**Sources of Value in Mergers and Acquisitions**

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## Abstract

This study investigates sources of value in mergers and acquisitions. While much emphasis is put on operating synergies from acquisitions the evidence provided in this study shows that the difference between the WACCs of the combined firm and the merging firms may have a significant role on the value effect of mergers. These findings suggest that changes in the capital structure of the combined firm, compared to capital structures of the acquirer and the target, play a key role in determining the value of an acquisition. Moreover, findings of this study suggest that reducing the cost of capital of the combined firm, compared to the merging firms, is value creating even in the absence of operating synergies. Furthermore, this study shows that the component of value associated with the difference between the WACCs of the combined firm and the acquirer is mainly determined by leverage of the acquiring firm and the method of payment. While cash payment is value creating, high leverage of the acquirer prior to an acquisition can destroy value by raising the cost of capital of the firm. This is especially important to managers when they are planning an acquisition.


Sources of value in mergers and acquisitions are extensively investigated in prior research. Yet, it is not clear that how mergers create or destroy value. Extant literature provides evidence that shows combined market reaction to acquisition announcements is positive on average, suggesting that mergers create value for shareholders of the merging firms. Moreover, several studies document enhancements in the performance of the combined firms compared to pre-merger performance of the merging firms and conclude that acquisitions create value through generating operating synergies, tax savings, and increasing market power. Devos, Kadapakkam, and Krishnamurthy (2009) study the relative prominence of these sources of value and suggest that the main source of value in mergers is productive

efficiencies. However, prior studies have not addressed the value effect of changes in the cost of capital around mergers.

We propose a new model that decomposes value of mergers into three components and identifies the value effects of changes in the cost of capital of the combined firm compared to the cost of capital of the merging firms. The first component of the model detects the contribution of sources that change cash-flows including operating synergies, tax savings and increased market power. The second component of the model detects the value effect of the difference between the cost of capital of the combined firm and the cost of capital of the acquirer. The last component of the model detects the value effect of the difference between the cost of capital of the combined firm and the cost of capital of the target. We then use a sample of US acquisitions from 1998 to 2011 to empirically decompose total value of acquisitions (TVA) based on this model.

Prior studies generally focus on the operating synergies gained from acquisitions. These synergies can be generated through productive efficiencies in the form of improvements in operating profits or reductions in capital investments (Devos et al., 2009). One exception is the studies that investigate the changes in interest tax shields that occur because of the acquisitions (e.g. Hayn, 1989; Leland, 2007). Therefore, relatively little is known about the role of WACC changes in merger gains. In contrast to prior research, we examine the impact of the difference between the WACC of the acquirer and the target prior to an acquisition, and the WACC of the combined firm subsequent to that acquisition, in order to estimate the influence of this difference on the value effects of mergers. We then further break down combined acquisition wealth effects as suggested by the developed model to estimate the relative role of its components in creating and destroying value.

Understanding sources of value in mergers and acquisitions are of essential importance to several stakeholder groups including shareholders, bond holders, customers, the government, policy makers and managers. Jensen (1984) argues that shareholders are the ultimate right holders of a firm and therefore should be in the centre of investigations regarding value effects of mergers. Consistent with this notion the value effect of mergers is primarily investigated in regard with shareholders' wealth. The findings of prior studies suggest that combined acquisition returns are positive, implying that shareholders gain significantly through mergers. A large body of research suggests that much of merger abnormal returns go to target shareholders. However, a recent study by Ahern (2012) shows that dollar abnormal returns to target firms are only slightly greater than dollar abnormal returns to acquirers around announcement of acquisitions.

Although shareholders are the ultimate holders of firms, the economic effects of mergers are not limited to the merging firms and their shareholders. Specifically, mergers are likely to affect bond holders, customers and governments. Shareholders can expropriate wealth from bond holders through leverage increasing acquisitions where shareholders can benefit from leverage tax savings in cost of bondholders that bear greater risk of default. On the other hand, a coinsurance effect may reduce the risk associated with the acquirer and the target firm and add to bond holders' wealth in both firms. Aside from that, wealth might be transferred from acquirer bondholders to target bondholders if the combined firm’s risk of default is greater than acquirer's risk but smaller than the target's risk. Moreover, if mergers increase market power of the merging firms and therefore impair competition in their respective product market, then it is likely that the shareholder value created in mergers be simply the transfer of wealth from customers' pocket to shareholders. Besides, shareholders can become wealthier if firms simply pay less tax, for example, through utilizing unused carry forwards that would expire in absence of the merger and expropriate wealth from the government.

Policy makers regulate wealth effects of mergers on different stakeholder groups. In this sense, they are interested to know whether the value created for shareholders is from generated "synergies" or is transferred from other stakeholders to shareholders. If value is transferred from other stakeholders then policy maker may revise regulations in a way that protects interests of all stakeholders. Anti-trust regulations that protect interests of consumers and Tax Reform Act of 1986 that restricts the use of net loss carry-forwards in mergers in the United States are two examples of such interventions by policy makers.

Managers are another group that benefit from a better understanding regarding sources of value in mergers. Managers have been accused to prefer their personal interests to shareholders interests for a long time. They allegedly tend to build empires and reduce their own employment risk through value destroying mergers (e.g. Amihud & Lev, 1981). They are also accused to make non-profitable acquisitions because of overestimating their governance capabilities and hubris (Roll, 1969) and paying too much premium for target firms. Aside from that, prior research suggests that firms who undertake value destroying acquisitions are likely to become acquisition targets later, and their incumbent managers are then likely to be replaced. Understanding sources of value helps managers to avoid risks of undertaking value-destroying mergers. Given vast effect of mergers on several stakeholders, findings of this study are of interest to researchers and different groups of practitioners.

We use I/B/E/S analyst forecasts[1] and DataStream corporate bond yields for a sample of 68 acquisitions by US firms over the period 1998-2011 to decompose the effect of the three components of our model on the combined value of acquisitions. This paper provides empirical evidence on the relative importance of the components of the model. First, we compare the analyst forecasts prior and subsequent to our sample mergers to estimate the

1 For a thorough discussion on advantages of using analyst forecasts for estimating merger synergies, see Devos et al. (2009).

magnitude of effect of the merger announcement on the cash-flow forecasts and the WACC at which the cash-flows are discounted. We show that the difference between cost of capital of acquirers and combined firms is significant. We also show that the cost of capital of the combined firm is significantly different from cost of capital of the target.

