 ***	0.98415	3405
	6.4369	1.288	-1.462	-2.315	90.746		
2003	1.0394	0.268	0.094	1.602 **	0.9656 ***	0.92629	717
	1.1084	1.412	0.1187	2.846	20.241		
Average Measure	**0.6356**	**0.499**	**0.2248**	**0.17**	**0.943**	**0.93217**	
	1.8132	**2.169**	**-0.548**	**0.347**	**36.748**		

Table 5.13

Cross-section regression of next period's price (P_{t+1}) on earnings after goodwill amortisation (EAG) and goodwill amortisation dummy (GAD), the most recent prior period's price (P_t)

This table provides estimates of the intercept (β_0) and the coefficients (β_1, β_2 and β_3) of firm *i*'s earnings after goodwill amortization (EAG) for period t, goodwill amortisation dummy (GAD), and price at time t ($P_{i,t}$) for explaining the next period's share price ($P_{i,t+1}$).The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled and yearly regression analyses. The intercepts of fixed year effect are the averages of the coefficient values for each year. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance.

$$P_{i,t+1} = \beta_0 + \beta_1 \, EAG_{i,t} + \beta_2 \, GAD_{i,t} + \beta_3 \, P_{i,t} + \varepsilon_{i,t+1}$$

Duration	β_0		β_1		β_2		β_3		Adjusted R^2	Sample
Pooled	**0.81245**	***	**0.1631**	**	**0.02771**		**0.9559**	***	**0.9303**	**36785**
	4.92896		**2.5384**		**0.35689**		**86.536**			
Fixed year	**0.82747**		**0.16566**	**	**0.11853**		**0.9555**	***	**0.931**	**36785**
	3.98373		**2.56516**		**1.53541**		**86.345**			
1988	0.7285	**	0.32173		0.32483		0.9455	***	0.9444	1754
	2.04384		1.33374		1.15423		23.809			
1989	1.6355	*	0.61116		-0.1203		0.8276	***	0.8979	2018
	1.89447		1.08319		-0.2958		7.7473			
1990	0.36926	**	1.3005	***	0.78075	***	0.943	***	0.9491	1981
	2.79127		4.38993		3.41028		37.75			
1991	0.53655	**	0.98453	***	0.45162	**	0.9154	***	0.9483	1994
	3.18946		4.333		2.02038		52.735			
1992	-0.0387		0.56105	*	-0.2039		1.0152	***	0.9539	2147
	-0.1518		1.66602		-1.0101		46.912			
1993	-0.3101		0.06833		0.17308		0.9866	***	0.949	2409
	-0.4514		0.46607		0.77813		24.17			
1994	-0.073		1.03419		-0.3832	**	0.9908	***	0.9272	2554
	-0.1513		1.39018		-2.0561		37.336			
1995	0.28852		0.82712	***	-0.0531		0.9697	***	0.9518	2802
	1.22918		3.51774		-0.2425		56.626			
1996	0.02984		0.45621	*	0.69703	**	0.954	***	0.9378	2974
	0.11373		1.8658		2.88061		36.486			
1997	0.11625		0.30537	**	0.72256	**	1.0212	***	0.939	2800
	0.15532		2.0121		2.38074		23.92			
1998	0.79976	**	-0.0317		-0.3405		0.9368	***	0.9297	2455
	1.96996		-0.1205		-1.1608		39.059			
1999	1.94066	***	0.20507		0.28474		0.8775	***	0.8528	2388
	4.88659		0.92697		0.56504		26.989			
2000	1.56239	**	0.09939	***	0.4326		0.8429	***	0.8664	2217
	3.03175		6.29806		1.21256		21.481			
2001	0.00613		0.58912	*	0.29817		1.0049	***	0.9545	2170
	0.01397		1.92848		1.10416		50.425			
2002	1.23294	***	0.08192		-0.4284	**	0.93	***	0.9841	3405
	5.72948		1.46422		-3.1801		79.242			
2003	1.03892		0.26833		1.66871	**	0.9655	***	0.9264	717
	1.10876		1.41849		3.27247		20.256			
Average Measure	**0.61647**		**0.48014**		**0.26904**		**0.9454**		**0.932**	
	1.71271		**2.12334**		**0.67707**		**36.559**			

Table 5.14
Cross-section regression of next period's price change (ΔP_{t+1}) on earnings before goodwill amortisation (EBG), and the most recent prior period's equity price (P_t)

The table provides estimates of intercept (β_0), and coefficients (β_1 and β_3) of firm *i*'s earnings before goodwill amortisation (EBG) and equity price at time t ($P_{i,t}$)), respectively, for explaining the share price change $\Delta P_{i,t+1}$ (= $P_{i,t+1} - P_{i,t}$, where $P_{i,t+1}$ indicates next period's end of quarter price). The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled and yearly regression analyses. The intercepts of fixed year effect are the averages of the coefficient values for each year. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance.

$$\Delta P_{i,t+1} = \beta_0 + \beta_1 EBG_{i,t} + \beta_3 P_{i,t} + \varepsilon_{i,t+1} \qquad (21)$$

Duration	β_0		β_1		β_3		Adjusted R^2	Sample
Pooled	**0.819123**	***	**0.161862**	**	**-0.04453**	***	**0.0249**	**36785**
	4.714117		**2.58497**		**-4.01924**			
Fixed	**0.860724**		**0.164611**	**	**-0.04482**	***	**0.034842**	**36785**
year	**4.017584**		**2.609295**		**-4.03464**			
1988	0.797485	**	0.36804		-0.05884		0.024798	1754
	2.218652		1.524834		-1.4755			
1989	1.606191	*	0.640319		-0.17583		0.187592	2018
	1.732175		1.049067		-1.59093			
1990	0.603575	***	1.1182	***	-0.04861	*	0.072133	1981
	4.520205		3.88872		-1.89279			
1991	0.652031	***	1.038991	***	-0.09003	***	0.059098	1994
	4.523892		4.653314		-5.11327			
1992	-0.10291		0.619763	**	0.009307		0.057388	2147
	-0.41507		2.250236		0.455859			
1993	-0.27184		0.131315		-0.01654		0.002075	2409
	-0.39629		0.889332		-0.4259			
1994	-0.20679		0.975909		-0.00664		0.060512	2554
	-0.40636		1.345986		-0.25525			
1995	0.229943		0.643284	**	-0.01893		0.036056	2802
	0.868572		2.523451		-0.99896			
1996	0.218178		0.483703	*	-0.04841	*	0.025042	2974
	0.848624		1.936305		-1.83573			
1997	0.335907		0.317064	**	0.020177		0.041001	2800
	0.423889		2.015503		0.469566			
1998	0.681319		-0.03142		-0.06332	**	0.060071	2455
	1.593571		-0.12715		-2.57918			
1999	2.004235	***	0.241243		-0.12393	***	0.093424	2388
	5.443167		1.107871		-3.81795			
2000	1.707964	**	0.098585	***	-0.15683	***	0.185085	2217
	2.950665		6.331537		-4.01881			
2001	0.075551		0.520497	*	0.008036		0.058102	2170
	0.1796		1.844526		0.422609			
2002	1.017809	***	0.061375		-0.07006	***	0.234881	3405
	4.402535		0.980094		-6.31499			
2003	1.34584		0.261818		-0.03653		0.024104	717
	1.474449		1.403421		-0.7678			
Average	**0.668405**		**0.468043**		**-0.05481**		**0.076335**	
Measure	**1.872642**		**2.101066**		**-1.85869**			

Table 5.15
Cross-section regression of next period's price change (ΔP_{t+1}) on earnings before goodwill amortisation (EBG), goodwill amortisation per share (GAPS) and the most recent prior period's equity price (P_t)

The table provides estimates of intercept (β_0), and coefficients (β_1, β_2 and β_3) of firm *i*'s earnings before goodwill amortisation (EBG), goodwill amortisation per share (GAPS), and equity price at time t ($P_{i,t}$), respectively, for explaining the share price change $\Delta P_{i,t+1}$ (= $P_{i,t+1} - P_{i,t}$, where $P_{i,t+1}$ indicates next period's end of quarter price). The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled and yearly regression analyses. The intercepts of fixed year effect are the averages of the coefficient values for each year. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance.

$$\Delta P_{i,t+1} = \beta_0 + \beta_1\, EBG_{i,t} + \beta_2\, GAPS_{i,t} + \beta_3\, P_{i,t} + \varepsilon_{i,t+1} \quad (22)$$

Duration	β_0		β_1		β_2		β_3		Adjusted R^2	Sample
Pooled	**0.819739** **4.728166**	***	**0.163231** **2.534716**	**	**-0.06705** **-0.49929**		**-0.04441** **-4.01505**	***	**0.024906**	**36785**
Fixed year	**0.861017** **4.023655**		**0.165603** **2.562094**	**	**-0.04869** **-0.36185**		**-0.04473** **-4.0341**	***	**0.034833**	**36785**
1988	0.839439 2.44972	**	0.335492 1.409632		3.890202 1.840316	*	-0.06449 -1.66867	*	0.039215	1754
1989	1.619403 1.710249	*	0.630532 1.072037		1.347698 0.419237		-0.1785 -1.54429		0.188166	2018
1990	0.570288 4.742077	***	1.286973 4.438835	***	-1.24849 -4.14422	***	-0.05577 -2.22281	**	0.07943	1981
1991	0.646669 4.421459	***	1.075372 4.593605	***	-0.26875 -1.04766		-0.09119 -5.12204	***	0.059313	1994
1992	-0.107 -0.42526		0.663783 1.809293	*	-0.132 -0.47195		0.007381 0.320197		0.057335	2147
1993	-0.25914 -0.38597		0.065402 0.449862		0.474325 1.047713		-0.01486 -0.37675		0.003245	2409
1994	-0.18246 -0.37026		1.043342 1.384765		-0.99495 -1.64077		-0.00993 -0.36596		0.063793	2554
1995	0.262119 1.128462		0.886642 3.732886	***	-0.58645 -3.01846	**	-0.03432 -1.96092	**	0.044514	2802
1996	0.20157 0.779574		0.464969 1.864404	*	0.462536 1.065654		-0.04761 -1.80333	*	0.025825	2974
1997	0.296644 0.376673		0.31027 2.044101	**	1.880215 1.910525	*	0.018031 0.410392		0.044884	2800
1998	0.68516 1.656713	*	-0.02593 -0.0989		-0.13246 -0.19528		-0.06338 -2.59848	**	0.059724	2455
1999	2.009985 5.528742	***	0.209024 0.939712		0.350868 0.592386		-0.12392 -3.83017	***	0.093404	2388
2000	1.711224 2.986866	**	0.098879 6.458271	***	-0.04322 -0.2113		-0.15675 -4.00148	***	0.184731	2217
2001	0.117184 0.280827		0.580292 1.908856	*	-0.74024 -1.9833	**	0.006101 0.312372		0.06428	2170
2002	0.978081 4.961902	***	0.075166 1.346523		-0.71811 -1.5391		-0.06518 -6.4277	***	0.242147	3405
2003	1.290637 1.407459		0.257056 1.391455		1.725076 1.777987	*	-0.03585 -0.75229		0.024191	717
Average Measure	**0.667488** **1.953077**		**0.497329** **2.171583**		**0.329141** **-0.34989**		**-0.05689** **-1.977**		**0.079637**	

Table 5.16
Cross-section regression of next period's price change (ΔP_{t+1}) on earnings after goodwill amortisation (EAG), and the most recent prior period's equity price (P_t)

The table provides estimates of intercept (β_0), and coefficients (β_1 and β_3) of firm *i*'s earnings after goodwill amortisation (EAG) and equity price at time t ($P_{i,t}$), respectively, for explaining the share price change $\Delta P_{i,t+1}$ (= $P_{i,t+1} - P_{i,t}$, where $P_{i,t+1}$ indicates next period's end of quarter price). The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled and yearly regression analyses. The intercepts of fixed year effect are the averages of the coefficient values for each year. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance.

$$\Delta P_{i,t+1} = \beta_0 + \beta_1 \, EAG_{i,t} + \beta_3 \, P_{i,t} + \varepsilon_{i,t+1} \qquad (23)$$

