

Full Length Research Paper

Goodwill impairment after business combination among Jordanian shareholding companies

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This study examined whether external users of financial statements are capable of assessing goodwill impairment apart from management. This study aimed at investigating goodwill write-offs resulted from acquisitions among Jordanian shareholding companies in Amman Stock Exchange (ASE) during 1985 - 2005. This study tested for the notion that the seeds of the eventual goodwill write-off are planted at the time of the acquisition. The likelihood of a write-off is related to an initial overpayment as indicated by acquisition characteristics as well as some of post acquisition performance indicators. The results of this study provided some support for the hypothesis that predicts the relationship between goodwill write-offs and acquisition and performance indicators. However, the study revealed that external users will not be able to assess goodwill impairment effectively within the available information and disclosure.

Key words: Goodwill, international accounting standards, impairment and acquisition.

INTRODUCTION

Goodwill recognition and measurement were in dispute for several years ago. In 2004, the International Accounting Standards Board (IASB, 2006) introduced new standards that changed the overall treatment of goodwill. Pooling of interests method was eliminated as an acceptable accounting method for business combinations in favor of acquisition method. Furthermore, goodwill is no longer be amortized instead it is tested annually for possible impairment. This study aims at identifying factors affecting goodwill impairment regarding the acquisitions occurred among Jordanian shareholding companies in Amman Stock Exchange (ASE) during 1985 - 2005. The methodology of investigation is based on the model of Hayn and Hughes (2005).

The importance of this study may be attributed to the recent enactments in accounting for goodwill as well as the need to determine goodwill deterioration externally which is of great importance to auditors and investors. Furthermore, Jordan has witnessed an increasing tendency of banks and firms to be combined which make

this study to be essential.

The aim of the study is to examine whether external users of financial statements are capable of assessing goodwill deterioration, this is in accordance with the purpose of adopting International Financial Reporting Standard No. 3 (IFRS 3) Business Combinations; that is to provide users with the most useful information. One way to address the question at hand is to determine whether goodwill write-offs are predictable. Goodwill writing-off involves the extreme elimination of this asset from the balance sheet either through immediate writing-off or through amortization as in previous accounting treatments or through goodwill impairment as the new standards suggest.

If using the financial statements and the market information enable predicting goodwill write-offs, the investors and auditors will have sufficient information to value goodwill. Moreover this may indicate that there are some factors may affect goodwill write-offs other than management choice. Consequently, if goodwill write-offs are predictable, then any deterioration in its value can also be predictable (Hayn and Hughes, 2005).

The amendments in acquisitions and goodwill accounting improved the financial reporting because it adjusted the way goodwill is treated. The users of financial

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statements will be better able to understand the investments made in those assets and subsequent performance of those investments. Since overpayments are a substantial component of goodwill it seems that it is reasonable to assume that in the years after the acquisition, the lack of coverage in future returns becomes evident and leads to write-offs of goodwill. If goodwill overpayment affects its subsequent writing-off, then it is appropriate to examine the probable effect of overpayment indicators on goodwill write-offs however; this is the essence of this study.

The core objective of the study is to determine the factors that affect goodwill impairment in the shareholding companies in Jordan. This study seeks to reveal whether those factors enable external users such as auditors and investors to predict goodwill write-off and hence goodwill impairment apart from management. This is an examination of management reporting quality, moreover it enables outside parties understanding the issues related to goodwill (Hayn and Hughes, 2005). The study also aims to highlight the market reaction to the acquisition release which may provide an insight of the success of the acquisition.

The balance of this study is organized as follows: the next section includes literature review related to goodwill. In the third section the methodology of investigation is illustrated, this includes the model of investigation as well as an explanation for each variable in it. Also it describes the sample and data used in the study. The statistical analysis results are displayed in the fourth part of the study. Finally the main conclusions are included in the fifth section of the study.

LITERATURE REVIEW

The concept of goodwill has developed in latest decades since the first definition of goodwill reflected it as a residual amount. Essentially goodwill is a residual that cannot be transferred to a new owner without also selling the other identifiable intangible and tangible assets (Sundararajan, 1995). Goodwill is difficult to measure regarding the factors that initially lead to the existence of it; in essence goodwill is what is left over after properly valuing everything else (Johnson and Petrone, 1999).

The definition of goodwill

At first goodwill was thought of as special properties of a business that make its relationships with customers more valuable than other businesses in the same field. The first definition describing goodwill was emerged in the 1880s whereas goodwill considered being the difference between the purchase price and the book value of an acquired company's assets (Johnson and Tearney, 1993).

Sundararajan (1995) discussed the two manners good-

will may be presented through; the first is the residuum approach that considers goodwill as a leftover amount. Goodwill represents the excess of purchase price over the fair market value of the acquiree's net assets and cannot be identified separately. The second is the excess profit approach where goodwill is the difference between the combined company's profits over normal earnings for a similar business. The second definition states that goodwill is the present value of the projected future excess normal earnings that may be generated by the acquiree. This concept is difficult to measure given the uncertainty related to the future earnings as well as the difficulty attributed to the probable discount rate to use (Sundararajan, 1995).

Under IFRS 3 goodwill is the excess of the cost of a business acquisition over the fair value of the net assets thereof. The fair value is defined as the amount for which an asset could be exchanged or a liability settled between knowledgeable, willing parties in an arm's length transaction.

Goodwill and business combination

Goodwill is an asset that cannot be determined unless an acquisition takes place (Ramanna, 2007). Firms may undertake business combinations for several reasons; the main reason is related to the expansion issue. Although firms can expand through internal growth as investment projects are carried out, external growth is usually used (in the form of business combinations).