Second, we estimate the impact of each component of our model and subsequently calculate total value effect of each acquisition (TVA). Specifically, this study finds that acquisitions create around 4% value, on average. More than 90% of value created in mergers comes from earnings synergies and the difference between cost of capital of the combined firm and the acquirer. Finally, we discuss the impact of factors such as mix of payment, firm size and industry relatedness on value components and the TVA. Diversifying mergers are found to underperform related mergers mainly because these mergers create less synergies. Besides, cash payments are associated with less synergy gains but positive value effect from the difference between the WACCs of the combined firm and the acquirer. In addition, acquisitions returns decrease in percentage of debt in the capital structure of the acquirer. This relationship is especially significant between leverage of the acquirer and the value effect of the difference between the WACCs of the combined firm and the acquirer.

This study is also relevant to an influential body of research that investigates the causes of merger waves. The neoclassical theory of mergers suggests that acquisitions happen in waves because of the need for restructuring at the industry level which is mainly driven by regulatory, technological and economic shocks (Gort, 1969; Harford, 2005; Jensen, 1993; Mitchell & Mulherin, 1996). In contrast, the behavioural theory of mergers argues that acquisition waves are driven by market mis-valuation (Bouwman, Fuller, & Nain, 2009; Dong, Hirshleifer, Richardson, & Teoh, 2006; Shleifer & Vishny, 2003). According to this theory in a period of high merger activity, relatively overvalued firms use their stocks to acquire undervalued or less overvalued firms to take advantage of the hot acquisition market

and create value for the acquirer shareholders in the expense of losses to the target shareholders or long-term shareholders of the combined firm. Therefore, under the behavioural argument potential synergies are not the drivers of acquisition waves. Our findings suggest that mergers are partly market driven.

The remainder of this paper is organized as follows. Section 1 reviews extant literature on sources of value in mergers. Section 2 provides details of the data used for this study and describes the sample. Section 3 discusses the method of analysis. Section 4 reports the empirical findings and discusses the results. Section 5 draws conclusions and recommends directions for further research.

**1. Operating synergies and changes in key risk factors**

Prior research proposes two types of synergies that can be retained from mergers: operational synergies and financial synergies. Operational synergies include different types of reduction in production and distribution costs whereas financial synergies comprise the use of underutilised tax-shields, increased leverage, reduced risk of default, and reduced agency costs because of higher debt (e.g. Jensen, 1986; Jensen & Ruback, 1983). Reduction in production and distribution costs can be achieved through realisation of economies of scale and scope, using more efficient technologies, and the benefits of changes in control (e.g. Wang & Xie, 2009).

Operational synergies are extensively investigated in extant literature (e.g. Berkovitch & Narayanan, 1993; Bradley, Desai, & Kim, 1983, 1988; Caron & Jeffrey, 1999; Chatterjee, 1992; Devos et al., 2009; Firth, 1978; Harrison, Hitt, Hoskisson, & Ireland, 1991; Stan Xiao & Royston, 2004). On the other hand, the literature on financial synergies from mergers is not as extensive. Lewellen (1971) suggests that mergers reduce risk of default and thereby cost of capital. Leland (2007) argues that Lewellen's proposition, although correct, is incomplete in

that financial synergies are not always positive. Leland breaks down financial synergies from an acquisition into three components: (1) the change in unlevered firm value that results from an acquisition, (2) the change in the value of tax savings from optimal leveraging of the combined versus stand-alone merging firms, and (3) the change in the value of default costs. Leland assumes that there is no operational synergy from mergers in developing his model.

Studies that compare the magnitude of operational and financial synergies are rare. An exception is research by Devos et al. (2009) who decompose synergy gains from mergers. They suggest that operating synergies account for a major part of the synergy gains. Besides, synergies from interest tax shields contribute to 17 per cent of gains in their sample of 266 large acquisitions in unregulated industries. Their proxy for financial synergies, however, is limited to tax benefits of debt.

Extant literature also suggests that components of the WACC, such as cost of debt (Billett, King, & Mauer, 2004) financial leverage (Harford, Klasa, & Walcott, 2009) and effective tax rate of acquirers (Devos et al., 2009) change substantially subsequent to acquisitions. These findings imply that the WACC of the combined firm is expected to be different from that of the acquirer and the target.

Prior studies find that acquirers are significantly less levered compared to a portfolio of control firms prior to acquisitions and increase their leverage levels subsequent to acquisitions (Uysal, 2011; Welch, 2004). Lewellen (1971) argues that mergers reduce the risk of default, and thus increase debt capacity. This increased debt capacity in turn leads to greater leverage and greater tax savings that generate financial synergies and create value. Ghosh and Jain (2000) provide evidence that shows combined firms can increase their financial leverage mostly because of an increase in their debt capacity compared to acquirers. This increase in debt capacity can be attributed to unused debt capacity of the merging firms

(e.g. Bruner, 1988) from the pre-merger years[2]. Moreover, in diversifying mergers where there exists an imperfect correlation between cash-flows of the acquirer and the target, a coinsurance effect can reduce cost of capital of the combined firm compared to the stand-alone merging firms (Hann, Ogneva, & Ozbas, 2013; Leland, 2007). The coinsurance effect that reduces cash-flow volatility may consequently reduce both cost of debt and cost of equity capital. The new rates for cost of capital components lead to a new optimal capital structure that might be different from optimal capital structure of each of the merging firms. This study argues that this does not necessarily lead the combined firm to a leverage level higher than that of the acquirer. While tax benefits from higher leverage are realised as enhanced cash-flows, a reduction in the WACC may also create value. Therefore, the notion that mergers only produce new debt capacity seems to be naïve. This is especially important when decomposing the value effect of acquisitions where ignoring this effect may lead to underestimation of the value effect of mergers.

A number of prior studies investigate the distribution of merger gains between extant bondholders and stockholders (Higgins & Schall, 1975; Kim & McConnell, 1977; Scott, 1977; Shastri, 1990). They argue that if the merging firms have existing debt that is callable at par, or can be retired at a price that reflects pre-acquisition risks, then bondholders of the stand-alone merging firms will not participate in gains from an acquisition. However, this is not typically the case. For example, while bondholders of nonfinancial acquirers earn negative announcement period returns (Billett et al., 2004), bondholders of banks earn significantly positive returns during a two-year window around merger announcements (Penas & Unal, 2004). On the other hand, bondholders of both financial and non-financial targets are reported to gain significantly positive returns.

2 Clayton and Ravid (2002) find that firms with higher leverage are likely to lose bidding contests. Therefore it is likely that acquirers have some unused debt capacity prior to acquisitions. Ghosh and Jain (2000) find weak evidence that some of the increase in financial leverage of the acquirer following the merger is due to its past unused debt capacity. Palepu (1986) finds that highly leveraged firms are less likely to be acquired.