Duration	β_0		β_1		β_3		Adjusted R^2	Sample
Pooled	**0.820915**	***	**0.163016**	**	**-0.0441**	***	**0.024866**	**36785**
	4.751977		**2.540084**		**-4.00662**			
Fixed year	**0.862084**		**0.165318**	**	**-0.04436**	***	**0.03476**	**36785**
	4.038501		**2.568302**		**-4.02152**			
1988	0.798066	**	0.31931		-0.05421		0.022027	1754
	2.204513		1.327712		-1.36572			
1989	1.607179	*	0.612522		-0.17257		0.186466	2018
	1.711921		1.093181		-1.62322			
1990	0.569737	***	1.287723	***	-0.05567	**	0.079896	1981
	4.751959		4.417684		-2.25556			
1991	0.655783	***	0.961334	***	-0.0828	***	0.053636	1994
	4.248022		4.222249		-4.75724			
1992	-0.09738		0.567488	*	0.014623		0.05004	2147
	-0.3793		1.684073		0.678845			
1993	-0.26154		0.065183		-0.01302		0.001278	2409
	-0.38375		0.449052		-0.31929			
1994	-0.18085		1.041426		-0.00978		0.064158	2554
	-0.37232		1.399195		-0.36839			
1995	0.274215		0.827611	***	-0.03034	*	0.041695	2802
	1.157396		3.520736		-1.77484			
1996	0.219465		0.454481	*	-0.04535	*	0.021545	2974
	0.845162		1.875271		-1.73789			
1997	0.335687		0.299482	**	0.021994		0.0395	2800
	0.424655		1.990332		0.518379			
1998	0.680259		-0.02592		-0.06373	**	0.060053	2455
	1.60296		-0.09879		-2.68368			
1999	2.03826	***	0.204987		-0.12235	***	0.092782	2388
	5.595477		0.92526		-3.75981			
2000	1.715488	**	0.099075	***	-0.15664	***	0.185074	2217
	2.962553		6.324839		-4.01878			
2001	0.103395		0.582784	*	0.00573		0.064381	2170
	0.252444		1.924903		0.290946			
2002	1.011586	***	0.085424		-0.071	***	0.236353	3405
	4.350917		1.551709		-6.21613			
2003	1.35626		0.258995		-0.03646		0.023608	717
	1.486068		1.393209		-0.76588			
Average Measure	**0.676601**		**0.477619**		**-0.05447**		**0.076406**	
	1.903667		**2.125039**		**-1.88489**			

Table 5.17
Cross-section regression of next period's price change (ΔP_{t+1}) on earnings before goodwill amortisation (EBG)

This table provides estimates of the intercept (β_0) and the coefficient (β_1) of firm *i*'s earnings before goodwill amortization (EBG) for period t for explaining the share price change $\Delta P_{i,t+1}$ (= $P_{i,t+1} - P_{i,t}$, where $P_{i,t+1}$ indicates next period's end of quarter equity price and $P_{i,t}$ is price at time t). The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled and yearly regression analyses. The intercepts of fixed year effect are the averages of the coefficient values for each year. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance.

$$\Delta P_{i,t+1} = \beta_0 + \beta_1 \, EBG_{i,t} + \varepsilon_{i,t+1}$$

Duration	β_0		β_1		Adjusted R^2	Sample
Pooled	0.140629	**	0.058846	*	0.001275	36785
	3.106902		1.72426			
Fixed year	0.179417	**	0.061192	*	0.011071	36785
	1.641698		1.804434			
1988	0.457649	**	-0.05799		9.12E-05	1754
	2.469537		-0.30099			
1989	0.651251		-0.85283	*	0.051414	2018
	1.522874		-1.88761			
1990	0.424552	**	0.685417	***	0.057917	1981
	2.568074		4.264863			
1991	0.176791		0.048264		-0.00029	1994
	1.272303		0.297874			
1992	-0.03246		0.700302	**	0.057027	2147
	-0.148		2.986833			
1993	-0.41523		-0.01642		-0.00039	2409
	-1.20208		-0.04545			
1994	-0.2519		0.918066		0.060649	2554
	-0.41875		1.599212			
1995	0.062015		0.487243	**	0.033379	2802
	0.278143		2.511593			
1996	-0.35956	**	0.193755	**	0.007243	2974
	-2.59285		2.022855			
1997	0.636418	**	0.413053	*	0.037913	2800
	2.254151		1.807059			
1998	0.149243		-0.55342	*	0.033782	2455
	0.415682		-1.81129			
1999	0.338591		-0.39172	**	0.005425	2388
	1.219281		-2.64224			
2000	-1.00972	***	0.063973	***	0.009294	2217
	-5.71043		4.075501			
2001	0.173415		0.561559	*	0.057666	2170
	0.521749		1.937162			
2002	0.185123		-0.32199		0.068946	3405
	0.605161		-1.38347			
2003	0.616628	**	0.189676		0.010039	717
	2.128166		1.256364			
Average	**0.112675**		**0.129183**		**0.030632**	
Measure	**0.323939**		**0.918017**			

Table 5.18

Cross-section regression of next period's price change (ΔP_{t+1}) on earnings before goodwill amortisation (EBG) and goodwill amortisation per share (GAPS)

The table provides estimates of intercept (β_0), and coefficients (β_1 and β_2) of firm *i*'s earnings before goodwill amortisation (EBG) and goodwill amortisation per share (GAPS) for period t, respectively, for explaining the share price change $\Delta P_{i,t+1}$ (= $P_{i,t+1} - P_{i,t}$, where $P_{i,t+1}$ indicates next period's end of quarter equity price and P_t is price at time t). The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled and yearly regression analyses. The intercepts of fixed year effect are the averages of the coefficient values for each year. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance.

$$\Delta P_{i,t+1} = \beta_0 + \beta_1 \text{ EBG}_{i,t} + \beta_2 \text{ GAPS}_{i,t} + \varepsilon_{i,t+1}$$

Duration	β_0		β_1		β_2		Adjusted R^2	Sample
Pooled	0.1477	**	0.063653	**	-0.19612		0.001526	36785
	3.132471		2.061067		-1.15079			
Fixed year	0.185203	**	0.065519	**	-0.17722		0.011271	36785
	1.676542		2.129069		-1.0547			
1988	0.465308	**	-0.11861		3.208485	**	0.009859	1754
	2.499662		-0.58033		2.554653			
1989	0.652697		-0.81727	*	-1.47411		0.05215	2018
	1.550756		-1.70842		-0.72278			
1990	0.383222	**	0.758249	***	-0.86531	**	0.061323	1981
	2.418447		4.750247		-2.97524			
1991	0.178093		0.045568		0.030568		-0.00078	1994
	1.253262		0.266878		0.195671			
1992	-0.05695		0.736187	**	-0.17319		0.057312	2147
	-0.23323		2.672265		-0.75275			
1993	-0.38352		-0.07561		0.551542		0.001379	2409
	-1.12718		-0.21378		1.611226			
1994	-0.25006		0.954969		-0.94883	*	0.063651	2554
	-0.41965		1.627151		-1.7932			
1995	0.000735		0.555753	**	-0.34466	**	0.036762	2802
	0.003394		2.824628		-2.09191			
1996	-0.36849	**	0.17613	*	0.584629		0.008692	2974
	-2.75379		1.899547		1.63689			
1997	0.559754	**	0.394751	*	2.024038	**	0.042509	2800
	2.087239		1.722595		2.278348			
1998	0.149995		-0.55228	*	-0.0304		0.03339	2455
	0.434763		-1.68031		-0.03997			
1999	0.344727		-0.42483	**	0.361498		0.00539	2388
	1.231987		-2.60088		1.353574			
2000	-0.9779	***	0.066136	***	-0.301		0.009536	2217
	-5.39102		5.353201		-1.10314			
2001	0.191913		0.612658	**	-0.75793	**	0.064214	2170
	0.580158		2.005652		-2.0777			
2002	0.227046		-0.22897		-1.65024		0.112472	3405
	0.921126		-1.35339		-1.53483			
2003	0.566917	**	0.185592		2.057651	**	0.010729	717
	1.964599		1.235654		2.285948			
Average Measure	**0.105218**		**0.141776**		**0.142046**		**0.035537**	
	0.313782		**1.013795**		**-0.07345**			

Table 5.19
Cross-section regression of next period's price change (ΔP_{t+1}) on earnings after goodwill amortisation (EAG)

This table provides estimates of the intercept (β_0) and the coefficient (β_1) of firm *i*'s earnings after goodwill amortization (EAG) for period t for explaining the share price change $\Delta P_{i,t+1}$ (= $P_{i,t+1} - P_{i,t}$, where $P_{i,t+1}$ indicates next period's end of quarter equity price and $P_{i,t}$ is price at time t). The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled and yearly regression analyses. The intercepts of fixed year effect are the averages of the coefficient values for each year. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance.

$$\Delta P_{i,t+1} = \beta_0 + \beta_1 \, EAG_{i,t} + \varepsilon_{i,t+1}$$

Duration	β_0		β_1		Adjusted R^2	Sample
Pooled	0.139594	***	0.063043	**	0.001423	36785
	3.376675		1.98251			
Fixed year	0.178739	**	0.065004	**	0.011206	36785
	1.66181		2.055542			
1988	0.479326	**	-0.07568		0.00052	1754
	2.547765		-0.38117			
1989	0.627908		-0.85494	*	0.049586	2018
	1.43965		-1.81533			
1990	0.382661	**	0.754012	***	0.061735	1981
	2.399486		4.614662			
1991	0.183509		0.043539		-0.00034	1994
	1.336875		0.258671			
1992	0.00898		0.707843	**	0.048557	2147
	0.036718		2.526979			
1993	-0.37188		-0.06022		-8.4E-05	2409
	-1.10647		-0.16141			
1994	-0.24999		0.954975		0.064023	2554
	-0.42545		1.632904			
1995	0.031639		0.54074	**	0.03549	2802
	0.146741		2.729969			
1996	-0.33125	**	0.178795	*	0.005901	2974
	-2.51936		1.953497			
1997	0.669214	**	0.403541	*	0.035709	2800
	2.441114		1.752368			
1998	0.120891		-0.56292	*	0.033036	2455
	0.336556		-1.73835			
1999	0.339115		-0.42527	**	0.005793	2388
	1.212089		-2.60455			
2000	-1.00411	***	0.0652	***	0.009559	2217
	-5.69115		4.581423			
2001	0.175156		0.613137	**	0.064371	2170
	0.546543		2.012114			
2002	0.106104		-0.28866		0.050584	3405
	0.366712		-1.20137			
2003	0.627296	**	0.186433		0.009625	717
	2.190552		1.238898			
Average	**0.11216**		**0.136283**		**0.029629**	
Measure	**0.328648**		**0.962456**			

Appendix 5A

Table 5.20
Descriptive Statistics

Panel A provides summary statistics for the study's variables. For firm *i*, $P_{i,t+1}$ indicates next fiscal period's first quarter end equity price, $P_{i,t}$ is price at time t, GWA is the goodwill amortization that is either directly reported or estimated, EAG is earnings after GWA per share, EBG is earnings before GWA per share, GAPS is GWA per share, and $\Delta P_{i,t+1}$ is change in price per share ($P_{i,t+1} - P_{i,t}$). The sample period is 1989-2004 for $P_{i,t+1}$ and $\Delta P_{i,t+1}$ and 1988-2003 for the other variables. Panel B provides the summary measures of market equity value (MEV) at the end of fiscal year based on shares outstanding (MEV is market equity value per share multiplied by the number of shares outstanding at fiscal year end). Panel C provides Pearson's correlation coefficient estimates for the study's variables on a per share basis.