Generally, business combinations are events or transactions in which two or more business enterprises or their net assets are brought under common control as a single accounting entity. Under IFRS 3 business combinations are considered to be acquisitions whereby one entity (the acquirer) obtains control over the net assets and synergies of another entity (the acquiree) in exchange for the transfer of assets, incurrence of liabilities or issuance of stocks.

Two methods are used in business combinations namely: pooling or uniting of interests and purchase or acquisition method. The main difference between the two methods is that goodwill arises only under the purchase method; the new treatment for acquisitions prohibits the use of pooling of interests. Acquisitions are complex and high risk processes unless there is logic to a takeover that leads to a planned approach to growth (Hopkins et al., 1999).

Several previous studies addressed the notion of business combination and its different methods reflecting the changes in the accounting treatment of acquisitions. Ayers et al. (2002) demonstrated that pooling of interests accounting results in substantially stronger reported performance and financial condition than purchase accounting.

Farhan (2002) studied banking mergers and acquisitions

in Jordan; he examined whether business combinations are useful and profitable for banks. He found that small banks should merge in order to form solid and large banking entities that may increase their share in the market as well as their contribution to the national economy growth.

An important aspect connected to business combinations is the impact of acquisitions on shareholders returns. Several previous studies examined this issue using event studies technique. Kusunadi and Sohrabian (1999) explored the impact of acquisitions on shareholders returns within the insurance sector. Their findings revealed that the acquiring firms do not obtain any significant abnormal returns. On the other hand Duso et al. (2006) proved the positive relationship between acquisitions and the profitability.

Accounting for goodwill

In 1997 the Financial Accounting Standards Board (FASB) enacted Concepts Statement No.6 in which the board decided that goodwill is an asset (Johnson and Petrone, 1999). Prior to the development of accounting standards on goodwill, there were many options related to goodwill accounting, these options were varied between asset based methods as capitalization and the elimination methods as the immediate write-off against reserves (Lewis and Pendrill, 2004). Amortization is another option that was widely used moreover it enables companies to match the cost of intangible assets over the period deemed to benefit from their acquisition.

Under International Accounting Standard No. 22 (IAS 22) Accounting for Business Combinations which was replaced by IFRS 3- the amortization was undertaken through goodwill's useful life, a specific number of years or subject to a maximum of twenty years. A lot of problems are related to the amortization method; it is difficult to determine the useful life of goodwill even when using specific years, the difficulty is attributed to the arbitrariness of such process as indicated in IFRS 3.

The impairment option is the current treatment of goodwill and which was allowed by IFRS 3 wherein goodwill is written-down to recoverable amount through the income statement. Impairment exists when the carrying amount of goodwill exceeds its fair value and is non recoverable, that is the book value is larger than the undiscounted cash flows expected from the goodwill's use and the eventual disposal. Goodwill deterioration may be determined regarding the indicators of goodwill overpayment and post acquisition performance indicators such as the firm return on assets (ROA). ROA is an important measure of performance and the change in its value may be a useful indicator in analysis as well.

Write-off in accounting is the expensing of goodwill that has been estimated to have no future benefits. This means that goodwill will be recorded as an expense on

the current period's income statement rather than keeping it on the balance sheet as an asset. Write-down is a partial write-off where only part of the value of the asset is removed from the balance sheet.

IFRS 3 maintained the same amendments of goodwill and business combination accounting adopted by FASB in 2001. The amendments are represented in both the Statement of Financial Accounting Standards No.141 (SFAS 141) Business Combinations and the Statement of Financial Accounting Standards No.142 (SFAS 142) Goodwill and Other Intangible Assets.

There are few differences between IFRS 3 and US standards. The cost of an acquisition must be measured at the date of the acquisition that is the date the acquirer obtains control of the acquiree net assets. Conversely, under US standards the cost is measured at the date of the announcement. Furthermore, under IFRS 3 the cost of acquisition is determined either in cost or with reference to IAS 39 Financial Instruments: Recognition and Measurement while the cost of acquisition is determined in US standards regarding the equity method.

In SFAS 142 goodwill is allocated among reporting units, which are operating segments of an enterprise, while in IFRS 3 goodwill shall be allocated to cash-generating units. A cash-generating unit is defined in IAS 36 Impairment of Assets as the smallest identifiable group of assets that generates cash inflows that are largely independent of the cash inflows from other assets or groups of assets. The cash-generating units may be similar to or smaller than reporting units mentioned in SFAS 142.

Most of researches concentrated on the usefulness of the new standards as compared to the previous practices. Hitz and Kuhner (2002) analyzed the usefulness of impairment charge in decision making through comparing the net income prior and after goodwill write-offs to the economic income. They favored the goodwill impairment method over the amortization method. Chen et al. (2004) proved that the new rules of goodwill accounting outperform the previous enactments. On the other hand Wiese (2005) favored the amortization approach. Chambers (2006) concluded that that goodwill accounting under SFAS 142 does not improve financial reporting compared to amortization-based accounting.

Carlin et al. (2007) discussed the adoption of IFRS 3, which seemed to be complex and of great risk according to their conclusion. Zhang and Zhang (2006) predicted that management is motivated to allocate more purchase price to goodwill. The exposure draft of SFAS 142 includes some indicators of goodwill overpayment. First, the existence of more than one bidder may cause the value allocated to goodwill to be overstated (Ruback, 1983). Second, the means of payment is an important indicator when evaluating goodwill overpayment. When the payment is made in form of stock-for-stock acquisitions rather than cash payment, then the existence of goodwill overpayment becomes evident (Loughran and Vijh, 1997).