Mergers that increase debt capacity create opportunities for decreasing cost of capital and increasing tax benefits from leveraging up. Debt-holders gain profits from relatively safer debt whereas tax benefits from increased leverage go to share-holders. Although shareholders can appropriate benefits from bondholders by increasing financial leverage, there is a limit for this expropriation as becoming overleveraged destroys value. Therefore, shareholders are only able to appropriate benefits from debt-holders to an optimum point where the value of the combined firm is maximised.

Leland (2007) argues that a number of factors including tax rates, default costs, relative size, and the riskiness and correlation of cash-flows determine the magnitude of financial synergies. He suggests that although the coinsurance effect reduces risk of default and the cost of capital of firms who engage in diversifying mergers, it does not always overcome the disadvantage of forcing a single financial structure onto multiple activities. Therefore, diversifying mergers are value-creating only when the coinsurance effect dominates. In fact, financial synergies from acquisitions can be negative when firms have very different risks or default costs. Leland (2007) suggests that "financial synergies by themselves are insufficient to justify mergers, but they can become important in specialised circumstances.

## 2. Data and summary statistics

### 2.1. Sample selection

From the SDC Mergers and Acquisitions database, we identify all completed domestic mergers during 1998–2011 where:

a) both merging firms are listed on Nasdaq, AMEX or NYSE,
b) the acquirer takes over 100% of the target firm (we exclude partial acquisitions, sales of subsidiaries, etc.),
c) the consideration offered includes cash, common or preferred stock, or debt,

d) value of the acquisition is at least $10 million, and

e) the ratio of value of the deal to total book value of assets of the acquirer is greater than 10%.

We exclude mergers in regulated industries including utilities, banking, and telecommunications, retaining only mergers involving industrial firms. We further require that target, acquirer and the combined firm to be either zero-debt[3] firms or have data for non-convertible corporate bond yields available on Datastream. We choose a sample of relatively recent acquisitions mainly because corporate bond yields are generally not available for our sample firms prior to 1998. Finally, we also require the firms to be followed by I/B/E/S. This results in an initial sample of 68 mergers.

**2.2. Data**

SDC provides data on transaction value, method of payment, whether the deal was a tender-offer or not, and announcement and closing dates for mergers. Returns and financial data are from Datastream. We require firms to have book value, earnings, dividends and long-term debt, corporate bond yields, stock prices, and shares outstanding information available on DataStream. The expected future cash-flows of the acquirer and the target are estimated from I/B/E/S analyst forecasts prior to the acquisition announcement. Expected cash-flows of the combined-firm are calculated from the analyst forecasts consequent to the acquisition announcement.

Although the sample size of this study is relatively small, it is well distributed across industries and time periods. The sample comprises mergers with acquirers from 24 Fama and French (1997) industry classifications. The target firms in the sample come from 26 different

[3] We define a firm zero-debt if its market leverage is less than 0.1%.

industries. The sample mergers are also well spread through the years of investigation - 1998 to 2011. Panel C of table 1 reports distribution of sample mergers through time. The first and last sub-period consists of four years, while two other sub-periods comprise three years each. The first sub-period (1998-2001) accounts for 25.7% of the sample and the second sub-period accounts for 24.3% of the sample. Two other sub-periods account for 29.7% and 20.3%, respectively.

The mean transaction value in the sample of this study is about $6.3 billion. This mean value is greater than mean transaction value of other studies (e.g. Moeller, Schlingemann, & Stulz, 2004), mainly because this study requires yield to maturity of sample merging firms to be available. This restriction drops mostly smaller acquisitions in which the acquirer or the target is not followed by DataStream's Bonds and Convertibles database. Although the study sample mainly comprises large acquisitions, it also includes smaller acquisitions since the first quartile of transaction value is about $248 million. The mean market value of acquirers and targets calculated on the third Thursday of the month preceding the mergers month are $15.5 and $4.6 billion, respectively. The liquidity ratio measured as cash and short-term investments over total assets is 29% for acquirers and 31% for targets.

Table 1 reports key sample characteristics. Book-to-market ratio (BTM) of equity is 0.52 for acquirers. This is comparable to 0.55 and 0.50 bidders' BTM of equity reported in Moeller et al. (2004) and Devos et al. (2009). Moreover, BTM of equity of the sample targets in this study is 0.59 which is similar to 0.61 in the study by Devos et al. (2009). Mean leverage of non-zero-debt acquirers and targets are 22.8% and 29.9%, respectively. All-cash acquisitions account for 27.9 % of the sample while 72.1% of acquisitions in the sample of this study are paid by stocks or a mix of cash and stocks. Related mergers, identified based on a 4-digit SIC industry classification, account for 57.4% of the sample. On the other hand, 42.6% of the sample of this study consists of diversifying acquisitions. An acquisition is defined as related

when both acquirer and target firms are from same 4 digit SIC code industry, otherwise it is defined as diversifying. Furthermore, while 10.8% of acquisitions are tender offers, 89.2% of the sample are negotiated mergers. Finally, 38.2% of acquirers are zero-debt firms and 61.8% of acquirers are leveraged firms.

[insert table 1 about here]

## 3. Research Method

The model suggested in appendix A provides a theoretical basis for decomposition of value effects of mergers. For determining the contribution of each component of this model we need to calculate the expected synergy gains as well as the WACC of the target, the acquirer and the combined firm. In an efficient market, the stock price of a given firm is a precise estimation of the present value of expected future cash-flows of the firm, based on available information. Prior to the merger announcement, stock prices of both the acquirer and the target reflect the available information about their future cash-flows and their WACC. Combined abnormal return to the firms then, is measured as weighted average of the abnormal returns to the merging firms, and is attributed to announcement of the merger. Therefore, combined abnormal return is equal to the difference between present value of the combined forecasted cash-flows of the merging firms prior to the merger announcement and that of the combined firm subsequent to the announcement. We use forecasts immediately before and after the announcement, which are typically only two calendar months apart. This method minimizes the noise caused from other factors affecting the forecasts.

We use the mean I/B/E/S forecasts[4] for stand-alone acquirer and target firms prior to the acquisition and forecasts for the combined firm in the month subsequent to the acquisition' month in order to estimate changes in forecasted earnings that occur following an acquisition.

[4] For a thorough review on advantages of using analyst forecasts for estimating synergies see (Devos et al., 2009).

We also use these forecasts to estimate the WACC of the firms prior and subsequent to acquisitions. Since these forecasts are typically two months apart, any change in the forecasts can be attributed to the impact of the acquisition. Although other factors that affect the forecasts may add noise, these noises should not make a bias when averaged across the sample (Devos et al., 2009). We extract the forecasts for forecasted earnings per share (FEPS) and long-term growth rate (Ltg) from I/B/E/S. The values of FEPS are then estimated for the intervening years using long-term growth rates provided by I/B/E/S. Forecasted earnings (FE) are estimated as FEPS multiplied by number of shares outstanding.