Panel A: Summary Statistics for the pooled data

Measure	$P_{i,t+1}$	$P_{i,t}$	GWA (in m$)	EAG	EBG	GAPS	$\Delta P_{i,t+1}$
Mean	15.6146	15.553	4.7185	0.92712	0.97412	0.0467	0.0616
Median	13	12.87	0	0.74	0.78	0	0.13
Std. Deviation	11.5703	12.0221	98.497	0.79935	0.79121	0.23477	4.7092
Coeff. of Var.	0.74099	0.77298	20.875	0.86219	0.81223	5.02688	76.436
Minimum	0.75	0.005	0	-22.27	0.02	0	-149.56
Maximum	52.37	189.56	14252	3.68	3.68	22.48	31.13
Number of observations	**31147**	**31147**	**31147**	**31147**	**31147**	**31147**	**31147**

Panel B: Percentiles of the market value of common equity for the pooled data

Measures		Market Equity Value (MEV in m$)
Mean		1138.49367
Median		124.055
Std. Deviation		6892.18362
Coeff. of Var.		6.05377421
Minimum		0.075
Maximum		340771.704
Percentiles	**5**	6.58432
	10	11.5491
	25	33.6798
	50	124.055
	75	520.044
	90	1864.75888
	95	4154.1443
Observations		**31147**

Panel C: Pearson's correlation coefficient for the variables in regression equations (15) to (23) on a per share basis

Variable	$P_{i,t+1}$	$P_{i,t}$	EAG	EBG	GAPS	$\Delta P_{i,t+1}$
$P_{i,t+1}$	1					
$P_{i,t}$	0.921017	1				
EAG	0.628998	0.610266	1			
EBG	0.653278	0.634594	0.956394	1		
GAPS	0.059039	0.059779	-0.18246	0.112652	1	
$\Delta P_{i,t+1}$	0.105684	-0.29	-0.01253	-0.01498	-0.00755	1

Appendix 5A (continued)

Table 5.21
Cross-section regression of next period's price (P_{t+1}) on earnings before goodwill amortisation (EBG)

This table provides estimates of the intercept (β_0) and the coefficient (β_1) of firm *i*'s fiscal year end earnings before goodwill amortization (EBG) in explaining the share price $P_{i,t+1}$, where $P_{i,t+1}$ indicates next fiscal period's first quarter end equity price. The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled and yearly regression analyses. The intercepts of fixed year effect are the averages of the coefficient values for each year. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance.

$$P_{i,t+1} = \beta_0 + \beta_1 \, EBG_{i,t} + \varepsilon_{i,t+1} \qquad (15)$$

Duration	β_0		β_1		Adjusted R^2	Sample
Pooled	**6.308619**	***	**9.553206**	***	**0.426754**	**31147**
	86.14256		**130.9515**			
Fixed year	**6.328879**	***	**9.562441**	***	**0.442989**	**31147**
	30.79153		**132.0845**			
1988	4.235304	***	9.333464	***	0.561365	1441
	15.89646		34.551			
1989	4.298008	***	9.428861	***	0.522603	1684
	17.63962		33.58078			
1990	4.046128	***	9.662528	***	0.502979	1673
	16.13242		33.59741			
1991	5.409046	***	10.80956	***	0.50242	1704
	20.5462		35.47875			
1992	5.73289	***	11.00666	***	0.490261	1898
	20.90006		34.37381			
1993	6.409759	***	10.151	***	0.453071	2173
	24.96963		33.20448			
1994	5.996533	***	9.633534	***	0.452731	2308
	24.25699		37.16644			
1995	6.872114	***	9.682451	***	0.433614	2361
	27.14151		37.36126			
1996	6.663322	***	10.14284	***	0.464551	2536
	26.97097		40.6877			
1997	7.737847	***	10.55764	***	0.409905	2354
	24.33732		34.07128			
1998	6.359212	***	8.482636	***	0.325942	2056
	20.00691		28.1258			
1999	7.330537	***	7.455301	***	0.254895	1937
	21.2003		24.74608			
2000	5.99355	***	7.829126	***	0.334995	1757
	17.77293		26.54277			
2001	7.529	***	9.804214	***	0.403812	1779
	21.88374		30.63849			
2002	6.657124	***	9.698101	***	0.483537	2894
	26.51934		46.66717			
2003	9.744433	***	10.12796	***	0.497802	592
	16.08232		22.67431			
Average Measure	**6.313425**		**9.612868**		**0.443405**	
	21.39104		**33.34172**			

Appendix 5A (continued)

Table 5.22
Cross-section regression of next period's price (P_{t+1}) on earnings before goodwill amortisation (EBG) and goodwill amortisation per share (GAPS)

The table provides estimates of intercept (β_0), and coefficients (β_1 and β_2) of firm *i*'s fiscal year end earnings before goodwill amortisation (EBG) and goodwill amortisation per share (GAPS), respectively, in explaining the share price $P_{i,t+1}$, where $P_{i,t+1}$ indicates next fiscal period's first quarter end equity price. The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled and yearly regression analyses. The intercepts of fixed year effect are the averages of the coefficient values for each year. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance.

$$P_{i,t+1} = \beta_0 + \beta_1 \, EBG_{i,t} + \beta_2 \, GAPS_{i,t} + \varepsilon_{i,t+1} \qquad (16)$$

Duration	β_0		β_1		β_2		Adjusted R^2	Sample
Pooled	**6.318893**	***	**9.577491**	***	**-0.72652**	**	**0.42695**	**31147**
	86.0808		**131.4549**		**-2.51098**			
Fixed year	**6.339323**	***	**9.586634**	***	**-0.76846**	**	**0.4432095**	**31147**
	30.83223		**132.619**		**-2.6306**			
1988	4.209571	***	9.308257	***	2.973036		0.561509	1441
	15.77408		34.32776		1.565379			
1989	4.303855	***	9.58772	***	-6.07731	**	0.527693	1684
	17.85105		34.35769		-3.25573			
1990	4.069081	***	9.717257	***	-2.42775		0.503556	1673
	16.19737		33.28719		-1.31205			
1991	5.399427	***	10.78613	***	1.080062		0.502224	1704
	20.48118		34.39017		0.318007			
1992	5.725002	***	11.14251	***	-3.00899		0.491591	1898
	20.91101		33.50614		-1.30524			
1993	6.412217	***	10.19205	***	-1.05062		0.45309	2173
	24.95326		33.19187		-0.48905			
1994	6.015647	***	9.710695	***	-2.37628	**	0.454918	2308
	24.40776		37.50964		-2.13418			
1995	6.888724	***	9.750203	***	-2.46155		0.434652	2361
	27.20232		38.12111		-1.43915			
1996	6.661872	***	10.14045	***	0.107091		0.464343	2536
	26.99436		40.40153		0.136005			
1997	7.742516	***	10.60894	***	-1.31245		0.410044	2354
	24.34028		33.83531		-0.73294			
1998	6.363264	***	8.586871	***	-2.08164		0.326662	2056
	20.05116		28.13006		-1.13856			
1999	7.347838	***	7.536688	***	-1.49426		0.255405	1937
	21.25732		24.55153		-1.34886			
2000	6.0179	***	7.863493	***	-0.81467		0.334908	1757
	17.88987		26.03369		-0.72288			
2001	7.544693	***	9.841899	***	-0.70442		0.403727	1779
	21.67735		31.17192		-0.50201			
2002	6.636633	***	9.694951	***	0.257259		0.483475	2894
	26.34479		46.61277		0.522273			
2003	9.574721	***	10.18023	***	4.232362		0.498727	592
	15.7612		22.76492		1.422096			
Average Measure	**6.30706**		**9.665522**		**-0.94751**		**0.4441578**	
	21.3809		**33.26208**		**-0.65106**			

Appendix 5A (continued)

Table 5.23

Cross-section regression of next period's price (P_{t+1}) on earnings after goodwill amortisation (EAG)

This table provides estimates of the intercept (β_0) and the coefficient (β_1) of firm *i*'s fiscal year end earnings after goodwill amortization (EAG) in explaining the share price $P_{i,t+1}$, where $P_{i,t+1}$ indicates next fiscal period's first quarter end equity price. The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled and yearly regression analyses. The intercepts of fixed year effect are the averages of the coefficient values for each year. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance.

$$P_{i,t+1} = \beta_0 + \beta_1\ EAG_{i,t} + \varepsilon_{i,t+1} \qquad (17)$$

Duration	β_0		β_1		Adjusted R^2	Sample
Pooled	**7.173694**	***	**9.10451**	***	**0.395619**	**31147**
	29.90456		**36.6067**			
Fixed year	**7.189066**	***	**9.098265**	***	**0.412533**	**31147**
	22.98344		**36.37149**			
1988	4.409694	***	9.315883	***	0.554088	1441
	16.1885		33.70369			
1989	4.389872	***	9.591104	***	0.526114	1684
	18.22501		34.31386			
1990	4.328903	***	9.677924	***	0.495826	1673
	16.85234		32.62906			
1991	5.701678	***	10.81208	***	0.490613	1704
	20.93818		33.99836			
1992	6.016781	***	11.13961	***	0.479646	1898
	20.03639		32.19809			
1993	6.889885	***	10.02059	***	0.432272	2173
	25.0827		31.27749			
1994	6.66512	***	9.306888	***	0.432578	2308
	15.66661		21.52991			
1995	7.241734	***	9.612549	***	0.423541	2361
	23.24754		30.65001			
1996	7.484846	***	9.616154	***	0.430184	2536
	14.34046		17.93818			
1997	8.326285	***	10.38383	***	0.390414	2354
	24.0798		30.76793			
1998	6.733889	***	8.547734	***	0.316207	2056
	20.28949		26.87545			
1999	7.942692	***	7.316627	***	0.240825	1937
	19.20096		19.1413			
2000	6.839781	***	7.580637	***	0.313311	1757
	16.69423		20.80724			
2001	8.848739	***	9.217748	***	0.36253	1779
	19.90828		22.7358			
2002	10.25861	***	7.198821	***	0.350727	2894
	6.747628		5.215141			
2003	10.47659	***	9.720145	***	0.479663	592
	16.75296		21.49357			
Average Measure	**7.034694**		**9.316145**		**0.419909**	
	18.39069		**25.95469**			

Appendix 5A (continued)

Table 5.24
Cross-section regression of next period's price (P_{t+1}) on earnings before goodwill amortisation (EBG) and the most recent prior period's equity price (P_t)

The table provides estimates of intercept (β_0), and coefficients (β_1 and β_3) of firm i's earnings before goodwill amortisation (EBG) and equity price at time t ($P_{i,t}$), respectively, for explaining the share price $P_{i,t+1}$, where $P_{i,t+1}$ indicates next period's end of quarter price. The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled and yearly regression analyses. The intercepts of fixed year effect are the averages of the coefficient values for each year. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance.

$$P_{i,t+1} = \beta_0 + \beta_1 \, EBG_{i,t} + \beta_3 \, P_{i,t} + \varepsilon_{i,t+1} \qquad (18)$$

Duration	β_0		β_1		β_3		Adjusted R^2	Sample
Pooled	**1.281661**	***	**1.684583**	***	**0.816046**	***	**0.85619**	**31147**
	15.83692		**12.38113**		**59.19914**			
Fixed year	**1.328199**	*	**1.732986**	***	**0.812703**	***	**0.8587461**	**31147**
	10.26674		**12.52083**		**58.18254**			
1988	0.346941		0.612202	*	0.968896	***	0.928372	1441
	1.366461		1.749191		20.28061			
1989	0.482534	***	0.71691	***	0.899554	***	0.917077	1684
	3.461113		3.760886		45.9203			
1990	0.833679	***	1.688129	***	0.884541	***	0.864515	1673
	4.313121		5.467649		23.51832			
1991	0.80977	***	1.574415	***	0.862039	***	0.89636	1704
	6.635807		6.570174		46.65806			
1992	1.055971	***	1.381629	***	0.879048	***	0.885147	1898
	6.377946		5.449663		37.31045			
1993	0.948018	***	0.817513	***	0.867562	***	0.897724	2173
	6.366347		3.689952		43.23778			
1994	0.635302	***	0.574123	**	0.957768	***	0.905884	2308
	4.666475		3.183052		54.93704			
1995	1.453848	***	1.093122	***	0.863946	***	0.85686	2361
	8.961773		4.251728		36.70853			
1996	1.08545	***	3.025928	***	0.736515	***	0.852332	2536
	3.366711		6.518822		16.13299			
1997	1.972561	***	2.045435	**	0.807174	***	0.82551	2354
	5.658061		3.200198		14.47992			
1998	1.327038	***	0.625274	**	0.8193	***	0.833751	2056
	7.169584		2.18745		29.39656			
1999	2.301375	***	1.73484	***	0.722033	***	0.751508	1937
	8.002513		3.705531		14.19058			
2000	2.066897	***	2.801648	***	0.604881	***	0.778585	1757
	5.910013		5.983149		10.84524			
2001	0.959064	***	1.87311	***	0.866795	***	0.890429	1779
	3.600607		6.403202		26.58706			
2002	0.515169	***	0.672327	***	0.916902	***	0.918977	2894
	5.202623		5.112998		87.05905			
2003	3.507215	**	2.714798		0.710577	***	0.807945	592
	2.722977		1.552963		4.35786			
Average	**1.268802**		**1.496963**		**0.835471**		**0.863186**	
Estimate	**5.236383**		**4.299163**		**31.97627**			

Appendix 5A (continued)

Table 5.25

Cross-section regression of next period's price (P_{t+1}) on earnings before goodwill amortisation (EBG), goodwill amortisation per share (GAPS) and the most recent prior period's equity price (P_t)

The table provides estimates of intercept (β_0), and coefficients (β_1, β_2 and β_3) of firm *i*'s earnings before goodwill amortisation (EBG), goodwill amortisation per share (GAPS), and equity price at time t ($P_{i,t}$), respectively, for explaining the share price $P_{i,t+1}$, where $P_{i,t+1}$ indicates next period's end of quarter price. The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled and yearly regression analyses. The intercepts of fixed year effect are the averages of the coefficient values for each year. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance.

$$P_{i,t+1} = \beta_0 + \beta_1\ EBG_{i,t} + \beta_2\ GAPS_{i,t} + \beta_3\ P_{i,t} + \varepsilon_{i,t+1} \qquad (19)$$