Third, the higher proportion of goodwill to the acquisition price may suggest the existence of overpayment. Finally, the difference between the acquisition price and the acquiree's market value is another factor that is suggested to be a reason for overpayment, the higher the difference, the more likelihood of goodwill overpayment.

In Jordan there is no study directly related to the issue of goodwill impairment, nevertheless, there is few researches demonstrated some issues of this study as the work of Waked (2005). He studied the effect of merging Jordanian shareholding companies on their financial performance. He concluded that in general there is no difference between the financial performances of merging firms before and after the acquisition but there are some significant differences in the firms ROA ratios.

METHODOLOGY OF THE STUDY

Management usually is the main responsible of performing goodwill write-offs. Determining goodwill write-offs by external users is what this study aims at, by using the goodwill write-off model which was developed by Hayn and Hughes (2005). This study depends on the acquisitions occurred among Jordanian firms within the period 1985 - 2005 in order to explain the main indicators that lead to goodwill impairment.

Goodwill write-off prediction model

Hayn and Hughes (2005) investigated if acquisition factors enable outside parties to predict the goodwill impairment pattern. Their work was actually inspired by the well-developed hazard model forecasting bankruptcy attributed to Shumway (1999) that served as guidance for them to develop the first model predicting goodwill write-off.

The goodwill write-off model was developed in accordance to the bankruptcy predicting model depending on two main things. First, bankruptcy is determined when the financial viability of the firm is getting worse similarly goodwill exists when there is a financial deterioration in the cash-generating unit. Second, the explanatory variables determine bankruptcy are varying with time resembles some of the explanatory variables that may affect goodwill write-offs, so both of models are interrelated in accounting for time.

Following is the model used in this study,

$$\text{Pr (Write-off)}_{i,t} = f(\text{acquisition characteristics}_{i,A}, \text{performance indicators}_{i,n}).$$

$$\text{WRITE-OFF}_{i,t} = \alpha + \beta_1 \text{PREM}_{i,A} + \beta_2 \text{BID}_{i,A} + \beta_3 \text{GW}\%_{i,A} + \beta_4 \text{STOCK}_{i,A} + \beta_5 \text{ANRET}_{i,A} + \beta_6 \text{ROA}_{i,n} + \beta_7 \Delta \text{ROA}_{i,n} + u_{i,t}$$

where:

WRITE-OFF= goodwill write-off.

PREM= the payment of a premium.

BID= the existence of more than one bidder.

GW = the percentage of goodwill to the acquisition price.

STOCK= using of stock as a mode of consideration in the acquisition.

ANRET= the abnormal return.

ROA= Return on assets.

Δ ROA= Change in return on assets.

The subscripts *i* and *A* denotes the firm and acquisition year respectively, while the subscript *t* represents the write-off year if there

is any.

The dependent variable in the model is the goodwill write-off. This variable is a dichotomous that receives the value 1 if the firm experienced the write-off of goodwill and if there is no write-off, the variable receives the value 0. Consequently, if the firm takes write-off then *t* is the year of the write-off and *n* ranges from *A*+1 to *t*, years following the write-off are eliminated from the sample. On the other hand for non write-off group during 1985 - 2005 which is the sample period, *n* ranges from *A*+1 up to the year 2006 wherein the last data available. The study excludes the acquisitions that occurred in the year 2006 because of the non availability of data of post acquisition performance indicators at the time of analyzing the data.

The study use a binary logistic model, the difficulty of such model is attributed to its non-linear likelihood functions, as well as it involves varying characteristics of its independent variables. This model includes each firm year as a separate observation. Since the acquisition variables are not observable for each firm-year, past years values are substituted for missing values, this does not present an econometric problem¹. Logistic models in which several observations exist for each individual, usually account for the lack of independence between observations that is the characteristic of panel data. This is resolved here because this model assumes that the number of independent observations used to estimate the model is the number of the firm-years in the data.

Performing correct descriptive statistics requires adjusting the sample size assumed by the logit program to account for the lack of independence between firm-year observations. For the write-off model each firm's entire life span is one observation thus the correct value of (*n*) for descriptive statistics is the number of acquisitions in the sample not the number of firm years. So to estimate the hazard model, each year in which the firm keeps goodwill without writing-off is included in the analysis.

The null hypothesis H_0 of this study is that there is no prediction power for the hazard model in goodwill write-off and hence goodwill impairment is not affected by the acquisition characteristics or by the performance factors. On the other hand the alternative hypothesis that is H_1 assumes the existence of some prediction effect of the independent variables on goodwill write-off.

The details of the econometric properties of the hazard model are described in Shumway's article (1999).

Variables of acquisition characteristics

The goodness of goodwill that indicates whether any overvaluation exists is determined at the time of the acquisition. The first variable in the goodwill write-off model is the payment of a significant premium. This represents the extent to which the acquirer is optimistic about the future performance of the acquired firm based on the current market operations which may contribute in overvaluation of goodwill. This variable is measured through firstly considering the average market value of the acquired firm.

After computing the average market value it is subtracted from the acquisition cost that embraces two components; the acquisition price and incurred liabilities. Eventually the premium is determined as the difference between the acquisition cost and the average market value of the acquired firm to the average market value of the acquired firm's equity over the pre-acquisition period.

