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Testing the Relevance of Goodwill Amortisation within the Ohlson (1995) Value Relevance Model Using Share Returns

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Abstract: This paper demonstrates that using share returns as the dependent variable is a preferable approach for testing value relevance of accounting information to overcome spurious regression results due to equity prices following a non-stationary, persistent process as indicated in Senthilnathan (2009). In this context, this study utilizes 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 for their forward looking earnings related information. The results indicate the irrelevance of the level of prior year goodwill amortisation for explaining monthly returns. The presence of positive goodwill amortisation does, however, have a positive significant relationship with monthly returns. 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. The results indicate that firms with positive goodwill amortisation provide higher returns.

Key words: Ohlson (1995), equity price, returns, goodwill amortization

This paper 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 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. In Senthilnathan (2009), it is 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, thus greatly improving the empirical specification of value relevance tests.

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. This study tests the informativeness of the level of positive goodwill amortisation using monthly stock returns, and also examines, using goodwill amortisation dummy variable, whether the presence versus non-presence of goodwill amortization affects monthly returns. The tests in this study therefore examine whether investors' perceptions of the presence of goodwill amortisation are consistent with goodwill accounting principles.

This 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, This study assumes 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 paper's Ohlson (1995) model reformulation. To further extend the analysis, this study also examines 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. This study shows 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, this study finds, 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 rest are presented as main sections as literature review, Ohlson (1995) and returns model formulation, data, return regression model results, and conclusion.

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 *et al.* 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 Senthilnathan 2009). Consistent with this, Hennings, Lewis and Shaw (2000) examine the relationship of amortisation of goodwill components with returns.

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 *et al.* (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 U.S. 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. This study utilises the Ohlson (1995) model, as well as the market efficiency literature, to make these contributions to the study of goodwill amortisation.

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.

OHLSON (1995) AND RETURNS MODEL FORMULATION

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 (also known as residual income as equal to earnings minus a capital contribution, as defined below), book value, dividends, and future abnormal earnings, and is thus known as the earnings, book values, and dividends model (Ohlson 2001).

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 = 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^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 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). Specifically, 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. 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)) in a model. Though Ohlson (2001) does not give examples of future earnings related value relevant information, it can be inferred from the empirical relationship between current and future earnings (see equation (5)).

To obtain a share returns dependent variable reformulation of the Ohlson (1995) model, this study first considers 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):

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

Equation (8) simplifies to the price change equation

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

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 $(x_{t+1}^a - (1+r)x_t^a)$, 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

$$P_{t+1} - P_t = r\,P_t - d_{t+1} + (1+\alpha_1)x_{t+1}^a - \alpha_1(1+r)x_t^a + \alpha_2[v_{t+1} - (1+r)v_t]. \qquad (10)$$

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

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

Returns in the Ohlson (1995) model therefore equal the risk free rate plus adjustments for innovations in abnormal earnings ($(1+\alpha_1)x_{t+1}^a - \alpha_1(1+r)x_t^a$) 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

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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 earnings is ignored, since it is examined extensively in Senthilnathan (2009). Notably, His study demonstrates that 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. Second, the level of future value relevant information (v) is examined, not innovations in the level (see equation (11)). It is also notable that lagged values of the goodwill amortisation explanatory variables could easily be incorporated into the regression analysis. 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).

Method

This study examines 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 *et al.* 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, this study devises 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), this study therefore cross-sectionally examines the following regression models in relation to goodwill amortisation:

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

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

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

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).

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. The study also obtains coefficient estimates using fixed time effects and individual year regression estimates.

Data

The data sets are obtained from 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 this study. Firstly, goodwill amortisation is estimated when it is not directly reported (note that 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). Goodwill amortisation per share is determined as goodwill amortisation divided by shares outstanding (DATA25). Specifically, 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. 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. As mentioned already, 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 (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 Tables 1 and 2. In Tables 1 and 2, 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. The pooled descriptive and percentile measures for the explanatory variables are reported in Table 1; and Table 2 reports correlation coefficients for the study's variables.

Table 1: 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 observa tions	**348480**	**348480**	**348480**	**348480**	**348480**

Table 2: 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

RETURN REGRESSION MODEL RESULTS

Returns – Goodwill Amortisation Regression Results

The pooled, fixed year effect, and cross sectional yearly results for regression equation (13), reported in Table 3, 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 3 are about 0.01 or less (see the pooled and 1988-2003 rows in Table 3). Although the fixed year effect adjusted R^2 is somewhat higher (0.123 in the fixed year row in Table 3), 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.

Table 3: Regression of monthly returns (R_{t+1}) on goodwill amortisation ratio (GAR)

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

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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 3 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 (1980) 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.

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

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. 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). However, their results do not appear to translate to an overall relationship between returns and goodwill amortisation. The results imply that the level of goodwill amortization appears to be an insignificant non-cash item in a firm's financial statements. This study extends 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.