Duration	β_0	β_1	β_2	β_3	Adjusted R^2	Sample
Pooled	**1.285472 *****	**1.693155 *****	**-0.23096 ***	**0.815957 *****	**0.8562072**	**31147**
	15.86378	**12.42338**	**-1.88172**	**59.18741**		
Fixed year	**1.331226 ***	**1.739606 *****	**-0.18428**	**0.812618 *****	**0.8587553**	**31147**
	10.28831	**12.54955**	**-1.5431**	**58.16839**		
1988	0.333826	0.600837 *	1.650781 *	0.968604 ***	0.9284608	1441
	1.327494	1.726062	1.918457	20.26492		
1989	0.492176 ***	0.768595 ***	-1.23916 **	0.897562 ***	0.9172488	1684
	3.525922	3.957609	-2.79298	45.60783		
1990	0.826635 ***	1.671134 ***	0.527696	0.885107 ***	0.8644752	1673
	4.293349	5.376043	0.693538	23.52653		
1991	0.788111 ***	1.52265 ***	2.174574 *	0.862469 ***	0.8966903	1704
	6.540621	6.309434	1.800908	46.69418		
1992	1.056665 ***	1.393977 ***	-0.21602	0.878811 ***	0.8850946	1898
	6.388673	5.404523	-0.38878	37.30271		
1993	0.943781 ***	0.789849 ***	0.582399	0.868019 ***	0.8977607	2173
	6.335831	3.574419	1.093259	43.27956		
1994	0.64507 ***	0.601325 ***	-0.56658 *	0.956837 ***	0.9059803	2308
	4.721168	3.333975	-1.68971	54.80224		
1995	1.454363 ***	1.094589 ***	-0.03871	0.863906 ***	0.8567995	2361
	8.945145	4.225282	-0.09873	36.63882		
1996	1.080843 ***	3.018451 ***	0.316555	0.736558 ***	0.8523075	2536
	3.353775	6.500105	0.651323	16.1322		
1997	1.969238 ***	2.027834 **	0.375222	0.807452 ***	0.8254674	2354
	5.636863	3.151324	0.488735	14.46317		
1998	1.328691 ***	0.640183 **	-0.26213	0.819114 ***	0.8336862	2056
	7.170623	2.218692	-0.39768	29.35944		
1999	2.305921 ***	1.75137 ***	-0.27508	0.721837 ***	0.7514098	1937
	8.006593	3.715428	-0.56409	14.1785		
2000	2.067518 ***	2.802516 ***	-0.01881	0.604872 ***	0.7784584	1757
	5.920619	5.97961	-0.04029	10.84341		
2001	0.982876 ***	1.936807 ***	-1.31365	0.867515 ***	0.8912393	1779
	3.638413	6.331324	-1.52524	27.128		
2002	0.526635 ***	0.671795 ***	-0.16585	0.917162 ***	0.9189973	2894
	5.287458	5.111028	-1.2616	87.11019		
2003	3.397291 **	2.760029	2.930934 **	0.709711 ***	0.8084722	592
	2.681001	1.573279	2.026416	4.353958		
Average Estimate	**1.262478**	**1.503246**	**0.278886**	**0.835346**	**0.8632843**	
	5.235847	**4.280509**	**-0.0054**	**31.98035**		

Appendix 5A (continued)

Table 5.26

Cross-section regression of next period's price (P_{t+1}) on earnings after goodwill amortisation (EAG), and the most recent prior period's equity price (P_t)

The table provides estimates of intercept (β_0), and coefficients (β_1 and β_3) of firm i's earnings after goodwill amortisation (EAG) and equity price at time t ($P_{i,t}$), respectively, for explaining the share price $P_{i,t+1}$, where $P_{i,t+1}$ indicates next period's end of quarter price. The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled and yearly regression analyses. The intercepts of fixed year effect are the averages of the coefficient values for each year. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance.

$$P_{i,t+1} = \beta_0 + \beta_1 \, EAG_{i,t} + \beta_3 \, P_{i,t} + \varepsilon_{i,t+1} \qquad (20)$$

Duration	β_0		β_1		β_3		Adjusted R^2	Sample
Pooled	**1.371415**	***	**1.543749**	***	**0.823762**	***	**0.8554022**	**31147**
	15.10235		**11.04846**		**61.04381**			
Fixed year	**1.422653**	**	**1.577724**	***	**0.82091**	***	**0.8578537**	**31147**
	10.41481		**11.06347**		**59.92485**			
1988	0.358192		0.575581	*	0.971582	***	0.9282563	1441
	1.386154		1.682806		20.63754			
1989	0.482755	***	0.774879	***	0.896908	***	0.9172664	1684
	3.470279		4.010717		45.766			
1990	0.889514	***	1.622058	***	0.889204	***	0.8638349	1673
	4.464263		5.254105		23.77407			
1991	0.852175	***	1.471087	***	0.867984	***	0.8956094	1704
	6.876072		6.067517		47.35274			
1992	1.080716	***	1.355981	***	0.882152	***	0.8848992	1898
	6.39881		5.282937		38.05246			
1993	0.981464	***	0.709694	***	0.873101	***	0.8973483	2173
	6.468304		3.355596		44.64155			
1994	0.646603	***	0.59749	***	0.957055	***	0.9060206	2308
	4.758226		3.559997		56.3904			
1995	1.486765	***	1.047152	***	0.86671	***	0.8566292	2361
	9.034315		4.12084		37.21649			
1996	1.234057	***	2.721147	***	0.750333	***	0.8488635	2536
	3.478602		5.725973		16.53951			
1997	2.064774	***	1.89462	**	0.814662	***	0.8242495	2354
	5.563888		3.042968		14.83918			
1998	1.344009	***	0.628899	**	0.820051	***	0.8337315	2056
	7.072001		2.215327		29.87969			
1999	2.421256	***	1.666734	***	0.725793	***	0.7506588	1937
	7.61842		3.633722		14.42403			
2000	2.340672	***	2.633636	***	0.611911	***	0.7752102	1757
	5.871607		5.728231		10.99501			
2001	1.032214	***	1.857403	***	0.871891	***	0.8911208	1779
	3.932519		5.595526		26.49108			
2002	0.600464	***	0.47133	**	0.927617	***	0.9187692	2894
	5.715926		2.944043		86.45183			
2003	3.650957	**	2.470059		0.720424	***	0.8057413	592
	2.639749		1.485078		4.470643			
Average	**1.341662**		**1.406109**		**0.840461**		**0.8623881**	
Estimate	**5.296821**		**3.981586**		**32.37014**			

Appendix 5A (continued)

Table 5.27
Cross-section regression of next period's price change (ΔP_{t+1}) on earnings before goodwill amortisation (EBG), and the most recent prior period's equity price (P_t)

The table provides estimates of intercept (β_0), and coefficients (β_1 and β_3) of firm *i*'s earnings before goodwill amortisation (EBG) and equity price at time t ($P_{i,t}$)), respectively, for explaining the share price change $\Delta P_{i,t+1}$ (= $P_{i,t+1} - P_{i,t}$, where $P_{i,t+1}$ indicates next period's end of quarter price). The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled and yearly regression analyses. The intercepts of fixed year effect are the averages of the coefficient values for each year. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance.

$$\Delta P_{i,t+1} = \beta_0 + \beta_1 \, EBG_{i,t} + \beta_3 \, P_{i,t} + \varepsilon_{i,t+1} \qquad (21)$$

Duration	β_0		β_1		β_3		Adjusted R^2	Sample
Pooled	**1.281661**	***	**1.684583**	***	**-0.18395**	***	**0.131893**	**31147**
	15.83692		**12.38113**		**-13.3448**			
Fixed year	**1.328199**	*	**1.732986**	***	**-0.1873**	***	**0.1473223**	**31147**
	10.26674		**12.52083**		**-13.4089**			
1988	0.346941		0.612202	*	-0.0311		0.013636	1441
	1.366461		1.749191		-0.65106			
1989	0.482534	***	0.71691	***	-0.10045	***	0.059037	1684
	3.461113		3.760886		-5.12753			
1990	0.833679	***	1.688129	***	-0.11546	**	0.057421	1673
	4.313121		5.467649		-3.06984			
1991	0.80977	***	1.574415	***	-0.13796	***	0.088028	1704
	6.635807		6.570174		-7.46715			
1992	1.055971	***	1.381629	***	-0.12095	***	0.060265	1898
	6.377946		5.449663		-5.1337			
1993	0.948018	***	0.817513	***	-0.13244	***	0.104121	2173
	6.366347		3.689952		-6.60046			
1994	0.635302	***	0.574123	**	-0.04223	**	0.009973	2308
	4.666475		3.183052		-2.42241			
1995	1.453848	***	1.093122	***	-0.13605	***	0.069455	2361
	8.961773		4.251728		-5.78084			
1996	1.08545	***	3.025928	***	-0.26348	***	0.254987	2536
	3.366711		6.518822		-5.7715			
1997	1.972561	***	2.045435	**	-0.19283	***	0.118979	2354
	5.658061		3.200198		-3.45912			
1998	1.327038	***	0.625274	**	-0.1807	***	0.153279	2056
	7.169584		2.18745		-6.48352			
1999	2.301375	***	1.73484	***	-0.27797	***	0.230251	1937
	8.002513		3.705531		-5.46308			
2000	2.066897	***	2.801648	***	-0.39512	***	0.46214	1757
	5.910013		5.983149		-7.08432			
2001	0.959064	***	1.87311	***	-0.1332	***	0.107252	1779
	3.600607		6.403202		-4.08576			
2002	0.515169	***	0.672327	***	-0.0831	***	0.042866	2894
	5.202623		5.112998		-7.89009			
2003	3.507215	**	2.714798		-0.28942	*	0.210545	592
	2.722977		1.552963		-1.77499			
Average	**1.268802**		**1.496963**		**-0.16453**		**0.1276396**	
Measure	**5.236383**		**4.299163**		**-4.89158**			

Appendix 5A (continued)

Table 5.28

Cross-section regression of next period's price change (ΔP_{t+1}) on earnings before goodwill amortisation (EBG), goodwill amortisation per share (GAPS) and the most recent prior period's equity price (P_t)

The table provides estimates of intercept (β_0), and coefficients (β_1, β_2 and β_3) of firm *i*'s earnings before goodwill amortisation (EBG), goodwill amortisation per share (GAPS), and equity price at time t ($P_{i,t}$), respectively, for explaining the share price change $\Delta P_{i,t+1}$ (= $P_{i,t+1} - P_{i,t}$, where $P_{i,t+1}$ indicates next period's end of quarter price). The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled and yearly regression analyses. The intercepts of fixed year effect are the averages of the coefficient values for each year. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance.

$$\Delta P_{i,t+1} = \beta_0 + \beta_1 \, EBG_{i,t} + \beta_2 \, GAPS_{i,t} + \beta_3 \, P_{i,t} + \varepsilon_{i,t+1} \quad (22)$$

Duration	β_0		β_1		β_2		β_3		Adjusted R^2	Sample
Pooled	**1.285472** **15.86378**	***	**1.693155** **12.42338**	***	**-0.23096** **-1.88172**	*	**-0.18404** **-13.35**	***	**0.1319957**	**31147**
Fixed year	**1.331226** **10.28831**	*	**1.739606** **12.54955**	***	**-0.18428** **-1.5431**		**-0.18738** **-13.4131**	***	**0.1473776**	**31147**
1988	0.333826 1.327494		0.600837 1.726062	*	1.650781 1.918457	*	-0.0314 -0.65687		0.0148547	1441
1989	0.492176 3.525922	***	0.768595 3.957609	***	-1.23916 -2.79298	**	-0.10244 -5.20517	***	0.0609911	1684
1990	0.826635 4.293349	***	1.671134 5.376043	***	0.527696 0.693538		-0.11489 -3.05391	**	0.0571429	1673
1991	0.788111 6.540621	***	1.52265 6.309434	***	2.174574 1.800908	*	-0.13753 -7.44594	***	0.0909305	1704
1992	1.056665 6.388673	***	1.393977 5.404523	***	-0.21602 -0.38878		-0.12119 -5.14408	***	0.0598356	1898
1993	0.943781 6.335831	***	0.789849 3.574419	***	0.582399 1.093259		-0.13198 -6.5806	***	0.1044385	2173
1994	0.64507 4.721168	***	0.601325 3.333975	***	-0.56658 -1.68971	*	-0.04316 -2.47212	**	0.0109889	2308
1995	1.454363 8.945145	***	1.094589 4.225282	***	-0.03871 -0.09873		-0.13609 -5.77184	***	0.0690622	2361
1996	1.080843 3.353775	***	3.018451 6.500105	***	0.316555 0.651323		-0.26344 -5.76996	***	0.2548635	2536
1997	1.969238 5.636863	***	2.027834 3.151324	**	0.375222 0.488735		-0.19255 -3.44894	***	0.1187652	2354
1998	1.328691 7.170623	***	0.640183 2.218692	**	-0.26213 -0.39768		-0.18089 -6.48346	***	0.1529506	2056
1999	2.305921 8.006593	***	1.75137 3.715428	***	-0.27508 -0.56409		-0.27816 -5.46374	***	0.2299469	1937
2000	2.067518 5.920619	***	2.802516 5.97961	***	-0.01881 -0.04029		-0.39513 -7.08338	***	0.4618335	1757
2001	0.982876 3.638413	***	1.936807 6.331324	***	-1.31365 -1.52524		-0.13249 -4.14293	***	0.1138569	1779
2002	0.526635 5.287458	***	0.671795 5.111028	***	-0.16585 -1.2616		-0.08284 -7.86775	***	0.0431072	2894
2003	3.397291 2.681001	**	2.760029 1.573279		2.930934 2.026416	**	-0.29029 -1.78087	*	0.2127117	592
Average Estimate	**1.262478** **5.235847**		**1.503246** **4.280509**		**0.278886** **-0.0054**		**-0.16465** **-4.89822**		**0.1285175**	