The second variable related to the goodness of goodwill is the bidding action. The tendency of the acquisition price tends to be driven up during the acquisition when more than one bidder aspires to the acquisition rather than when the target firm is acquired through a fire sale or distress where goodwill seemed to be understated. This is a dummy variable denoted as 1 where there is more than one bidder and receives the value 0, otherwise. Goodwill is the third acquisition variable represented as a percentage of the amount imputed to goodwill to the acquisition price. Overpayment

may be connected to this variable more than others in the model whereas the higher the ratio of goodwill to acquisition price the higher the probability of overpayment.

The fourth variable in the model is the use of stock as a means of payment. Since using stock may produce higher value than if those shares were sold for cash, the acquirer usually is aware of the potential loss of cash more than the dilutive effects of stock. The value of this variable ranging from 0 to 1 depending on the use of cash in the transaction where 0 indicates that it was all cash transaction, 1 means pure stock transaction (Hayn and Hughes, 2005).

The fifth indicator of goodwill overvaluation is the cumulated acquisition period abnormal return. This variable is generated as a market reaction to the acquisition announcement. This variable may serve as an estimator of acquisition success, if the abnormal returns were much less than those expected then the acquisition price might be overvalued (Kusnadi and Sohrabian, 1999).

The last variable may be estimated through the practice of event study analysis that is the statistical approach commonly used in researches to measure the impact of a particular information release on returns. The measure of the unexpected return that results from the announcement of acquisition is measured as the difference between the actual stock return and the return that might have been expected given the performance of the market (Kothari and Warner, 2004). This is accomplished through using the index model, which holds that the daily stock returns are determined by a market factor and a firm-specific factor. The index model is shown below:

$$r_t = \alpha + b r_{mt} + e_t$$

Where:

r_t : is the stock return given period t .

r_{mt} : is the market's rate of return during the period t .

e_t : is the part of a security's return resulting from firm-specific events.

b : is the measure of sensitivity to market return.

α : is the average rate of return the stock would realize in a period with a zero market return.

The general strategy to estimate this variable is to determine the cumulative abnormal return around the date of acquisition. The first step is to estimate the parameters α and b by using the regression analysis in a 250 trading day's period. Then the abnormal returns of each firm surrounding the acquisition date are computed for 21 days. Using the following formula:

$$e_t = r_t - (\alpha + b r_{mt})$$

Finally the abnormal returns are compounded to estimate the cumulative abnormal return.

Variables of post acquisition performance

This study includes two post acquisition performance explanatory variables. The first post acquisition indicator used in the model is the Return on Assets (ROA). This represents an important performance indicator that in its most simplified form equals income over assets. However; it may be disaggregated to more meaningful components, in relation with sales it may be considered as the profit margin times the asset turnover so that it possess a very indicative insight to the purpose of the study (Epstein and Mirza, 2005).

The second performance variable is much related to the first one since it represents the change in return on assets (Δ ROA). This variable highlights the situation of any deterioration occur in the performance of the firm and draws the direction of the firm's total return on assets (Hayn and Hughes, 2005). The performance indicators

and the acquisition characteristics are combined together to estimate the hazard model of goodwill write-off. The study uses the statistical package SPSS to test the main hypothesis that assumes the independent variables as variables with no power in predicting goodwill write-off.

Sample and Data

This study examines the acquisitions that took place among Jordanian firms in the period 1985 - 2005 however, there are some conditions must be met by acquisitions in order to be included in the sample. First, both of the involved parties in the acquisition process are shareholding companies listed in ASE. Second, Acquisition characteristics data were available at the acquisition date. Fourth, business combinations that used the pooling of interests method were erased from the sample keeping only those acquisitions gave rise for goodwill to be included.

Given the above conditions, only 20 cases are included in the analysis whereas the original population was 52 acquisitions. Nine of them were in 1985-1989 while six occurred after 2005 and the remainders were in 1990s. There is no common trend in the attitude of acquisitions in Jordan perhaps it was remarkable that the acquisitions of 1985 - 1989 were mainly among the insurance sector. On the other hand the intensity of acquisitions beyond the year 2000 were concentrated in the industrial sector. The sample of the study includes 20 acquisitions with 89 firm-years.

The sources of data collection were multiple given the numerous data required, the information about the closing prices and the market values for the intended firms and the general market index were obtained from ASE. While the data about the study's performance indicators were obtained from the ASE company guides. The data related to the amount of goodwill, number of bidders, the acquisition price, the liabilities incurred the use of stock in the acquisition and goodwill write-offs were obtained from a various sources. The Ministry of Industry and Trade is the main source of data and the other sources are: ASE and The Central Bank of Jordan (for those acquisitions related with banks).

The descriptive statistics of the final sample that includes 20 acquisitions are drawn in Table 1 wherein each variable statistics in the goodwill write-off model are displayed. The table draws the mean, median, maximum value, minimum value and the standard deviation for each variable. As mentioned earlier the number of observations is adjusted to the number of acquisitions instead of the number of firm years in the descriptive statistics.

Table 1 indicates the data statistics for the overall sample whether performed goodwill write-off or not. It is displayed in the table that 80% of the acquisitions performed the write-off. Goodwill is an important asset in the acquisition process, as Table 1 indicates its mean value is 60.66% of the acquisition price which is relatively high. The acquisitions with multiple bidders constitute 20% of the sample while 35% of the acquisitions used the stock as the primary method of payment. The abnormal return of the acquisition period mean value is -0.21 which is a small negative number that affirms the notion of overpayment since the firms (on average) do not generate positive returns as expected. The performance indicators illustrate reductions in the values of return on assets.