### 3.1. Earnings forecasts changes subsequent to acquisitions

There are three sets of forecasts for each acquisition, including two sets of forecasts prior to the acquisition for the acquirer and the target, and one set of forecasts for the combined firm subsequent to the acquisition. These sets of forecasts are used to estimate changes in expected earnings following an acquisition from equation (1). Changes in expected earnings of each year ($FE_{OS,t}$) are measured as the difference between the sum of forecasted earnings for the acquirer and the target before the acquisition $\left(FE_{A,t} + FE_{G,t}\right)$ and forecasted earnings of the combined firm subsequent to the acquisition ($FE_{P,t}$), where the two analyst forecasts are two months apart. Forecasted earnings (*FE*) of a firm are defined as the number of shares outstanding for that firm multiplied by their FEPS. FE of the combined firm is estimated as FE of portfolio of the acquirer and the target subsequent to an acquisition announcement.

$$FE_{OS,t} = FE_{P,t} - \left(FE_{A,t} + FE_{G,t}\right) \quad (1)$$

The model presented in Appendix A suggests that the appropriate discount rate for the changes in expected cash-flows that take place because of the acquisition is the WACC of the combined firm rather than the WACC of the acquirer prior to the merger. Consistent with this

proposition, we estimate the present value of such changes in cash-flows by using the WACC rate of the combined firm. The method for WACC estimation is discussed in section 3.2.1.

### 3.2. WACC differences

#### 3.2.1. Details of calculation of weighted average cost of capital

Examining the effect of WACC on the combined value of acquisitions is an important question of this study. In this study, WACC is calculated as a sum of weighted after tax cost of debt and weighted cost of equity. Pre-acquisition cost of debt for the acquirer and the target is measured as the yields on the last corporate debt issue prior to announcement of the acquisition. Similarly, post-acquisition cost of debt of the combined firms is measured as the yields on the first corporate debt issue subsequent to announcement of the acquisition.[5] We adjust the cost of debt to an after-tax measure by multiplying it by (1- $T_{avg}$), where $T_{avg}$ is the tax rate equal with 35%. Finally, we use CAPM to calculate the cost of equity. The details of estimation of cost of equity for the combined firm are provided in section 3.2.3.

The weight of each component of the WACC for the acquirer and the target is calculated as the relative percentage of a firm's capital structure that is debt or equity at the end of the year prior to the year of merger announcement. Likewise, the weight of each cost of capital measure for the combined firm is calculated as the relative percentage of a firm's capital structure that is debt or equity at the end of the year of acquisition announcement. Specifically, for stand-alone acquirer and target firms, we calculate firms' debt as the level of long-term debt at the end of the year prior to the year of acquisition. We also calculate combined firms' debt as the level of long-term debt at the end of the year of acquisition. Further, we calculate firms' equity as the market value of equity at the end of the year prior to the year of acquisition for stand-alone target and acquirer firms, and combined firms' equity

[5] Credit ratings do not incorporate information that is priced by debt markets (Campbell et al., 2012). Therefore, they are not appropriate proxies for cost of debt.

as the market value of equity at the end of the year of acquisition. We then multiply the after-tax cost of debt estimate by the relative percentage of debt in the firm's capital structure (i.e., firms' debt divided by the sum of firms' debt and equity). Similarly, we weight the cost of equity estimate by the relative percentage of equity in the firm's capital structure (i.e., firms' equity divided by the sum of firms' debt and equity).

### 3.2.2 The cost of debt of acquirers, targets, and combined firms

The cost of debt of the acquirer is estimated as the weighted average of yields on a portfolio of bonds of the acquirer on the third Thursday of the month preceding the acquisition announcement, where the weights are market values of the bonds. Similarly, the cost of debt of the target is calculated as the weighted average of yields on a portfolio of bonds of the target on the third Thursday of the month preceding the merger announcement. The cost of debt of the combined firm is estimated as weighted average yield of a portfolio of bonds of the acquirer and the target on third Thursday of the month following month of a merger. Third Thursday of each month is the day on which I/B/E/S analyst forecasts are available.

### 3.2.3. Measuring cost of equity of merging firms and the combined firm using CAPM

We use CAPM to estimate an alternative cost of equity measure for acquirer, target and the combined firm. First, we estimate 5 year beta of acquirer and target using monthly returns and S&P 500 Composite Index. The beta of the combined firm is computed in three steps. We first estimate the unlevered betas for acquirer and target using equation (2):

$$Unlevered\ Beta = \frac{Current\ Beta}{1 + (1 - Tax) \times (5 - year\ average\ debt\ to\ market\ equity\ ratio)} \quad (2)$$

Second, we estimate unlevered beta of the combined firm as weighted average of unlevered betas of acquirer and target using market value of equity of the firms on third Thursday of the

month preceding merger month as weights. Finally, we use debt to equity ratio for the combined firm to estimate levered beta, and CAPM to estimate cost of capital for the combined firm. The debt to equity ratio of the combined firm is estimated as a sum of outstanding long-term debt of acquirer and target over their market value of equity. We use 7% market risk premium in our calculations.

### 3.4. Measuring total value effect of acquisitions

We collect three sets of I/B/E/S forecasts for each sample acquisition, including two sets for pre-merger individual acquirer and target firms and one set of analyst forecasts for the combined firm. These forecasts are then used to estimate the cash-flow synergies for each firm. Subsequently, net present value (NPV) of I/B/E/S forecasted earnings are calculated by discounting them at the rate of respective estimated WACC. Finally, equation 3 is used to calculate the total value effect of an acquisition (TVA):

$$TVA = \sum_{t=0}^{T} \frac{FE_{OS,t}}{(1+c_P)^t} + \left(\sum_{t=0}^{T} \frac{FE_{A,t}}{(1+c_P)^t} - \sum_{t=0}^{T} \frac{FE_{A,t}}{(1+c_A)^t}\right) + \left(\sum_{t=0}^{T} \frac{FE_{G,t}}{(1+c_P)^t} - \sum_{t=0}^{T} \frac{FE_{G,t}}{(1+c_G)^t}\right) \quad (3)$$

This research uses a 12-year time horizon for estimation of TVA and its components. Although using the last forecast reports for the merging firms prior to the merger for value estimations is plausible, identifying appropriate forecast reports for the combined firm is not as straightforward. The reason being it may take a few months for the merging firms to close a deal. The probability of factors other than the acquisition impacting on analyst forecasts increases with the time distance between the announcement date and the closing date of a merger. Therefore, post-completion analyst forecasts may become too noisy, being affected by industry-wide changes or other firm-level plans. On the other hand, first post-announcement analyst forecasts provide relatively precise estimations of expected changes in future cash-flows and cost of capital. Therefore, to minimise the noise when estimating value effects of mergers this study uses post-announcement analyst forecast for a portfolio of the acquirer and the target as a forecast for the combined firm.