Appendix 5A (continued)

Table 5.29

Cross-section regression of next period's price change (ΔP_{t+1}) on earnings after goodwill amortisation (EAG), and the most recent prior period's equity price (P_t)

The table provides estimates of intercept (β_0), and coefficients (β_1 and β_3) of firm *i*'s earnings after goodwill amortisation (EAG) and equity price at time t ($P_{i,t}$), respectively, for explaining the share price change $\Delta P_{i,t+1}$ (= $P_{i,t+1} - P_{i,t}$, where $P_{i,t+1}$ indicates next period's end of quarter price). The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled and yearly regression analyses. The intercepts of fixed year effect are the averages of the coefficient values for each year. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance.

$$\Delta P_{i,t+1} = \beta_0 + \beta_1 \, EAG_{i,t} + \beta_3 \, P_{i,t} + \varepsilon_{i,t+1} \qquad (23)$$

Duration	β_0		β_1		β_3		Adjusted R^2	Sample
Pooled	**1.371415**	***	**1.543749**	***	**-0.17624**	***	**0.1271368**	**31147**
	15.10235		**11.04846**		**-13.0599**			
Fixed year	**1.422653**	**	**1.577724**	***	**-0.17909**	***	**0.1419352**	**31147**
	10.41481		**11.06347**		**-13.0732**			
1988	0.358192		0.575581	*	-0.02842		0.0120378	1441
	1.386154		1.682806		-0.60363			
1989	0.482755	***	0.774879	***	-0.10309	***	0.0611906	1684
	3.470279		4.010717		-5.26044			
1990	0.889514	***	1.622058	***	-0.1108	**	0.0526888	1673
	4.464263		5.254105		-2.96228			
1991	0.852175	***	1.471087	***	-0.13202	***	0.0814195	1704
	6.876072		6.067517		-7.20214			
1992	1.080716	***	1.355981	***	-0.11785	***	0.0582371	1898
	6.39881		5.282937		-5.0835			
1993	0.981464	***	0.709694	***	-0.1269	***	0.1008263	2173
	6.468304		3.355596		-6.48831			
1994	0.646603	***	0.59749	***	-0.04295	**	0.0114127	2308
	4.758226		3.559997		-2.53038			
1995	1.486765	***	1.047152	***	-0.13329	***	0.0679549	2361
	9.034315		4.12084		-5.72346			
1996	1.234057	***	2.721147	***	-0.24967	***	0.2374879	2536
	3.478602		5.725973		-5.50338			
1997	2.064774	***	1.89462	**	-0.18534	***	0.1126159	2354
	5.563888		3.042968		-3.37596			
1998	1.344009	***	0.628899	**	-0.17995	***	0.1531812	2056
	7.072001		2.215327		-6.55671			
1999	2.421256	***	1.666734	***	-0.27421	***	0.2276205	1937
	7.61842		3.633722		-5.44946			
2000	2.340672	***	2.633636	***	-0.38809	***	0.4539429	1757
	5.871607		5.728231		-6.9733			
2001	1.032214	***	1.857403	***	-0.12811	***	0.1128909	1779
	3.932519		5.595526		-3.8924			
2002	0.600464	***	0.47133	**	-0.07238	***	0.0404123	2894
	5.715926		2.944043		-6.74589			
2003	3.650957	**	2.470059		-0.27958	*	0.2014861	592
	2.639749		1.485078		-1.73493			
Average Measure	**1.341662**		**1.406109**		**-0.15954**		**0.1240878**	
	5.296821		**3.981586**		**-4.75538**			

Appendix 5A (continued)

Table 5.30
Cross-section regression of next period's price change (ΔP_{t+1}) on earnings before goodwill amortisation (EBG)

This table provides estimates of the intercept (β_0) and the coefficient (β_1) of firm *i*'s earnings before goodwill amortization (EBG) for period t for explaining the share price change $\Delta P_{i,t+1}$ (= $P_{i,t+1} - P_{i,t}$, where $P_{i,t+1}$ indicates next period's end of quarter equity price and $P_{i,t}$ is price at time t). The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled and yearly regression analyses. The intercepts of fixed year effect are the averages of the coefficient values for each year. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance.

$$\Delta P_{i,t+1} = \beta_0 + \beta_1 \, EBG_{i,t} + \varepsilon_{i,t+1}$$

Duration	β_0		β_1		Adjusted R^2	Sample
Pooled	**0.148477**	***	**-0.08917**	**	**0.000192**	**31147**
	3.944612		**-2.28478**			
Fixed year	**0.175733**	*	**-0.07141**	*	**0.01405**	**31147**
	1.911568		**-1.83404**			
1988	0.222115	**	0.332228	**	0.009112	1441
	2.202947		2.42722			
1989	0.056492		-0.25588	*	0.003778	1684
	0.501716		-1.73602			
1990	0.414359	**	0.647235	***	0.015121	1673
	3.166058		3.94285			
1991	0.073703		0.096425		-0.00024	1704
	0.630658		0.61905			
1992	0.412454	***	0.057281		-0.00042	1898
	3.479574		0.346736			
1993	0.114256		-0.60729	***	0.013758	2173
	1.161508		-4.43681			
1994	0.398903	***	0.174656		0.001133	2308
	3.756346		1.394594			
1995	0.600583	***	-0.25952	*	0.001603	2361
	4.690389		-1.76294			
1996	-0.91001	***	0.479885	**	0.004856	2536
	-5.9303		3.001342			
1997	0.595288	**	0.011947		-0.00042	2354
	3.150798		0.062239			
1998	0.217174		-1.1077	***	0.027863	2056
	1.420986		-7.88927			
1999	0.365253		-0.46742	**	0.002593	1937
	1.527494		-2.83547			
2000	-0.49807	**	-0.48239	**	0.002525	1757
	-2.32383		-2.61138			
2001	-0.05057		0.6543	***	0.014111	1779
	-0.36687		4.569152			
2002	-0.04147		-0.14567	*	0.000944	2894
	-0.45134		-1.64867			
2003	0.966753	**	-0.30464		0.000163	592
	2.512571		-1.03322			
Average	**0.183576**		**-0.07353**		**0.00603**	
Measure	**1.195544**		**-0.47441**			

Appendix 5A (continued)

Table 5.31
Cross-section regression of next period's price change (ΔP_{t+1}) on earnings before goodwill amortisation (EBG) and goodwill amortisation per share (GAPS)

The table provides estimates of intercept (β_0), and coefficients (β_1 and β_2) of firm *i*'s earnings before goodwill amortisation (EBG) and goodwill amortisation per share (GAPS) for period t, respectively, for explaining the share price change $\Delta P_{i,t+1}$ (= $P_{i,t+1} - P_{i,t}$, where $P_{i,t+1}$ indicates next period's end of quarter equity price and P_t is price at time t). The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled and yearly regression analyses. The intercepts of fixed year effect are the averages of the coefficient values for each year. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance.

$$\Delta P_{i,t+1} = \beta_0 + \beta_1\, EBG_{i,t} + \beta_2\, GAPS_{i,t} + \varepsilon_{i,t+1}$$

Duration	β_0		β_1		β_2		Adjusted R^2	Sample
Pooled	**0.150162**	***	**-0.08519**	**	**-0.11918**		**0.000195**	**31147**
	3.983237		**-2.17403**		**-1.00374**			
Fixed year	**0.176407**	*	**-0.06984**	*	**-0.04957**		**0.0140248**	**31147**
	1.923356		**-1.789**		**-0.42993**			
1988	0.208198	**	0.318595	**	1.607921	*	0.01023	1441
	2.088317		2.297564		1.897539			
1989	0.057153		-0.23792		-0.68699		0.003964	1684
	0.507285		-1.59547		-1.17919			
1990	0.405743	**	0.62669	***	0.911333		0.015389	1673
	3.121688		3.721821		1.207134			
1991	0.052782		0.045479		2.349106	**	0.003188	1704
	0.45476		0.283768		2.26845			
1992	0.412898	***	0.049645		0.169134		-0.00091	1898
	3.476432		0.287307		0.37025			
1993	0.112313		-0.63974	***	0.830698	**	0.014792	2173
	1.139166		-4.64095		2.056754			
1994	0.402804	***	0.190402		-0.48494		0.001762	2308
	3.790786		1.530663		-1.54737			
1995	0.598268	***	-0.26896	*	0.342964		0.001341	2361
	4.669498		-1.81302		0.865012			
1996	-0.91531	***	0.471145	**	0.391473		0.004724	2536
	-5.96152		2.933093		0.942622			
1997	0.592521	**	-0.01845		0.777672		-0.00016	2354
	3.137159		-0.09522		1.291166			
1998	0.216902		-1.11469	***	0.139679		0.027413	2056
	1.41822		-7.83174		0.217364			
1999	0.362998		-0.47802	**	0.194742		0.002125	1937
	1.516084		-2.85122		0.483527			
2000	-0.51304	**	-0.50353	**	0.501072		0.002225	1757
	-2.37659		-2.65922		1.266464			
2001	-0.01923		0.729557	***	-1.40669		0.021704	1779
	-0.13729		5.191653		-1.44796			
2002	-0.02522		-0.14317		-0.20406		0.001466	2894
	-0.27166		-1.62112		-1.14059			
2003	0.870572	**	-0.27501		2.398618	**	0.000813	592
	2.190307		-0.92792		2.532654			
Average	**0.176272**		**-0.078**		**0.489484**		**0.0068797**	
Estimate	**1.172665**		**-0.48688**		**0.630239**			

Appendix 5A (continued)

Table 5.32
Cross-section regression of next period's price change (ΔP_{t+1}) on earnings after goodwill amortisation (EAG)

This table provides estimates of the intercept (β_0) and the coefficient (β_1) of firm *i*'s earnings after goodwill amortization (EAG) for period t for explaining the share price change $\Delta P_{i,t+1}$ (= $P_{i,t+1} - P_{i,t}$, where $P_{i,t+1}$ indicates next period's end of quarter equity price and $P_{i,t}$ is price at time t). The sample period is 1988-2003 for all independent variables and 1989-2004 for the dependent variables. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the pooled and yearly regression analyses. The intercepts of fixed year effect are the averages of the coefficient values for each year. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 0.1% significance, ** = 5% significance, and * = 10% significance.

$$\Delta P_{i,t+1} = \beta_0 + \beta_1 \, EAG_{i,t} + \varepsilon_{i,t+1}$$

Duration	β_0		β_1		Adjusted R^2	Sample
Pooled	**0.130056**	***	**-0.07383**	*	**0.000125**	**31147**
	3.618883		**-1.93718**			
Fixed year	**0.164654**	*	**-0.06296**	*	**0.014022**	**31147**
	1.806217		**-1.66158**			
1988	0.239689	**	0.319935	**	0.008316	1441
	2.376775		2.304626			
1989	0.033663		-0.23848		0.003101	1684
	0.303487		-1.59744			
1990	0.460961	***	0.618285	***	0.013497	1673
	3.540959		3.659764			
1991	0.114587		0.050363		-0.00049	1704
	0.978472		0.313978			
1992	0.421298	***	0.048968		-0.00045	1898
	3.572597		0.283291			
1993	0.12272		-0.64357	***	0.015175	2173
	1.312544		-4.72807			
1994	0.376536	***	0.206677	*	0.001813	2308
	3.905281		1.761513			
1995	0.601718	***	-0.27011	*	0.001752	2361
	4.875676		-1.84157			
1996	-0.84584	***	0.426893	**	0.003887	2536
	-5.80405		2.752316			
1997	0.640262	***	-0.0367		-0.0004	2354
	3.525986		-0.19164			
1998	0.16127		-1.10879	***	0.026653	2056
	1.076641		-7.7745			
1999	0.335236		-0.46782	**	0.00254	1937
	1.473468		-2.83602			
2000	-0.51277	**	-0.50387	**	0.002799	1757
	-2.56875		-2.69034			
2001	-0.11629		0.775928	***	0.0204	1779
	-0.6922		5.03337			
2002	-0.15317	**	-0.05362		-0.00012	2894
	-2.16559		-0.80911			
2003	1.002119	**	-0.3435		0.000776	592
	2.750794		-1.21202			
Average Measure	**0.180125**		**-0.07621**		**0.006203**	
	1.15388		**-0.47324**			