The acquisition variables of the model were included in the model because of the possibility of being related to goodwill write-off and the main issue is the existence of overpayment. The lower part of Table 1 divides the sample into two groups: the write-off group which are those firms that performed write-off before the year 2006, and the non-write-off group which includes the firms with no goodwill write-off prior to 2006. The table displays the mean and median for each group and the t-statistic of differences in mean values.

Table 1 indicates that the premium of the write-off group is higher than of the non-write-off group but the t-statistics shows that the

Table 1. Descriptive statistics of variables of goodwill write-off model.

N = 20 acquisitions		80 % of acquisitions resulted in goodwill write-off			
		35 % of the acquisitions performed the write-off during the first year			
Variable	Mean	Median	Standard deviation	Maximum	Minimum
Acquisition indicators					
PREM	37.43	32.47	29.01	98.18	4.23
GW as a % of acquisition price	60.66	50.50	18.08	90.00	40.60
% of acquisitions with multiple bidders	20				
% of stock acquisitions	35				
ANRET as a%	-0.21	-0.51	8.46	32.29	-12.58
Performance indicators: variables are measured at the end of the second year following the acquisition year.					
ROA as a %	3.06	2.97	3.18	7.60	-1.84
Δ ROA as a %	-2.15	-1.85	3.15	4.30	-8.50
		Write-off group (n = 16)		Non-write-off group (n = 4)	
		Mean	Median	Mean	Median
		Difference in mean values (t-statistics)			
Acquisition indicators					
PREM	37.78	32.47	36.02	36.44	1.76 (0.150)
GW as % of acquisition price	64.79	61.00	44.15	44.00	20.64 (4.348)
% of stock acquisitions	12.5		50		
% of acquisitions with multiple bidders	37.5		25		
ANRET as a %	-0.04	-0.52	-0.88	-0.50	0.84 (0.345)

difference is not significant using two-tailed test. Furthermore, goodwill percentage of the acquisition price for the write-off group (64.79% on average) is much higher than for the non-write-off group (44.15% on average), a statistically significant difference. This may assure that the higher the value attributed to goodwill the higher the probability of overestimation of the acquisition price.

The announcement period abnormal returns are on average small negative numbers for both groups, and this is consistent with previous studies as Kusnadi and Sohrabian (1999). They found that the acquiring firms do not obtain any significant abnormal returns in the acquisition announcement period.

RESULTS

The analyses are performed to test for two main hypotheses; the first is the examination of the prediction power of the model and the second is to predict goodwill write-off using the results of the analysis. The study is based on a binary logistic regression model because the ordinary least squares (OLS) regression is inappropriate for explaining dependent variables that are dichotomous. It aims at estimating whether there is any relationship between the goodwill write-off and the variables that were observed at the time of the acquisition, and other variables observed beyond the acquisition event.

The model of the study is a binary logistic model whereby the regress receives only two values namely; 1 and 0. The analysis was orientated toward examining the

existence or absence of the goodwill write-off based on the independent variables which are divided into two groups; acquisition variables and post acquisition performance indicators. Second, the other goal of estimating the goodwill write-off model is to rank the relative importance of independents based on their significance in determining goodwill write-off.

With reference to the criteria of selecting the sample of the study, 20 acquisitions were included in the analysis making the number of observations (n) to be 20 acquisitions and 89 firm-years. The first part of the analysis demonstrates the prediction of goodwill write-off.

The null model results

The analysis in Table 2 shows the first step in the binary logistic model that describes a "null model", that is model with no predictors and just the intercept. The first step, called step 0, includes no predictors and just the intercept, and step 1, where the explanatory variables are included with the intercept.

The overall percentage that was correctly predicted given the null model is 82.0. The coefficient for the constant (B) is -1.518 with a standard error 0.276. The null hypothesis that the constant equals zero is rejected because the calculated p-value is smaller than the critical

Table 2. The null model results.

			Write-off		Percentage correct			
			0.00	1.00				
Step 0	Write-off	0.00					100	
		1.00	73	0			0	
	Overall percentage		16	0			82.0	
Step 0	Constant		B	S.E	Wald	df	Sig.	Exp (B)
			-1.518	0.276	30.236	1	0.000	0.219
	The initial -2 log likelihood				83.847			
	Score test results							
			Score		df		Sig.	
Step	Variables	PREM	0.100		1		0.752	
0		GW	30.364		1		0.000	
		BID	0.264		1		0.607	
		STOCK	9.646		1		0.002	
		ANRET	0.874		1		0.350	
		ROA	8.511		1		0.004	
		Δ ROA	6.498		1		0.011	
	Overall statistics		39.716		7		0.000	

P value at the level of significance 0.05 (Table 2). Hence, the analysis concludes that the intercept is not zero. The initial -2 log likelihood (-2LL) is 83.847, however this number is not informative itself but it will be compared with -2 log likelihood in step1. The intercept analysis findings are not of interest except that it shows the difference of including the independent variables in the model.

Table 2 displays also the results of the score test. When looking at the p-values, the variables that are expected to be significant at the level of 0.05 in the model are: GW, STOCK, ROA and Δ ROA considering the other variables to be statistically insignificant regarding their p-values that exceed 0.05. When looking at the final component of Table 2, the overall statistics are predicted to be statistically significant given the level of significance that equals zero. The results demonstrated above are the results of Step 0 that is the first step in the binary logistic regression. The score test predicts the attitude of the independent variables in the model but it is just a preliminary prediction, which signifies that the results may be changed in the next step of the analysis that is step1.