### 3.5. Combined announcement returns

We follow Bradley et al. (1988) and calculate combined acquisition return as the weighted average of announcement returns for the acquirer and the target. The announcement abnormal returns are calculated over a 3-day window using the market adjusted abnormal returns. We expect the level of corporate risk to be largely affected by the acquisition announcement. Hence, using a market model or the CAPM for estimating the abnormal returns will be spurious as these models are based on the historical data and essentially insufficient for estimation of the expected returns. Although the choice of method does not significantly affect the results of the estimations (Brown & Warner, 1985), we use the simpler market adjusted returns method because it is not based on the historical returns of the acquirer or the target.

## 4. Empirical findings

We start with estimating WACC of the individual acquirer and target firms and the combined companies. We show that WACCs of the combined firms are significantly different from those of the acquirer and the target. Then, we use equation 4, estimated WACCs, and analyst forecasts to estimate TVA for each sample acquisition. We also divide total value effect of acquisition into its components: cash-flow synergies, capital synergies for the acquirer, and capital synergies for the target. Then, we examine the relationship between calculated TVAs and combined announcement returns of the merging firms. We further explore the components of equation (3) and investigate mechanisms through which firm and deal characteristics impact TVAs. We also suggest formulas for calculating size and leverage of the combined firms. These formulas show how characteristics such as method of payment and size of merging firms determine size and leverage of the combined firm and consequently affect TVA. Finally, we use cross sectional tests to explore the association of estimated TVAs

and their components with firm and deal characteristics that are suggested to affect value of acquisitions.

### 4.1. Changes in earnings forecasts subsequent to acquisitions

Table 2 reports analyst earnings forecasts and the changes in average forecasts subsequent to acquisitions. As shown in panel A of this table, mean (median) forecasted earnings for fiscal year 1 scaled by total assets is 9.0% (6.8%) for acquirers. Moreover, mean (median) forecasted earnings for fiscal year 1 scaled by total assets is 7.4% (3.7%) for target firms. In addition, combined firms have a mean (median) forecasted earnings scaled by total assets for fiscal year 1 equal with 8.4% (7.2%). Finally, percentage difference between forecasted earnings of the combined firm and those of a portfolio of the acquirer and the target is averaged as 6.0% (t=1.78) with a median equal with 0.5%. These findings show a significant increase in fiscal year 1 average analyst forecasts subsequent to announcement of acquisitions.

[insert table 2 about here]

Panel B reports mean (median) fiscal year 2 forecasted earnings scaled by total assets as 5.1% (6.7%) for acquirers. Besides, mean (median) fiscal year 2 forecast for target firms is 10.7% (8.0%) of their total assets. Moreover, combined firms' mean (median) forecasted earnings over total assets is 10.3% (8.5%). Finally, percentage difference between forecasted earnings of the combined firm and those of a portfolio of the acquirer and the target is averaged as 4.3% (*t*= 2.23) with a median equal with 0.9%. These findings also show a significant increase in fiscal year 2 average analyst forecasts subsequent to announcement of acquisitions.

Forecasted Ltgs are reported in panel C of Table 2. As reported in the table, mean (median) forecasted long-term growth rate for acquirers is 16.7% (14.6%). Moreover, mean (median) Ltg for target firms is 16.7.9% (15.3%). In addition, combined firms have a mean (median) of 16.8% (14.8%). Finally, percentage difference between forecasted Ltg of the combined firm

and Ltg of a portfolio of the acquirer and the target is 2.7% (*t*= 1.05) on average, with a median equal with 1.3%. Similar to those of forecasted earnings, these findings again show an increase in Ltg forecasts subsequent to announcement of acquisitions. However, this difference is not statistically significant at conventional levels.

The findings reported in Table 2 shows that forecasted earnings and Ltg are on average greater for combined firms than stand-alone acquirer and target firms. These observations imply that acquisitions generate synergies and improve growth opportunities. This finding is consistent with that proposition of prior studies that mergers are partly motivated by opportunities for synergy gains (e.g. Jensen & Ruback, 1983). It is also consistent with findings of a number of prior empirical works on mergers and acquisitions that suggest synergies are a source of value in mergers (e.g. Carline, Linn, & Yadav, 2009; Devos et al., 2009).

### 4.1. Changes in the WACCs subsequent to acquisitions

#### 4.1.1. The cost of debt

The findings regarding estimated cost of debt of merging firms that are presented in Table 3 show that, on average, acquirers have greater costs of debt than targets. These findings also indicate that average cost of debt of combined firms is significantly smaller than mean cost of debt of targets. Specifically, mean cost of debt of combined firms is 5.7% smaller than mean bond yield of targets. On the other hand, it is significantly greater than mean cost of debt of acquirers. That is, mean bond yield of combined firms is 5.9% greater than mean bond yield of acquirers. The potential value effect of these changes in the cost of debt is substantial. For example, in the simple Gordon growth model and under a zero dividend growth assumption, a 1% increase in cost of capital from 10% to 10.1% approximately translates into a 1% decline in firm value. However, the relation between cost of capital and firm value is

nonlinear and depends on other variables in the valuation formula including expected earnings and earnings growth.

[insert table 3 about here]

When cost of debt increases, like what is found in this study regarding cost of debt of acquirers, value of bonds decline and bondholders earn negative returns. Conversely, when cost of debt decreases value of bonds increase and bondholders earn positive returns. This is the case for cost of debt of target firms in the sample of this research. These results are consistent with evidence provided by Billett et al. (2004) who find that bondholders of nonfinancial acquirers earn negative announcement period returns. On the other hand, they find that bondholders of target firms gain significantly positive returns.

Moreover, the results of this study regarding cost of debt of acquirers and combined firms are in line with the idea that mergers increase the default risk of acquirers (Furfine & Rosen, 2011). In fact, the cost of debt is positively related to the risk of default. That is, the greater risk of default the greater cost of debt. Therefore, an increase in the cost of debt following announcement of an acquisition can be considered as evidence of increase in the risk of default of the acquirer because of the acquisition.

### 4.1.2. Cost of equity

Table 4 reports cost of equity of the firms involved in mergers. According to this table, the mean estimated cost of equity of sample acquirers is 10.9% and target firms have a mean cost of equity equal to 11.59%. Moreover, the average cost of equity of combined firms is 10.2%. In addition, the average difference between cost of equity of combined firms and cost of equity of acquirers is 1.0% ($t$ =0.29). This observation means that cost of equity of combined firms is on average 1.0% greater than the cost of acquirers' equity prior to announcement of mergers. However, the median of such a difference is -3.5% suggesting a decline in average

cost of equity of acquirers. Finally, the average difference between cost of equity of combined firms and cost of equity of targets is -4.1% (*t* =0.70*)*. This result implies that cost of equity of combined firms is on average smaller than cost of equity of targets by 4.1% of target's cost of equity prior to announcement of the acquisition. The median of such a difference is -10.8%.