CHAPTER 6

TESTING THE RELEVANCE OF GOODWILL AMORTISATION WITHIN THE OHLSON (1995) VALUE RELEVANCE MODEL USING SHARE RETURNS

6.1 INTRODUCTION

This chapter demonstrates how share returns can be used to test the value relevance of accounting information such as goodwill amortisation within the Ohslon (1995) value relevance modelling framework. Ohlson (1995) considers a firm's closing book value of equity and future abnormal earnings as explanatory variables, and conceptualises the current equity price as being determined by book value, current earnings, and other information related to future abnormal earnings. The Ohlson (1995) model can easily be reformulated to demonstrate how goodwill amortisation and its presence can be included as explanatory variables to empirically test their value relevance using monthly share returns. The chapter's results show that the presence, but not the level, of positive goodwill amortisation explains subsequent returns, and imply that investors potentially perceive the presence of positive goodwill amortisation as a wealth creating element. Results obtained when using returns to test whether goodwill amortisation is value relevant therefore extend the existing literature, since the prevailing expectation in the accounting literature is that goodwill amortization either represents a reduction in the value of goodwill over time or is not value relevant.

Prior empirical studies that apply the Ohlson (1995) value relevance model generally use price as the dependent variable but do not use the most recent prior period's price as an additional explanatory variable, even though the share price follows a highly persistent process, thus implying that previous period's price helps to explain the current price. Share returns are determined by the change in share price, not the price level, so using returns as the dependent variable is a preferable econometric approach for testing value relevance, since returns are stationary and not highly persistent (see, e.g., Enders, 1995). In prior chapters, we have demonstrated how the problems of persistence and non-stationarity can lead to misleading inference and potentially spurious results when share price is the dependent variable in empirical tests of the value relevance of earnings and goodwill amortization. In particular, using share price as the dependent variable can create the misleading impression that past earnings are value relevant, even though the information provided by earnings releases are already incorporated into the most recent prior period's price, thus rendering them non-value relevant. Using returns (or price change) as the dependent variable overcomes these problems of persistence and non-stationarity in regression analysis, since returns are stationary and not highly persistent.

Prior studies that have investigated the value relevance of goodwill amortisation include Bugeja and Gallery (2006) and Jennings, LeClere, and Thompson (2001). These studies focus on the goodwill amortisation - equity price relationship to explore the value relevance of goodwill amortization. We test the informativeness of the level of positive goodwill amortisation using monthly stock returns, and we also examine, using goodwill amortisation dummy variable, whether the presence versus non-presence of goodwill amortization affects monthly returns. Our tests therefore examine whether investors' perceptions of the presence of goodwill amortisation are consistent with goodwill accounting principles.

Our study examines a 16 year period when goodwill amortisation was potentially reported. First, companies' goodwill amortisation per share is used to explain subsequent monthly returns in order to examine whether goodwill amortization is value relevant. As with most accounting studies, we assume that there is a three month release delay after the fiscal year end before a company's goodwill amortization is reported, so returns for the 12 months starting three months after the fiscal year end are regressed against the prior year's goodwill amortization to test whether goodwill amortization is value relevant. The goodwill amortization explanatory variable is scaled by the most recent prior period's share price, as indicated by the chapter's Ohlson (1995) model reformulation. To further extend the analysis, we also examine whether firms that report positive goodwill amortisation are distinguishable from other firms using a goodwill amortization dummy explanatory variable that is set at one in the presence of positive goodwill amortization, and zero otherwise. Consistent with past chapters, we find that a goodwill amortization continuous explanatory variable is not value relevant. When using a discrete dummy explanatory variable to test whether the presence or non-presence of goodwill amortization affects returns we find, however, that firms that report positive goodwill amortization actually have higher subsequent returns, thus extending the results of prior empirical studies.

The finding of a significantly positive relationship between the presence versus non-presence of goodwill amortisation and monthly returns could imply that investors consider the presence of goodwill as a wealth creating element in a firm. This could possibly be due to the fact that growing firms tend to possess goodwill when they use acquisitions to expand. This result is inconsistent with the accounting principle that goodwill amortisation conveys information on the declining value of unidentifiable intangibles.

The following sections are presented as: literature review, Ohlson (1995) and returns model formulation, data, return regression model results, and conclusion.

6.2 LITERATURE REVIEW

A number of studies investigate the value relevance of goodwill amortisation for explaining share prices (e.g., Jennings, LeClere, and Thompson, 2001; Jennings, Robinson, Thompson, and Duall, 1996). Goodwill is the excess amount beyond the stated value of a firm's underlying assets. In other words, goodwill can reflect the values of unidentifiable intangibles within the firm (Jennings, LeClere, and Thompson, 2001). Goodwill amortisation is the amount by which goodwill is reduced to represent the declining value of goodwill. Studies therefore examine, for example, the value relevance of goodwill amortisation for its additional contribution to explaining equity prices (e.g., Smith, 2003; Jennings, LeClere, and Thompson, 2001). These studies conclude that goodwill amortisation has no value relevance. However, the results of these studies are subject to the problem of the extreme persistence of share prices when share price is the dependent variable, since equity prices form a non-stationary process, thus implying that the most recent prior period share price should be included as an explanatory variable when forecasting or explaining the subsequent level of the share price (Aggarwal and Kyaw, 2004). Jeon and Jang (2004) argue that the first difference of equity prices is stationary, so using either returns or price change as the dependent variable overcomes the problems of persistence and non-stationarity (see also chapters 4 and 5). Consistent with this, Hennings, Lewis, and Shaw (2000) examine the relationship of amortisation of goodwill components with returns.

6.2.1 The Goodwill Amortisation – Return Relationship

Hennings, Lewis, and Shaw (2000) examine whether purchased goodwill and its amortisation are important for explaining equity prices and returns. They consider the empirical work by Jennings, Robinson, Thompson, and Duall (1996) and extend it to examine the returns – goodwill amortisation relationship. Hennings, Lewis, and Shaw (2000) examine whether investors identify different elements of goodwill. They consider three components of goodwill: (a) going concern goodwill of a target firm, measured as the difference between the fair market value of a target firm's assets and the target firm's pre-acquisition market value assessed six days prior to acquisition, (b) the synergistic goodwill value that results from an acquisition, and (c) any other (residual) payment made beyond the above two types of goodwill values. They consider an equity price regression model and a return regression model to explore the importance of goodwill components and their amortisation.

Hennings, Lewis, and Shaw (2000) find insignificant relationships between returns and amortisation of going concern goodwill or synergistic goodwill components, and a negative significant relationship between returns and residual payment goodwill. Their full sample size is 1,576 acquisitions for the period 1990-1994 (five years), and the data are collected from various sources, including COMPUSTAT, the Center for Research in Security Prices (CRSP), and Security Data Company Unite States Mergers and Acquisition. Hennings, Lewis, and Shaw (2000) do not examine the relationship of goodwill amortisation in aggregate with returns, and do not examine whether the presence of goodwill amortisation (using a dummy variable) is related to returns. We utilise the Ohlson (1995) model, as well as the market efficiency literature, to make these contributions to the study of goodwill amortisation.

6.2.2 Market Efficiency and the Ohlson (1995) Model

According to Fama (1970), the efficient market hypothesis implies that equity prices fully incorporate all information available in markets, so investors cannot earn excess returns by using old information because it has been already incorporated in equity prices. If current information on past and anticipated future events is already incorporated in current equity prices, only unexpected events cause equity prices to change. Ohlson (1995) demonstrates that investors earn a normal rate of return in an efficient market if equity prices incorporate all value relevant information in the market, as outlined immediately below.

6.3 OHLSON (1995) AND RETURNS MODEL FORMULATION

6.3.1 Ohlson (1995) Model Transformation

Ohlson (1995) conceptualises how the equity price of a firm can be modelled using the dividend discount model as well as a clean surplus relationship among accounting variables (i.e., change in book value equals earnings minus dividends). Ohlson's (1995) model explains a firm's market value using current abnormal earnings, book value, dividends, and future abnormal earnings, and is thus known as the earnings, book values, and dividends model (Ohlson, 2001).[1]

[1] Abnormal earnings, also known as residual income, equal earnings minus a capital contribution, as defined below.

The Ohlson (1995) model starts with the dividend discount model (equation (A1) on page 666 of Ohlson, 1995):

$$P_t = \sum_{\tau=1}^{\infty} (1+r)^{-\tau} E_t(d_{t+\tau}), \qquad (1)$$

where

t = a particular time,

P_t = equity price at time t,

r = risk free rate of interest,

$E_t(.)$ = expectations operator at time t,

d_t = dividends for period t,

and the clean surplus relation (equation (A2a) on page 666 of Ohlson, 1995),

$$y_{t-1} = y_t + d_t - x_t, \qquad (2)$$

where

y_t = book value of equity at time t

and

x_t = trailing earnings for period t.

From these relationships, Ohlson (1995) derives the reformulated dividend discount model (equation (1) on page 667 of Ohlson, 1995):

$$P_t = y_t + \sum_{\tau=1}^{\infty} (1+r)^{-\tau} E_t(x^a_{t+\tau}) \qquad (3)$$

where

$$x^a_t \equiv (x_t - r.y_{t-1}) \qquad (4)$$

represents abnormal earnings at time t. Equation (3) indicates that a firm's future abnormal earnings are the crucial determinant of the firm's market value, along with current book value and current abnormal earnings.

Ohlson (1995) considers AR(1) dynamics for earnings within the earnings, book values, and dividends model. For this, he postulates that next period's future abnormal earnings (x_{t+1}^a) are determined by current abnormal earning and other forward looking earnings related information (v_t). In this context, his assumptions (equations (2a) and (2b) on page 668 of Ohlson, 1995) are given as:

$$x_{t+1}^a = \omega x_t^a + v_t + \varepsilon_{1,t+1} \ , \qquad (5)$$

and

$$v_{t+1} = \gamma v_t + \varepsilon_{2,t+1} \ , \qquad (6)$$

where ω and γ are persistence parameters that are identifiable by market participants. Using the combination of residual income, clean surplus relations among accounting variables, and these assumptions, Ohlson (1995) shows (equation (5) on page 669 of Ohlson, 1995) that

$$P_t = y_t + \alpha_1 x_t^a + \alpha_2 v_t \ , \qquad (7)$$

where

$$\alpha_1 = \left(\frac{\omega}{1 + r - \omega} \right)$$

and

$$\alpha_2 = \left(\frac{1 + r}{(1 + r - \omega)(1 + r - \gamma)} \right).$$

Ohlson (1995) indicates that equation (7) is a simplified form of the primary model (equation (3) above), where v_t is future value relevant information that affects future but not current trailing earnings (i.e., information not related to abnormal earnings at time t). In the simplified model (equation (7)), the closing book value (y_t), current abnormal earnings (x_t^a) and future value relevant information (v_t) explain the time t equity price (P_t).[2] According to Ohlson (2001), the empirical nature of the earnings, book values,

[2] Ohlson (1995) does not give specific examples of future earnings related value relevant information, but an example would be research and development expenditures which do not increase current earnings but are expected to increase next period's earnings.

and dividends model very much depends on future value relevant earnings related information. He argues that any value relevant variable could represent future earnings related information (v in equation (7)) in a model.[3]

To obtain a share returns dependent variable reformulation of the Ohlson (1995) model, we first consider the price change version of the Ohlson (1995) valuation model, obtained using the period t and period t+1 versions of equation (7), that is outlined at the top of page 683 of Ohlson (1995):

$$P_{t+1} + d_{t+1} - (1+r)P_t = y_{t+1} + d_{t+1} + \alpha_1 x^a_{t+1} + \alpha_2 v_{t+1} - (1+r)(y_t + \alpha_1 x^a_t + \alpha_2 v_t)\,. \quad (8)$$

Equation (8) simplifies to the price change equation

$$P_{t+1} - P_t = r\,P_t + y_{t+1} - (1+r)y_t + \alpha_1[x^a_{t+1} - (1+r)x^a_t] + \alpha_2[v_{t+1} - (1+r)v_t]\,. \quad (9)$$

Equation (9), derived directly from the Ohlson (1995) model price change equation (page 683 of Ohlson, 1995), reveals an important random walk feature of the Ohlson (1995) model. In particular, the time t+1 price (P_{t+1}) is equal to the future value of the prior period price ($(1+r)P_t$) plus adjustments representing innovations in book value ($y_{t+1} - (1+r)y_t$), innovations in current abnormal earnings $(x^a_{t+1} - (1+r)x^a_t)$, and innovations in future earnings related value relevant information ($v_{t+1} - (1+r)v_t$).