As mentioned earlier the study uses the binary logistic regression model for two main targets one of them is to estimate whether there is any prediction relationship between goodwill write-off and the independent variables, which is the main goal of the study. This may be achieved through examining the overall test of the model coefficients. Thus if the model tests explored that the model failed to fit the data then the null hypothesis of no prediction power of the independent variables will be accepted.

The second target of the analysis is ranking the relative prediction power of the regressors which will not be meaningful if the tests of the overall model were negative. The null hypothesis may be rejected even if no one of regressors possesses any prediction power, if the model fits the data.

The overall model tests

This section includes what is frequently the most interesting part of the output that is the overall test of the model that is performed in step 1 wherein the predictors are included. Four tests are performed namely; Omnibus tests of model coefficients, Hosmer and Lemeshow test, R-squares and the -2log likelihood test. The following table represents the four tests.

With reference to Table 3 the first of the four tests is Omnibus tests of model coefficients, this is the chi-square statistic; the statistics for the step, block and model are the same because the analysis does not use stepwise logistic regression or blocking. The value given in the sig. column is the probability of obtaining the chi-square statistics given the null hypothesis is true. The null hypothesis is rejected given the level of significance less than 0.05, which indicates that the model is statistically significant.

Second, Hosmer and Lemeshow test provides a formal test for whether the predicted probabilities match the observed probabilities. The null and alternative hypotheses that are tested against this test are:

Table 3. The overall model tests.

First Test: Omnibus Tests of Model Coefficients					
		Chi-square	df	Sig.	
Step 1	Step	37.299	7	0.000	
	Block	37.299	7	0.000	
	Model	37.299	7	0.000	
Hosmer and Lemeshow test					
Step		Chi-square	df	Sig.	
1		5.574	8	0.695	
R-squares					
Step		-2 log likelihood	Cox and Snell	Nagelkerk	Pseudo
1		46.549	0.342	0.561	0.445

H_0 : Logistic model is appropriate.

H_1 : Logistic model is not appropriate.

In this case a large p-value indicates a good match; the goodwill write-off model analysis generates a 0.695 p-value, which indicates a good match. The Hosmer and Lemeshow test is also used in this study to predict the write-off pattern, which will be discussed later in the chapter.

Third, R-squares; the R^2 measures in binary logistic regression are not the same for OLS regression R^2 . Nevertheless a number of logistic R-squared measures have been proposed. The R-square measures are not goodness of fit tests but rather attempt to measure strength of association. There are a lot of types for R^2 in the binary logistic regression, this study uses three types: Cox and Snell's R-square, Nagelkerke's R-square and Pseudo R-square. Cox and Snell's R-square is an attempt to imitate the interpretation of multiple R-square based on likelihood. With reference to Table 3 Cox and Snell's R-square is 0.342, which cannot be interpreted, as on OLS regression furthermore its maximum value does not reach one.

Nagelkerke's R-square is a further modification of the Cox and Snell's R-square and its maximum value may reach to the value 1 contrary to Cox and Snell's R-square. The Nagelkerke's R-square is 0.561, which is an indicator of a moderate association. Finally, Pseudo R square is not generated directly through the SPSS analysis instead it is measured through using this formula:

$$(I_0 - (I + C)) / I_0$$

Where:

I_0 : is the -2log likelihood for the null model.

$I+C$: is the -2log likelihood in the full model: intercept plus covariates.

The Pseudo R-square in the study is 0.445, which indicates a moderate prediction relationship. But actually

R-square is of less importance in the logistic regression, since there is no direct equivalent of R-square in logistic regression to that used in OLS (Dufty, 2007).

The final goodness of fit test is -2log likelihood that has approximately a chi-square distribution; -2LL can be used for assessing the significance of the logistic regression analogous to the use of the sum of squared errors in OLS regression. The reduction in -2LL is an indicator that including the independent variables is appropriate. This reduction is equal to the Chi-square. In this study the -2LL has been reduced from 83.847 to 46.549, which means that the independent variables were useful.

After considering the goodness of fit tests, the first objective of the analysis was demonstrated. The model adequately fits the data, which indicates that there is a prediction power for the regressors. The next discussion will turn the attention to the second objective related to measure the significance of the variables in the model and rank their relative significance.

Acquisition variables versus performance indicators

After considering the analysis of the overall model, the analysis of independent variables significance is to be discussed through this section. This is through considering first the results of parameters significance and then rank their relative prediction power in goodwill write-off and hence goodwill impairment.

With reference to the score test analysis, the null model predicts goodwill, the use of stock as a mode of consideration and the performance indicators to be significant in the goodwill write-off prediction. But this may be changed after conducting the analysis of step 1. The results of the binary logistic regression are displayed in Table 4.

As Table 4 indicates; only goodwill and Δ ROA are the significant variables among all independent variables because their p-value is less than 0.05, thus other variables are not powerful in predicting the goodwill write-off. Those results do not signify that the null hypothesis of no

Table 4. Variables in the equation.

	B	S.E	Wald	Sig.	Exp (B)
PREM	-0.004	0.017	0.071	0.790	<1
GW	17.292	6.061	8.138	0.004	>1
BID	-1.357	1.489	0.830	0.362	<1
STOCK	1.128	1.375	0.674	0.412	>1
ANRET	-7.616	7.824	0.947	0.330	<1
ROA	7.997	9.533	0.704	0.402	>1
Δ ROA	-25.101	10.623	5.583	0.018	<1
Constant	-11.054	3.317	11.14	0.001	<1

		Predicted		
		Write-off	Percentage correct	
Observed		0.00	1.00	
Step 1	Write-off 0	73	0	100
	1	7	9	56.3
Overall percentage				92.1

Table 5. Estimates of the predictive model.