Findings reported in Table 4 show that mean cost of equity of combined firms is greater than cost of equity of acquirers. This difference is around 1.0% of acquirers cost of equity. However, median difference between cost of equity of combined firms and acquirers is negative in the table, indicating a lower cost of equity for the combined firm compared to the acquirer. The difference between mean and median cost of equity in table 4 is because in 4 sample acquisitions cost of capital of the target firm is very larger than that of the acquirer. In All these mergers the acquirer and the target are from same industry. Although these cases are relatively rare, they support the idea that even in the absence of operating synergies liquid firms acquire financially distressed firms in their industries in order to reallocate liquidity to firms that are otherwise inefficiently terminated (Almeida, Campello, & Hackbarth, 2011).

[insert table 4 about here]

### 4.1.3. Differences in WACCs

Although cost of debt of combined firms is greater than cost of debt of acquirers the average WACC of combined firms is found to be smaller than acquirers perhaps because of their smaller cost of equity. Moreover, the WACC of combined firms are smaller than the WACC of target firms as both cost of debt and cost of equity of combined firms are smaller than those of target firms. These findings suggest that the value effects of differences between the WACC of combined firms and the WACCs of acquirers and targets are expected to be positive, on average.

[insert table 5 about here]

The evidence provided in table 5 shows that average WACC of acquirers and target firms are 10.4% and 10.8% respectively. However, mean WACC of combined firms is lower and is around 9.5%. The potential value effect of these changes in the cost of capital is substantial. For example, in the simple Gordon growth model and under a zero dividend growth assumption, a 1% increase in cost of capital from 10% to 10.1% approximately translates into a 1% decline in firm value. However, the relation between cost of capital and firm value is nonlinear and depends on other variables in the valuation formula including expected earnings and earnings growth.

### 4.2. Sources of value in acquisitions

Larger firms are expected to create larger cash-flows and generate greater values. The size of the cash flows can also influence the value effect of changes in the WACC, i.e. the greater the cash-flows, the greater the value effect by changing the WACC. Therefore, a combination of relatively large firms is expected to cause a relatively great value effect, when stated in dollars. Hence, it is necessary to deflate the estimated value effects by size of the firms to be able to make an apple-to-apple comparison. For this purpose we deflate components of value calculated by equation (4) by market value of equity of the respective firm. Specifically, we deflate operating synergies by the combined premerger market value of equity of the merging firms. Moreover, we deflate capital synergies of the target firm by market value of equity of the target and capital synergies of the acquirer by market value of equity of the acquirer prior to the merger. Finally, we deflate TVA by the combined premerger market value of equity of the merging firms.

[insert table 6 about here]

Consistent with prior research, this study finds that average value effect of acquisitions is positive. In other words, merger activity is value creating. Table 6 reports that the average TVA of acquisitions included in the sample of this research is around 4.1%. This mean TVA is close to the combined abnormal announcement return for a 21-day event window which is 4.5% on average. In addition, consistent with several other studies on synergy effect of mergers mean earnings synergies are positive suggesting that mergers create value through utilising potential synergies between acquirers and targets. The results suggest that percentage contribution of earnings synergies to the TVA is around 49%. Moreover, value effect of the difference between the WACC of the combined firm and the acquirer accounts for around 43% of the TVA. Finally, value effect of the difference between the WACCs of combined firms and acquirers is around 8%.

### 4.3. Abnormal stock returns and value effects of acquisitions

Abnormal announcement returns of acquirers, targets and combined firms are reported in table 7. The results are consistent with findings of several prior studies. Specifically, Table 7 provides evidence of positive and significant abnormal returns for target firms. The average abnormal announcement returns for target firms is 19.45% (*t =7.02).* Moreover, mean abnormal return of acquirers is around zero. That is, acquirers gain 0.2% (*t* = 0.09) on average. Median of abnormal announcement returns is -0.6% and 16.2% for acquirers and targets, respectively. Average combined announcement returns is a significant 4.5% (*t* = 2.73) and the median of combined abnormal returns is 4.4%.

[insert table 7 about here]

### 4.3.1. Industry shocks versus overvalued stocks

Next, we examine the relationship between stock-returns and the TVA in market-driven and nonmarket-driven mergers in order to test whether acquisitions are driven by mis-valuation of stocks in the market or actual value-creation incentives. If the abnormal announcement returns reflect factors other than expected TVAs, the relationship between estimated TVAs and the combined abnormal returns is expected to be weaker for market driven acquisitions. Shleifer and Vishny (2003) and Rhodes-Kropf, Robinson, and Viswanathan (2005) argue that acquisitions could be driven by stock market misvaluation of the merging firms. They suggest that in such instances overvalued acquirers use their stock as the medium of exchange to make acquisitions. On the other hand, Mitchell and Mulherin (1996) and Harford (2005) argue that industry shocks drive mergers. Harford (2005) argues that the relation between high stock market valuations and merger waves has been misattributed to behavioral misvaluation factors. Rather, the relation is actually driven by the higher capital liquidity (lower transaction costs) that accompanies an economic expansion. Consistent with the theory of market-driven mergers, Devos et al. (2009) suggest that the relationship between announcement abnormal returns and synergies is stronger for non-market-driven mergers. In this study, such a stronger relationship was not found between abnormal announcement returns and the TVA. As reported in table 8, the coefficient $\beta_1$ on TVA × MDA is 0.12 (t = 0.93) and the coefficient $\beta_2$ on TVA × NonMDA is an insignificant 0.01 (t = 0.12). The results reported in 8 suggest that the relationship between abnormal returns and the TVA is not significantly weaker for market driven acquisitions than other mergers. Therefore, these findings do not support the idea of market-driven mergers.

[insert table 8 about here]

### 4.3.2. Diversifying mergers and components of TVA

This study further investigates the relationship between combined abnormal returns and the TVA and its components in related and diversifying mergers. Industry-related acquisitions are more likely to create value through synergy gains. Therefore, they are more likely to be motivated by earnings synergies. On the other hand, diversifying mergers are expected to reduce risk and cost of capital. Thus, they are more likely to be motivated by value effects of changes in the cost of capital. In this sense, abnormal stock returns are expected to be related to synergies in non-diversifying mergers. Moreover, abnormal announcement returns are expected to be related to the value effect of changes in the WACC in diversifying acquisitions.