Note that book value (y) can be all but eliminated from equation (9) by substituting in the book value identity (2) as well as the abnormal earnings definition (4). The resulting price change equation is

$$P_{t+1} - P_t = r\,P_t - d_{t+1} + (1+\alpha_1)x^a_{t+1} - \alpha_1(1+r)x^a_t + \alpha_2[v_{t+1} - (1+r)v_t]\,. \quad (10)$$

[3] Ohlson (2001) does not give examples of future earnings related value relevant information (see also footnote 2), but implies that it can be inferred from the empirical relationship between current and future earnings (see equation (5)).

Further rearrangement of equation (10) leads to a returns version of the Ohlson (1995) value relevance model:

$$\frac{P_{t+1} - P_t + d_{t+1}}{P_t} = r + \frac{(1+\alpha_1)x^a_{t+1}}{P_t} - \frac{\alpha_1(1+r)x^a_t}{P_t} + \frac{\alpha_2[v_{t+1} - (1+r)v_t]}{P_t}. \qquad (11)$$

Returns in the Ohlson (1995) model therefore equal the risk free rate plus adjustments for innovations in abnormal earnings ($(1+\alpha_1)x^a_{t+1} - \alpha_1(1+r)x^a_t$) and innovations in future earnings related information ($\alpha_2[v_{t+1} - (1+r)v_t]$). The most recent prior period price P_t inversely enters equation (11), thus creating a value effect for returns.

Equation (11) can be used to derive a simplified regression equation for the Ohlson (1995) model that incorporates the potentially important informational role played by the most recent prior period's price (P_t) and future earnings related information (v) in value relevance studies. Two simplifications are used. First, the value relevance of current trailing earnings is ignored, since it is examined extensively in other chapters.[4] Second, the level of future value relevant information (v) is examined, not innovations in the level (see equation (11)).[5] These simplifications to equation (11) create a cross-sectional returns regression model where firm i's return is a function of firm i's future earnings related information ($v_{i,t+1}$) and the firm's most recent prior period equity price $P_{i,t}$:

$$\frac{\Delta P_{i,t+1} + d_{i,t+1}}{P_{i,t}} = \mu_0 + \mu_1\left(\frac{v_{i,t+1}}{P_{i,t}}\right) + \varepsilon_{i,t+1} \;, \qquad (12)$$

where i indicates firm i and μ represents the regression coefficients of regression equation (12).

[4] Chapters 4 and 5 demonstrate that current trailing earnings are not value relevant when the role of the most recent prior period's price is incorporated, using Ohlson (1995), in the regression analysis.

[5] Lagged values of the goodwill amortisation explanatory variables could easily be incorporated into the regression analysis.

6.3.2 Method

We examine whether the level and the presence of positive goodwill amortisation (as a dummy variable) provides information to shareholders, thus determining whether goodwill amortisation represents future earnings related information in the Ohlson (1995) model and has informativeness for explaining equity returns (see also Smith, 2003; Jennings, LeClere, and Thompson, 2001; Jennings, Robinson, Thompson, and Duall, 1996). In this context, future earnings related value relevant information $v_{i,t+1}$ is represented by prior year goodwill amortisation and its positive presence (as a dummy variable) in regression equation (12), to determine if prior year goodwill amortisation helps to explain subsequent one month returns. Hence, we devise returns regression models as a function of prior year goodwill amortisation and its positive presence on a stand-alone-basis, as well as incrementally. By utilising regression equation (12), we therefore cross-sectionally examine the following regression models in relation to goodwill amortisation:

$$\boldsymbol{R_{i,t+1} = \beta_0 + \beta_1 GAR_{i,t} + \varepsilon_{i,t+1}} \quad (13)$$

$$\boldsymbol{R_{i,t+1} = \beta_0 + \beta_2 GAD_{i,t} + \varepsilon_{i,t+1}} \quad (14)$$

$$\boldsymbol{R_{i,t+1} = \beta_0 + \beta_1 GAR_{i,t} + \beta_2 GAD_{i,t} + \varepsilon_{i,t+1}} \ , \quad (15)$$

where

i = firm *i*,

t = month,

$R_{i,r+1}$ = firm *i* return for month t+1,

β_0 = intercept of the model,

β_1 = coefficient estimate of goodwill amortisation ratio GAR,

β_2 = coefficient estimate of goodwill amortisation dummy variable GAD,

$GAR_{i,t}$ = ratio of firm *i* prior year goodwill amortisation per share over the month t closing equity price,

$GAD_{i,t}$ = dummy variable set as 1 for months with positive firm *i* prior year goodwill amortisation and zero otherwise,

and

$\varepsilon_{i,t+1}$ = error term.

These regression models (13) to (15) explain firms' monthly returns in terms of goodwill amortisation ($v_{i,t+1}$ = $GAR_{i,t}$) and the presence of positive goodwill amortisation ($v_{i,t+1}$ = $GAD_{i,t}$). Firms cannot disclose accounting information immediately at fiscal year end, so three months duration is assumed to be the information delay required for the release of a firm's fiscal year end financial statements, as assumed in many studies (e.g., Jennings, LeClere, and Thompson, 2001; Collins, Maydew, and Weiss, 1997; Collins, Pincus, and Xie, 1999).

6.3.3 Regression Model Estimation

Cross section analysis of regression models (13) to (15) is conducted using Ordinary Least Squares (OLS) pooled regression estimation. The coefficient standard error estimates are based on White's heteroskedasticity-consistent standard errors to overcome the problem of non-constant variance of the cross-sectional error terms. We also obtain coefficient estimates using fixed time effects and individual year regression estimates.

6.4 DATA

The data sets are obtained from United States COMPUSTAT and the Center for Research in Security Prices (CRSP) databases. The data set from COMPUSTAT consists of goodwill-based data for 1988-2003. Annual data extracted from the goodwill-based dataset consist of intangible assets (DATA33), amortisation of intangibles (DATA65), goodwill (DATA204), amortisation of goodwill (DATA394), and number of common shares outstanding (DATA25). Firms' monthly closing prices (F11.5) and dividend adjusted returns (F10.6) are obtained from the Center for Research in Security Prices (CRSP) database.

The goodwill-based data have been manipulated to satisfy the data requirements for our study. Firstly, goodwill amortisation is estimated when it is not directly reported.[6] Goodwill amortisation per share is determined as goodwill amortisation divided by shares outstanding (DATA25).[7] One month returns and monthly closing prices are merged with the annual goodwill amortisation based dataset. The merged dataset consists of 1,852,737 firm monthly return and closing price observations that are matched with annual goodwill amortisation per share observations for the prior fiscal year.[8] As mentioned already, firms cannot disclose accounting information immediately at fiscal year end, so three months duration is assumed to be the information delay

[6] The Financial accounting Standard Board has implemented two new accounting standards for goodwill accounting (SFAS 141: Business Combination, and SFAS 142: Goodwill and Other Intangible Assets) effective from financial year 2002. These standards have not permitted firms to account for goodwill amortisation in the fiscal year end financial statements from fiscal year 2002. They have, however, allowed firms to provide goodwill amortisation information separately with other financial information.

[7] Goodwill amortisation is estimated in accordance with the method devised by Jennings, LeClere, and Thompson (2001): (1) directly reported amortisation of goodwill (GWA) is directly used. Otherwise, (2) if current year goodwill (GW) equals current year intangible assets (IA) then the amortisation of goodwill (GWA) equals amortisation of intangibles (IAA), i.e., if GW=IA then GWA = IAA; (3) if GW≥0, IAA≥0, and IA=0 or missing (" "), then GWA = IAA; (4) if GW>0.9*IA (i.e., >90% of GW), then GWA = (IAA*GW)/IA; and (5) if GW<0.9*IA and 0.9*GWL<GW<GWL, then GWA = GWL-GW, where GWL = last (previous) year goodwill.

[8] We do not restrict the analysis to certain industries since, unlike in other corporate finance studies, there is no a priori reason why the return – goodwill amortisation relationship should differ between industries.

required for the release of a firm's fiscal year end financial statements (e.g., Jennings, LeClere, and Thompson, 2001; Collins, Maydew, and Weiss, 1997; Collins, Pincus, and Xie, 1999). The goodwill amortisation dummy variable ($GAD_{i,t}$) is set at 1 for a particular month if a firm's goodwill amortization was positive in the prior year, and zero otherwise. The sample period is 1988-2003, and the goodwill amortization dummy equals 1 in 348,480 monthly return observations.

Summary statistics for the data set as well as a correlation table for the data set variables are provided in Table 6.1. The pooled descriptive and percentile measures for the explanatory variables are reported in Panel A of Table 6.1. Panel B reports correlation coefficients for the study's variables.

[Please insert Table 6.1 about here.]

6.5 RETURN REGRESSION MODEL RESULTS

6.5.1 Returns – Goodwill Amortisation Regression Results

The pooled, fixed year effect, and cross sectional yearly results for regression equation (13), reported in Table 6.2, indicate that goodwill amortisation (GAR) does not explain one month returns. The pooled and all the cross sectional yearly result adjusted R^2s in Table 6.2 are about 0.01 or less (see the pooled and 1988-2003 rows in Table 6.2). Although the fixed year effect adjusted R^2 is somewhat higher (0.123 in the fixed year row in Table 6.2), all the explanatory power is due to the fixed year effects only, and is not due to the explanatory power of goodwill amortisation (GAR), so all the results imply that goodwill amortisation (GAR) cannot be used to explain one month returns.

[Please insert Table 6.2 about here.]

The results are consistent with Johnson and Petrone (1998) who consider going-concern and synergy goodwill measures, and are somewhat consistent with Hennings, Lewis, and Shaw (2000) who find that going concern and synergistic goodwill amortisation are not related to subsequent one year returns.[9] The Table 6.2 results are also consistent with the price - goodwill amortisation relationship documented in chapters 4 and 5. We extend the analysis to determine whether the presence or non-presence of positive goodwill amortization is also irrelevant, using regression models (14) and (15), as presented below.

6.5.2 Returns – Presence of Positive Goodwill Amortisation Regression Results

The results for goodwill amortization dummy ($GAD_{i,t}$) regression model (14), reported in Table 6.3, indicate that the presence of goodwill amortisation ($GAD_{i,t}$) is actually useful for explaining monthly returns. The pooled and fixed year effect regression coefficient estimates for the positive goodwill amortisation dummy ($GAD_{i,t}$) explanatory variable are significantly different from zero, and are all positive (see the pooled and fixed year effect rows in Table 6.3). The goodwill amortisation dummy variable ($GAD_{i,t}$) also explains monthly returns in some of the year by year cross-sectional analyses, but only for five of the years (see the result rows for the years 1988, 1997, 1998, 1999, and 2003 in Tables 6.3), whereas for the other years the coefficient estimates for positive goodwill amortisation ($GAD_{i,t}$) are insignificant. All the adjusted R^2s in Table 6.3 are quite low, however, being 0.01 or less. Even though the adjusted

[9] Hennings, Lewis, and Shaw (2000) do find, however, that residual amortisation is negatively related to annual returns, so it might be expected from their results that overall amortisation would also be negatively related to returns (to the extent that residual amortisation is an important component of overall goodwill amortisation). The Hennings, Lewis, and Shaw (2000) results do not appear to translate to an overall relationship between returns and goodwill amortisation.

R^2s are all very low, there is a positive relationship between monthly returns and the presence of positive goodwill amortisation ($GAD_{i,t}$) in the pooled and fixed effects models as well as some of the individual year results (see Tables 6.3), so the presence of positive goodwill amortisation ($GAD_{i,t}$) does help to explain subsequent monthly returns.

[Please insert Table 6.3 about here.]