Variable	Prediction	Full model	Acquisition variables	Performance variables
Intercept		-11.158 (0.000)	-8.55 (0.000)	-1.06 (0.007)
Acquisition variables				
PREM	-	-0.004 (0.795)	-0.010(0.490)	
GW	+	17.413 (0.004)	14.227 (0.003)	
BID	-	-1.349 (0.368)	-1.155 (0.379)	
STOCK	+	1.171 (0.394)	0.429 (0.701)	
ANRET	-	-7.817 (0.318)	-2.986 (0.675)	
Performance variables				
ROA	+	8.350 (0.376)		-14.054 (0.064)
Δ ROA	-	-24.882 (0.019)		-11.618 (0.237)
Pseudo R ²		0.442	0.335	0.120

prediction power of the model is accepted given that the overall model is significant.

The coefficients of B are not interpreted as for the OLS regression, what is important is the sign of the coefficient. The odds ratios (Exp (B)) of the independents that are the exponentiations of the coefficients are actually more important than the coefficients. As mentioned in the table only GW and Δ ROA are the significant variables that may affect the goodwill write-off. The odd ratio for GW is greater than one, which corresponds to increase in the dependent variable; on the other hand the odd ratio for the Δ ROA is less than one, which indicates the negative relationship with the dependent variable. The classification table represents the appropriateness of the goodwill write-off model and presented in Table 4. The

overall correct predicted percentage after including the explanatory variables is 92.1% as compared to 82.0% of the null model. The percentage of 92.1% is relatively a high percentage, which indicates that the model adequately fit the data.

The goodwill write-off prediction model is displayed in Table 5 after the split of the regressors into two groups namely; the acquisition variables and the performance variables. Table 5 represents the analysis of the full model and the results of the model after considering each group in separate. It is clear from the table that the performance indicators are weak in predicting goodwill write-off when considering in separate from the acquisition variables. The acquisition variables outperform the performance indicators regarding the values of Pseudo

Table 6. Contingency table for Hosmer and Lemeshow test.

	Write-off = 0		Write-off = 1		Total
	Observed	Expected	Observed	Expected	
1	9	8.939	0	0.061	9
2	9	8.845	0	0.155	9
3	8	8.734	1	0.266	9
4	9	8.660	0	0.340	9
5	8	8.510	1	0.490	9
6	8	8.215	1	0.785	9
7	7	7.816	2	1.184	9
8	8	7.183	1	1.817	9
9	7	5.723	2	3.277	9
10	0	0.376	8	7.624	8

R-square, 0.335 as compared to 0.120. However, the model generates better results when combining both groups of variables.

The predictive ability of the model

The final part of the analysis represents the predictive ability of the acquisition and post acquisition variables using Hosmer and Lemeshow test. The firm-year observations are ranked by their fitted probability values and are partitioned into ten probability deciles. This analysis is displayed in Table 6. Under the null hypothesis of no predictive power for the model, actual write-offs should be distributed evenly across the deciles, with an expected percentage of 10% of the write-offs occurring in each decile. The deciles are ranked relative to the probability of occurrence from the lowest to the highest. The table shows that the occurrence of goodwill write-off tends to be greater as the estimated probability of the model increases, indicating that the goodwill write-off model has a predictive power.

Conclusion

This study conducted a binary logistic regression in order to estimate the results of the goodwill prediction model. The results obtained may be interpreted with respect to several aspects. The null hypothesis of no prediction power of the model is rejected because the model is statistically significant in all tests of goodness of fit.

Although the overall model generates good results in the significance testing; only two explanatory variables are considered to be significant; that are GW and Δ ROA. This result may be attributed to the importance of the goodwill in acquisitions occurred in Jordan that on average constitutes 60.66% of the acquisition price, as well as the importance of Δ ROA as an indicator of financial performance deterioration. This implies that the strength

of the model is moderate which is consistent with the findings of Hayn and Hughes (2005).

The ROA is not significant in the goodwill write-off process. This may occur as a consequence of including information about the firm as a whole not the cash-generating unit. When goodwill is allocated to a cash-generating unit, its effect will be more meaningful. Hayn and Hughes (2005) found that the performance indicators on the firm level are both significant. Schultze (2005) argued that goodwill impairment could be a result of several factors other than the deterioration of financial performance.

Although goodwill is the only significant variable among the acquisition variables, those indicators outperform the effect of performance indicators on goodwill write-off when splitting the effect of each group separately. The study highlighted the market reaction to acquisitions as a component of acquisition variables. The study is consistent with many of previous studies that firms usually do not generate positive abnormal returns during the announcement period (Oler, 2005).

The aim of the analysis is to predict the effect of available disclosures in determining the goodwill impairment. The main finding of this study is that investors and auditors may not be able to determine the goodwill impairment effectively apart from management. Nevertheless, the value attributed to goodwill may serve as an important indicator in goodwill impairment because managements are motivated to drive up the price of goodwill (Zhang and Zhang, 2006).

When the value of goodwill is high relative to the acquisition price, the existence of overpayment becomes evident. Consequently, goodwill impairment must take place in the few years following the acquisition. The change in ROA is useful in determining the goodwill impairment since it is an indicator of the profitability performance. The study revealed that on average the firms ROA tends to decrease after acquisition which is the same finding of Martynova et al. (2006).