Returns – Presence of Positive Goodwill Amortisation Regression Results

The results for goodwill amortization dummy ($GAD_{i,t}$) regression model (14), reported in Table 4, 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 4). 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 4), whereas for the other years the coefficient estimates for positive goodwill amortisation ($GAD_{i,t}$) are insignificant. All the adjusted R^2s in Table 4 are quite low, however, being 0.01 or less. Even though the adjusted 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 Table 4), so the presence of positive goodwill amortisation ($GAD_{i,t}$) does help to explain subsequent monthly returns.

Table 4: Regression of monthly returns (R_{t+1}) on goodwill amortisation dummy variable (GAD)

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	***	0.004656	***	0.000409	42854

	45.2306	4.28125		
Average Measure	**0.009652** **9.479851**	**-0.0000017** **0.502984**	**0.000309**	

Table 4 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 (1980) 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.

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

The Table 4 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 5 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 3 and 4 with Table 5). 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.

Table 5: Regression of monthly returns (R_{t+1}) on goodwill amortisation ratio (GAR) and goodwill amortisation dummy variable (GAD)

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**	

Table 5 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 (1980) 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.

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

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 3 to 5). 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. Notably, 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 Senthilnathan (2009). The low adjusted R^2s therefore indicate that returns should 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.

Conclusion

This study demonstrates that using share returns as the dependent variable is a preferable approach for testing value relevance of accounting information, since using equity prices as the dependent variable can create spurious regression results due to equity prices following a non-stationary, persistent process. Using returns (or price change) as the dependent variable overcomes these problems. In this context, this study utilizes 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.

The results indicate the irrelevance of the level of prior year goodwill amortisation for explaining monthly returns. The presence of positive goodwill 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. The 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 (not lower) returns, even though the actual level of goodwill amortisation is not important.

References

Aggarwal R. and Kyaw N. A., (2005), "Equity Market Integration in the NAFTA Region: Evidence from Unit Root and Cointegration Tests", International Review of Financial Analysis, Vol. 14, Issue-4, pp. 393-406.

AICPA, (1970)a, Accounting Principle Board Opinion No. 16 – Business Combinations, American Institute of Certified Public Accountants, New York.

AICPA, (1970)b, Accounting Principle Board Opinion No. 17 – Intangible Assets, American Institute of Certified Public Accountants, New York.

Bugeja M. and Gallery N., (2006), "Is older goodwill value relevant?", Accounting and Finance, Vol. 46, pp. 519-535.

Collins D. W., Pincus M. and Xie H., (1999), "Equity valuation and negative earnings: the role of book value of equity", The Accounting Review, Vol. 74, Issue-1, pp. 29-61.

Collins D. W., Maydew E. and Weiss I., (1997), "Changes in the value-relevance of earnings and book values over the past forty years", Journal of Accounting and Economics, Vol.24, Issue-1, pp. 39-67.

Fama E. F., (1970), "Efficient capital markets: a review of theory and empirical works", Journal of Finance, Vol. 25, Issue-2, pp. 383-417.

FASB, (2001)a, Statement of Financial Accounting Standard No. 141 – Business combinations, Financial Accounting Standard Board, USA.

FASB, (2001)b, Statement of Financial Accounting Standard No. 142 – Goodwill and other intangible assets, Financial Accounting Standard Board, USA.

Hennings S. L., Lewis B. L. and Shaw W. H., (2000), "Valuation of the components of purchased goodwill", Journal of Accounting Research, Vol. 38, Issue-2, pp. 375-386.

Jennings R., LeClere M. and Thompson II R. B., (2001), "Goodwill amortisation and usefulness of earnings", Financial Analysts Journal (September/October), pp. 20-28.

Jennings R., Robinson J. R., Thompson II R. B. and Duall L., (1996), "The relation between accounting goodwill numbers and equity values", Journal of Business Finance & Accounting, Vol. 23, Issue-4, pp. 513-533.

Jeon B. N. and Jang B. S., (2004), "The linkage between the US and Korean stock markets: the case of NASDAQ, KOSDAQ, and the semiconductor stocks", Research in International Business and Finance, Vol. 18, Issue-3, pp. 319–340.

Johnson L. T. and Petrone K. R. (1998), "Commentary: Is goodwill an asset?", Accounting Horizons, Vol. 12, Issue-3, pp. 293-303.

Ohlson J. A., (1995), "Earnings, book values, and dividends in equity valuation", Contemporary Accounting Research, Vol. 11, Issue-2, pp. 661-687.

Ohlson J. A. (2001), "Earnings, book values, and dividends in equity valuation: an empirical perspective", Contemporary Accounting Research, Vol. 18, Issue-1, pp. 107-120.

Senthilnathan S., (2009), "The role of the most recent prior period's price in value relevance studies", PhD thesis, Massey University, New Zealand.

Smith D. J., (2003), "The information value of earnings excluding goodwill amortisation in publicly listed New Zealand companies", Master of Business Studies thesis, Massey University, New Zealand.

White H., (1980), "A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity", Econometrica, Vol. 48, Issue-4, pp. 817-838.