The Table 6.3 results are somewhat surprising, since a positive relationship between monthly returns and the presence of goodwill amortisation ($GAD_{i,t}$) is found, whereas Hennings, Lewis, and Shaw (2000) find a negative relationship between annual returns and residual goodwill amortization (see also footnote 8). To test the result further, Table 6.4 presents a regression of monthly returns on goodwill amortisation ($GAR_{i,t}$) as well as the positive goodwill amortisation dummy ($GAD_{i,t}$) using regression equation (15). The results are consistent with the results presented in the previous tables (compare Tables 6.2 and 6.3 with Table 6.4). The results once again show that goodwill amortisation ($GAR_{i,t}$) does not explain monthly returns, but the presence of positive goodwill amortisation ($GAD_{i,t}$) helps to explain monthly returns. Future research could help to clarify this interesting relationship, and explain why firms with positive goodwill amortization have higher returns, even though the actual level of goodwill amortisation is not important. A potential explanation for this latter result is that investors might not perceive the presence of goodwill amortization as reflecting a reduction in earnings, especially since goodwill amortization is a non-cash accounting statement variable. Instead, investors might possibly consider positive goodwill amortisation as a proxy for wealth creating element in firms (albeit, potentially risky wealth creation), since goodwill amortization is present when firms seek to grow by acquiring other firms.

[Please insert Table 6.4 about here.]

Also of note are the very low adjusted R^2 results when non-persistent monthly returns are used as the dependent variable in the regression models (see Tables 6.2 to 6.4). The very low adjusted R^2s are due to employing returns as the dependent variable in the Ohlson (1995) model regression analysis. Since returns are based on price change, not the level of price, the problems of persistence and non-stationarity of equity prices are not present in the regression analysis when returns are used as the dependent variable.[10] The low adjusted R^2s therefore indicate that returns can be used as the dependent variable for testing the value relevance of accounting variables to avoid the spurious regression statistical problems caused by dependent variable persistence and non-stationarity that are outlined in chapters 4 and 5.

6.6 CONCLUSION

We utilize the Ohlson (1995) model to examine whether the level or the presence of positive goodwill amortisation helps to explain subsequent returns, where prior year goodwill amortisation and its positive presence are considered as forward looking earnings related information in Ohlson's (1995) model.

Our results indicate the irrelevance of the level of prior year goodwill amortisation for explaining monthly returns. The presence of positive goodwill

[10] When price is the dependent variable and the most recent prior period's price is not used as an explanatory variable, any other persistent explanatory variable can act as a spurious proxy for the most recent prior period's price, as demonstrated in chapters 4 and 5.

amortisation does, however, have a positive significant relationship with monthly returns during the study's sample period 1988-2003. This implies that investors might consider the presence of positive goodwill amortisation as representing a wealth creating element in firms, since goodwill amortisation is a non-cash accounting item that results from acquisition activity, and the intended purpose of the acquisition activity would presumably be to create wealth. Our results indicate that firms with positive goodwill amortisation provide higher returns; future research can help to clarify this interesting relationship, and explain why firms with positive goodwill amortization have higher, even though the actual level of goodwill amortisation is not important.

Table 6.1

Descriptive Statistics

Panel A provides summary statistics for the study's variables. For firm i, $R_{i,t+1}$ is return for month t+1 (t = month); $P_{i,t}$ is monthly closing equity price; GAPS is prior year goodwill amortisation per share; GAR is the ratio of prior year goodwill amortisation per share over the month t closing equity price; and GAD is a goodwill amortisation dummy variable set at 1 for months with positive prior year goodwill amortisation, and zero otherwise. Panel B provides Pearson's correlation coefficients for the study's variables. The sample period is 1988-2003.

Panel A: Summary Statistics for the pooled data for monthly returns and percentage of goodwill amortisation on closing price of the month

Measure	$R_{i,t+1}$	$P_{i,t}$	**GAPS**	**GAR**	**GAD**
Mean	0.0111	17.857	0.08339	0.00107	0.32592
Median	0	12.03	0	0	0
Std. Deviation	0.1238	20.7043	1.97148	0.03333	0.46872
Minimum	-0.3	0.01	0	0	0
Maximum	0.43	803.45	298.67	6.63426	1
Number of observations	**348480**	**348480**	**348480**	**348480**	**348480**

Panel B: Pearson's correlation coefficient for the variables in regression equations (13) to (15)

	$R_{i,t+1}$	$P_{i,t}$	**GAPS**	**GAR**	**GAD**
$R_{i,t+1}$	1				
$P_{i,t}$	0.00653	1			
GAPS	0.00209	0.02378	1		
GAR	0.00183	-0.0177	0.64821	1	
GAD	0.01868	0.05824	0.06083	0.046303	1

Table 6.2
Regression of monthly returns (R_{t+1}) on goodwill amortisation ratio (GAR)

This table provides estimates of the intercept (β_0) and the coefficient (β_1) of firm *i*'s goodwill amortisation ratio (GAR) measured as prior year goodwill amortisation per share over the monthly closing equity price, when explaining monthly returns $R_{i,t+1}$. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the regression analyses. The intercepts of fixed year effects estimation are the averages of the coefficient values for each year. The sample period is 1988-2003. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 1%, ** = 5%, and * = 10% significance level.

$$R_{i,t+1} = \beta_0 + \beta_1 GAR_{i,t} + \varepsilon_{i,t+1} \qquad (13)$$

Duration	β_0	β_1	Adjusted R^2	Sample
Pooled	**0.011093** *** **52.89107**	**0.00679** **0.8653**	**0.000000473**	**348480**
Fixed Year	**0.009798** ** **12.63439**	**0.003728** **0.453529**	**0.123046**	**348480**
1988	0.014346 *** 6.097153	-2.24912 -0.98491	0.000203	2182
1989	0.000972 1.003671	-0.14661 -1.18456	-0.000027	12082
1990	-0.0018 * -1.7742	0.019198 0.488681	-0.000064	14939
1991	0.023052 *** 23.54858	0.007584 1.44073	-0.000034	15511
1992	0.007701 *** 8.735976	-0.00055 -0.02121	-0.00006	16659
1993	0.014804 *** 17.87076	-0.01003 -0.5376	-0.000032	18732
1994	-0.0025 *** -3.34025	0.209303 0.477113	-0.000022	20985
1995	0.01897 *** 25.00473	-0.37131 *** -3.93458	0.000195	22371
1996	0.015021 *** 19.75884	-0.08031 -0.65703	-0.000023	23904
1997	0.009567 *** 12.79301	0.25297 1.315984	0.00000897	26408
1998	0.001836 ** 2.193769	-0.06339 -0.3594	-0.000034	26031
1999	0.008737 *** 10.37639	-0.00394 -0.05517	-0.000039	25397
2000	0.005678 *** 6.02052	0.063781 0.337809	-0.000036	23921
2001	0.008797 *** 10.27422	-0.01229 -0.11343	-0.000038	25870
2002	-0.00789 *** -10.769	0.022252 1.336508	0.0000841	30634
2003	0.040035 *** 74.41852	-0.02298 -1.18557	0.000036	42854
Average Measure	**0.009832** **12.63829**	**-0.14909** **-0.22729**	**0.0000073**	

Table 6.3
Regression of monthly returns (R_{t+1}) on goodwill amortisation dummy variable (GAD)

This table provides estimates of the intercept (β_0) and the coefficient (β_2) of firm *i*'s goodwill amortisation dummy variable (GAD) set as 1 for the months with positive prior year goodwill amortisation, and zero otherwise when explaining monthly returns $R_{i,t+1}$. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the regression analyses. The intercepts of fixed year effects estimation are the averages of the coefficient values for each year. The sample period is 1988-2003. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 1% significance, ** = 5% significance, and * = 10% significance.

$$R_{i,t+1} = \beta_0 + \beta_2\, GAD_{i,t} + \varepsilon_{i,t+1} \qquad (14)$$

Duration	β_0	β_2	Adjusted R^2	Sample
Pooled	**0.009493** *** **36.90899**	**0.004931** *** **11.11544**	**0.000346**	**348480**
Fixed Year	**0.009376** ** **11.57976**	**0.001426** *** **3.155322**	**0.01164**	**348480**
1988	0.017337 *** 6.52285	-0.01598 *** -2.99849	0.003256	2182
1989	0.000974 0.891415	-0.00022 -0.09449	-0.000082	12082
1990	-0.00093 -0.79731	-0.00366 -1.52678	0.00009	14939
1991	0.022851 *** 20.33964	0.000894 0.391458	-0.000054	15511
1992	0.006886 *** 6.652848	0.002998 1.518151	0.0000773	16659
1993	0.015024 *** 15.0494	-0.00081 -0.4556	-0.000043	18732
1994	-0.00227 *** -2.58529	-0.00056 -0.34506	-0.000042	20985
1995	0.018904 *** 21.36555	-0.00017 -0.09735	-0.000044	22371
1996	0.01466 *** 16.45569	0.001286 0.757027	-0.000019	23904
1997	0.007612 *** 8.556637	0.007464 *** 4.584564	0.000709	26408
1998	0.000117 0.117317	0.005912 *** 3.241633	0.000355	26031
1999	0.01037 *** 10.17628	-0.00525 *** -2.90716	0.000289	25397
2000	0.005045 *** 4.349334	0.001996 1.0134	0.000000467	23921
2001	0.007803 *** 7.256834	0.00269 1.531948	0.0000509	25870
2002	-0.00735 *** -7.90418	-0.00128 -0.84673	-0.0000093	30634
2003	0.0374 *** 45.2306	0.004656 *** 4.28125	0.000409	42854
Average Measure	**0.009652** **9.479851**	**-0.0000017** **0.502984**	**0.000309**	

Table 6.4
Regression of monthly returns (R_{t+1}) on goodwill amortisation ratio (GAR) and goodwill amortisation dummy variable (GAD)

This table provides estimates of intercept (β_0) and the coefficients (β_1 and β_2, respectively) of firm *i*'s goodwill amortisation ratio (GAR) measured as prior year goodwill amortisation per share over the monthly closing equity price and goodwill amortisation dummy variable (GAD) set as 1 for the months with positive prior year goodwill amortisation, and zero otherwise, when explaining monthly returns $R_{i,t+1}$. In a row, the upper entry is the explanatory variable regression coefficient estimate, and the lower entry is the *t*-statistic. The *t*-statistic is estimated using White's heteroskedasticity-consistent standard errors and covariance in the regression analyses. The intercepts of fixed year effects estimation are the averages of the coefficient values for each year. The sample period is 1988-2003. The significance level of the coefficient estimate *t*-statistic is indicated as: *** = 1% significance, ** = 5% significance, and * = 10% significance.

$$R_{i,t+1} = \beta_0 + \beta_1 GAR_{i,t} + \beta_2 GAD_{i,t} + \varepsilon_{i,t+1} \quad (15)$$

Duration	β_0		β_1		β_2		Adjusted R^2	Sample
Pooled	**0.009493** **36.90894**	***	**0.003586** **0.451541**		**0.00492** **11.08027**	***	**0.000344**	**348480**
Fixed Year	**0.009376** **11.57928**	**	**0.002872** **0.3478**		**0.001417** **3.132276**	***	**0.011592**	**348480**
1988	0.017337 6.521354	***	-0.58633 -0.22778		-0.01541 -2.7079	***	0.002839	2182
1989	0.000974 0.891378		-0.14654 -1.18978		-0.000009 -0.00373		-0.00011	12082
1990	-0.00093 -0.79729		0.034833 0.903789		-0.00376 -1.5612		0.0000323	14939
1991	0.022851 20.33898	***	0.007358 1.388638		0.000808 0.353158		-0.000091	15511
1992	0.006886 6.652648	***	-0.00198 -0.07617		0.003005 1.522226		0.0000178	16659
1993	0.015024 15.049	***	-0.00979 -0.52407		-0.00077 -0.43193		-0.000076	18732
1994	-0.00227 -2.58523	***	0.240894 0.537579		-0.00085 -0.50954		-0.000057	20985
1995	0.018904 21.36507	***	-0.37378 -4.0255	***	0.000255 0.14837		0.000151	22371
1996	0.01466 16.45535	***	-0.09025 -0.73375		0.001416 0.830793		-0.000038	23904
1997	0.007612 8.556475	***	0.127342 0.79625		0.007345 4.50529	***	0.000683	26408
1998	0.000117 0.117315		-0.14462 -0.7729		0.006081 3.319304	***	0.000337	26031
1999	0.01037 10.17608	***	0.040904 0.560214		-0.00531 -2.93742	***	0.000253	25397
2000	0.005045 4.349243	***	0.038317 0.198961		0.001928 0.967742		-0.000039	23921
2001	0.007803 7.256694	***	-0.03141 -0.28478		0.002792 1.570928		0.0000179	25870
2002	-0.00735 -7.90405	***	0.022906 1.376697		-0.00145 -0.95843		0.0000814	30634
2003	0.0374 45.23007	***	-0.0263 -1.39237		0.004759 4.375715	***	0.000463	42854
Average Measure	**0.009652** **9.479569**		**-0.05615** **-0.21656**		**0.000052** **0.530211**		**0.000279**	

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