To the best of the researchers' knowledge this study is

considered to be one of the first studies that address the issue of goodwill impairment in Jordan. To validate the conclusion of this study further comprehensive researches are required in the post-IFRS 3 era in Jordan. The recommendations for the future research have to concentrate on the notion of tracing goodwill performance at the level of cash-generating units as implied by IFRS 3. This may give the analysis a more comprehensive view of the deterioration in the performance of goodwill.

Even though the study concluded that the external users could not have an adequate view for goodwill impairment within the available disclosure, IFRS 3 requires substantial additional disclosures. Therefore, other studies should concentrate on the effectiveness of the new information to the external users in determining the appropriateness of management determinations regarding goodwill impairment.

REFERENCES

- Ayers B, Lefanowicz C, Robinson J (2002). "Do Firms Purchase the Pooling Method". Working Paper, University of Texas, Austin.
- Carlin T, Finch N, Ford G (2007). "Goodwill Impairment-An Assessment of Disclosure Quality and Compliance Levels by Large Listed Australian Firms". Working Paper, Macquarie Graduate School of Management.
- Chambers D (2006). "Is Goodwill Impairment Accounting Under SFAS 142 an Improvement over Systematic Amortization of Goodwill." Working Paper, University of Kentucky.
- Chen C, Kohlbeck M, Warfield T (2004). "Goodwill Valuation Effects of the Initial Adoption of SFAS 142". Working Paper, University of Wisconsin-Madison.
- Duffy D (2007). "What is Logistic Regression." Working Paper, StatGun Statistics Consulting.
- Duso T, Gugler K, Yurtoglu B (2006). "Is the Event Study Methodology Useful for Merger Analysis? A Comparison of Stock Market and Accounting Data". Working Paper, Humboldt University Berlin and WZB.
- Epstein B, Mirza A (2005). "Interpretation and Application of International Accounting and Financial Reporting Standards". Chapter 11. John Wiley and Sons, INC.
- Farhan M (2002). "Banking Merger and Acquisition: Jordan Case". Master Thesis, Amman Arab University.
- FASB (2001). "Statement of Financial Accounting No.141-Business Combinations". Financial Accounting Standards Board.
- FASB (2001). "Statement of Financial Accounting No.142-Goodwill and Other Intangible Assets". Financial Accounting Standards Board.
- Hayn C, Hughes P (2005). "Leading Indicators of Goodwill Impairment". Working Paper, University of California-Los Angeles.
- Hitz J, Kuhner C (2002). "The New Rules for the Accounting of Derivative Goodwill in Accordance with SFAS 141 and SFAS 142." The Audit, pp. 273-287.
- Hopkins P, Houston R, Peters M (1999). "Purchase, Pooling and Equity Analyst's Valuation Judgements". Working Paper, Indiana University.
- IASB (2006). "International Accounting Standard No. 36 –Impairment of Assets". International Accounting Standards Board.
- IASB (2006). "International Accounting Standard No. 38 –Intangible Assets". International Accounting Standards Board.
- IASB (2006). "International Financial Reporting Standards No. 3 – Business Combinations". International Accounting Standards Board.
- Johnson J, Tearney M (1993). "Goodwill- An Eternal Controversy". The CPA Journal, 63(4): 58-69.
- Johnson L, Petrone K (1999). "Is Goodwill an Asset?". Commentary, Financial Accounting Standards Board.
- Kothari, S. and Warner, J. (2004). "Econometrics of Event Studies". Working Paper, University of Rochester.
- Kushnadi J, Sohrabian A (1999). "The Impact of Insurance Mergers on Shareholder Returns". URL: <http://www.csupomona.edu>.
- Lewis R, Pendrill D (2004). "Advanced Financial Accounting". Chapter 13. Seventh Edition, Prentice-Hall.
- Loughran T, Vijh A (1997). "Do Long-Term Shareholders Benefit from Corporate Acquisitions?" .J. of Finance. 52(5): 1765-1790.
- Martynova M, Oosting S, Renneboog L (2006). "The long Term Operating Performance of European Mergers and Acquisitions". Working Paper, European Corporate Governance Institute.
- Oler D (2005). "Does Acquirer Cash Level Predict Post-Acquisition Returns." Working Paper, Indiana University.
- Ramanna K (2007). "The Implications of Unverifiable Fair-Value Accounting: Evidence from the Political Economy of Goodwill Accounting". Working Paper, Massachusetts Institute of Technology.
- Ruback R (1983). "Assessing Competition in the Market for Corporate Acquisitions". J. of Financial Economics, 11(1-4): 141-153.
- Schultze W (2005). "The Information Content of Goodwill-Impairments under FAS 142: Implications for External Analysis and Internal Control". Working Paper, Schmalenbach Business Review. 57: 276-297.
- Shumway T (1999). "Forecasting Bankruptcy More Accurately: A Simple Hazard Model". Working Paper, University of Michigan Business School.
- Sundararajan V (1995). "Accounting for Goodwill". Working Paper, the CPA Journal Online.
- Waked M (2005). "The Impact of Merging Jordanian Shareholding Companies on their Financial Performance." Master Thesis, Al-alBayt University.
- Wiese A (2005). "Accounting for Goodwill: The Transition from Amortization to Impairment- An Impact Assessment". Working Paper, University of Stellenbosch.
- Zhang I, Zhang Y (2006). "Accounting Discretion and Purchase Price Allocation after Acquisitions". Working Paper, University of Minnesota.