[insert table 9 about here]

The results are reported in table 9. In model (1), the coefficient $\beta_1$ on TVA × DIV is an insignificant 0.00 (t = 0.03) and the coefficient $\beta_2$ on TVA × NonDIV is an insignificant 0.15 (t = 1.16). In model (2) these coefficients are similar to those of model (1). In model (3), the coefficient $\beta_1$ on TVA × DIV is a significant 0.77 (t = 2.36) and the coefficient $\beta_2$ on TVA × NonDIV is an insignificant 0.18 (t = 0.28). These results suggest that value effects from lower cost of capital of the combined firm compared to the acquirer is a driving force behind diversifying acquisitions. Finally, in model (4) the coefficient $\beta_1$ on TVA × DIV is a significant -0.63 (t = -2.16) and the coefficient $\beta_2$ on TVA × NonDIV is an insignificant 1.09 (t = 0.92). These findings suggest that the relationship between stock price reaction and synergy effects is stronger in related mergers. Moreover, combined abnormal announcement return is significantly related to value effect of the difference between the WACC of the combined firm and the WACC of the acquirer for diversifying mergers. This relationship is weaker in related acquisitions and is not significant. These evidences confirm that related mergers are motivated by synergies whereas diversifying mergers are motivated by value creation expected from reducing the cost of capital.

### 4.4. Factors affecting the components of combined value of mergers

Prior research suggests that a number of deal and firm characteristics influence abnormal returns of mergers. Main factors suggested by extant literature include method of payment (e.g. Loughran & Vijh, 1997; Moeller et al., 2004; Travlos, 1987; Uysal, 2011), size of the acquirer (Moeller et al., 2004), relative size of the merging firms (DeLong, 2001; James & Wier, 1987), value of the deal (Moeller, Schlingemann, & Stulz, 2005), B/M ratio of equity of the acquirer (Rau & Vermaelen, 1998; Sudarsanam & Mahate, 2003), the industry-diversifying nature of the deal (Graham, Lemmon, & Wolf, 2002), whether the acquisition is domestic or cross-border (Moeller & Schlingemann, 2005), level of leverage of the merging firms (Morellec & Zhdanov, 2008), whether the acquisition is a tender offer or a merger

(Loughran & Vijh, 1997; Walker, 2000), level of bidding competition (Bradley et al., 1988; Limmack, 1993), bidder's toehold (Betton & Eckbo, 2000), and termination fees and lockup contracts (Burch, 2001; Coates & Subramanian, 2000; Officer, 2003).

We distinguish between those firm and deal characteristics that can contribute to the TVA of acquisitions and those that determine how the generated TVA is divided between the parties. Our criterion for this separation of the factors is whether or not they can affect at least one of the components of TVA as are expressed in equation 3. This study further examines factors that are likely to affect TVA and look for variables that can explain TVA and/or its components. The impact of these factors on TVA and its three components are tested. If market reaction to an acquisition announcement is related to TVA, then one expects to find evidence consistent with the studies that investigate the impact of these factors on the abnormal acquisition returns.

Other characteristics of acquisition deals that are known to be able to explain the division abnormal returns are not likely to have an impact on TVA as they are basically theoretical explanations for how an acquirer can take a bigger part of the TVA cake. For example, in a hostile multi-bidder acquisition it is likely that all generated TVA goes to the target firm as suggested by the perfectly competitive acquisition market hypothesis (Mandelker, 1974). In contrast, in a solo-bidder friendly merger, the acquirer may retain a considerable part of the TVA, especially if an agency problem is present on the sell-side.

It is well documented that size, measured as market value of equity, book-to- market ratio of equity and leverage of a firm, explain a major part of expected returns on the firm's debt and equity (Fama & French, 1992; 1993, among others). Historical relationships between return and size or B/M of equity of the acquirer do not provide precise estimations of expected returns of the combined firm because the characteristics of the combined firm can be severely

different from those of the acquirer. However, size and B/M ratio of equity of the merging firms and the combined firm are related to TVA. These relationships are multidimensional and complex. Size of the merging companies may affect operating synergies from mergers, i.e. the larger the merging firms the greater the potential operating synergies, in presence of industry-relatedness, similarity and asset complementarity (Rhodes-Kropf & Robinson, 2008). Besides, these factors determine cost of debt and cost of equity of the acquirer and the target. These measures of cost of capital along with leverage of these firms determine their WACCs.

Aside from that, as discussed in chapter 3, the role of market value of equity (i.e. size) and leverage of the merging firms and method of payment in determining financial leverage of the combined firm is important. Moreover, size and book-to-market ratio of the combined firm are two important determinants of cost of debt and cost of equity. These capital costs in combination with leverage of the combined firm determine the combined firm's WACC. Finally, WACC of the combined firm and WACCs of the merging firms, in conjunction with operating synergies from an acquisition, determine TVA as calculated by equation 3.

Value of transaction is also shown to explain acquisition returns (Moeller et al., 2005). I decompose value of transaction into two parts: (a) pre-merger market value of equity (i.e. size) of the target, and (b) acquisition premium. These two parts of the transaction value impact leverage of the combined firm. Additionally, they are determinants of the size of target and size of the combined firm. These factors, in conjunction with other factors that have been discussed previously, ultimately determine TVA. Therefore, it is plausible to examine value components of the deal as determinants of TVA. Figure 2 depicts how characteristics of an acquisition deal, such as method of payment, industry-relatedness and acquisition premium, along with firm characteristics, such as size, B/M of equity and leverage, can affect combined value effect of acquisitions. This discussion sheds light on the mechanisms through which acquisitions are affected by a number of factors that are distinguished by prior research.

Industry related acquisitions can provide greater operating synergies through reduction of operating costs and improving efficiency. On the other hand, diversifying acquisitions may reduce cost of capital of the combined firm. Hann et al. (2013) find that diversified firms have a lower cost of capital than comparable portfolios of standalone firms. They also find that the reduction in cost of capital is strongly associated with the correlation of business unit cash-flows. Therefore, diversification can reduce cost of capital of the combined firm because acquiring target firms from other industries that provide imperfect cash-flow correlations with the acquirer's industry, causes a "coinsurance effect". Hence, related and diversifying acquisitions can be both potentially value-creating and value-destroying. However, actual value effects will depend on the extent to which synergistic cash-flows and the WACC are affected by an acquisition deal.

#### *4.4.1. Univariate analysis*

This research further investigates the impact of a number of factors that are likely to affect returns from acquisitions. This includes diversifying nature of the acquisition, method of payment, relative WACC of the merging firms, relative size of the merging firms, liquidity of acquirer, BTM ratio of the acquirer and size (market value) of the acquirer. Results of the investigations are reported in table 10.

[insert table 10 about here]

The results support the idea that the TVA is greater for mergers in which the acquirer and the target firm are from the same industry than for mergers with merging firms from two different industries. Similarly, earnings synergies are greater for industry-related mergers. However, the difference between the WACC of the combined firm and that of the acquirer seems to be greater in diversifying mergers than related ones perhaps because diversifying mergers reduce cost of capital of acquiring firms. In contrast, the value effect of the

difference between the WACC of the combined firm and the target is greater in related mergers suggesting that diversification creates value in the third part of equation (3).

Findings of this study also provide interesting evidence on how the method of payment affects the TVA. There are two hypotheses regarding the market reaction to method of financing. First, target stockholders would prefer stock because cash acquisitions create an immediate tax liability for them, while stock payments are taxable only when they are redeemed. Second, the information asymmetries hypothesis suggests that acquirers who use stock to purchase a target signal to the market that their stock is overvalued. Hence, their stock price declines around announcement of the acquisition. In contrast, Stockholders of targets who know their stock is undervalued prefer payment in stock rather than cash so they may enjoy the benefits of corrected valuation. While theory offers several conflicting interpretations of the choice of financing, empirical evidence provided by Amihud, Lev, and Travlos (1990) and Travlos (1987), among others, shows that acquirers who pay in cash earn significantly more than those who choose stock payments. Consistent with findings of prior studies, in un-tabulated results we find that both acquirers and targets receive greater abnormal returns around announcement of the acquisition. In fact, acquirers who pay cash gain 12% ($t = 3.47$) more than non-cash acquirers. Targets of cash acquisitions also earn abnormal returns 8% ($t = 1.36$) greater than targets of non-cash acquisitions. Combined abnormal returns are also greater for cash acquisitions compared to non-cash acquisitions by around 9% ($t = 2.98$).

In contrast with market reaction to announcement of cash acquisitions, the TVA is greater for non-cash takeovers. This result is consistent with the hypothesis that suggests stock-financed acquirers create value for their long-term shareholders (Savor & Lu, 2009). Stock financed mergers are equity issues as well. Therefore, the value changes cannot be interpreted as pure merger effects. Prior studies suggest that equity issues are associated with negative abnormal

returns around the announcement day. An explanation is that, by issuing equity, mangers signal to the market that the stocks of their firms are overvalued. Consequently, the investors adjust for the equity issue news and the stock price declines (Myers & Majluf, 1984). Hence, it is essential to consider the equity issue effect in the analysis of acquisition returns. In this sense, worse abnormal return to non-cash acquisitions can be, at least partially, attributed to the effect of the equity offerings.

Although the TVA as a sum of three components is greater for non-cash acquisitions, its components show conflicting effects. The findings of this study show that consistent with the TVA earnings synergies are greater for non-cash acquisitions. However, the value effect of the difference between the WACCs of the combined firm and the acquirer in cash mergers is significantly greater than non-cash mergers. This finding shows that how choice of cash or stock payment can affect value of an acquisition in two opposite ways. Specifically, it shows that cash payment typically reduces cost of capital of the acquirer perhaps through increasing leverage. On the other hand, it seems that cash payments are used in mergers that generate negative synergies.

Relative size of the target to the acquirer is another factor that may affect acquisition returns (e.g. Gorton, Kahl, & Rosen, 2009). Results of this study suggest that the average TVA is greater for acquisitions with below-median relative size of the target to the acquirer. In un-tabulated results we also find a similar difference between combined abnormal returns of acquisitions with below and above-median relative size of the merging firms. That is, combined abnormal returns to the merging firms 21 day around the announcement day is around 6% ($t = 1.15$) greater for acquisitions with below-median relative size. Earnings synergies are also greater for mergers with below-median relative size. However, acquisitions with below and above-median relative size are not different in the effect of the difference between the WACC of the combined firm and the target. Interestingly, the results provided in

table 10 suggest that acquisitions with below-median relative size generate significantly greater value because of the difference between the WACCs of the combined firm and the target. This difference implies that when a relatively larger acquirer takeover a relatively small target the decrease in the discount rate of future earnings of the target is so large that despite small overall effect of this part of the model, it makes a significant difference in the TVA. This difference in the value effect is around 42% of the total difference in the TVAs of acquisitions with below and above-median relative size and is statistically significant.

This study also finds that acquisitions with greater relative WACC of the target to the acquirer generate more value. Moreover, earnings synergies and the value effect of the difference between the WACCs of the combined firm and the target are greater for acquisitions with above-median relative WACCs. However, the value effect of the difference between the WACCs of the combined firm and the acquirer is smaller for acquisitions with above-median relative WACC.

This study further examines the difference in the TVAs of acquisitions with glamour and value acquirers. Prior studies suggest that glamour acquirers with low BTM ratio of equity underperform value bidders with high BTM ratio of equity in long-term (Datta, Iskandar-Datta, & Raman, 2001; Rau & Vermaelen, 1998). Rau and Vermaelen (1998) suggest that this is due to market overreaction to the past performance of acquirers at the time of announcement of an acquisition. They call their hypothesis "performance extrapolation". Moreover, it is likely that managers of glamour acquirers become overconfident and overestimate the value they can create through mergers due to hubris (Roll, 1986). Therefore, they are more likely to undertake acquisitions that are value-destroying or less value creating. Consistent with extrapolation and hubris hypotheses, this study finds that acquisitions with below-median BTM ratio of equity of the acquirer generate smaller TVAs compared to those

with above-median BTM of equity of the acquirers. Specifically, acquisitions with value acquirers generate around 1% more TVA than acquisitions with glamour acquirers.

Next, this study investigates effect of leverage of the acquirer on the gains from acquisitions. Prior studies find that acquirers are significantly less levered compared to a portfolio of control firms prior to acquisitions (Uysal, 2011; Welch, 2004). One possible reason for this observation can be that lower leverage of the acquirer prior to the acquisition is value creating. In fact, acquirers with lower leverage may finance the acquisition with a lower cost of capital and avoid value destruction because of too much leverage following the acquisition. This study examines whether lower leverage affects the TVA and its components. Consistent with this idea, the findings suggest that in acquisitions that the acquirer has below-median leverage the TVA is greater than acquisitions in which the acquirer has an above median leverage. Specifically, this difference is around 5% where a significant 3% of it is generated by the difference between the WACC of the combined firm and the acquirer.

Finally, the sample is divided into two groups based on the liquidity of the acquirer to test whether acquirer's liquidity affects acquisition returns. Consistent with agency costs hypothesis, Harford (1999) finds that acquirers with greater cash reserves undertake acquisitions with subordinate returns. On the other hand, it is also likely that cash-rich firms, with lower risk of default and lower cost of capital, make better acquisition decisions that create value. Results of this study support the latter idea. That is, acquirers with above-median liquidity undertake acquisitions that generate average TVA around 2% greater than those undertaken by acquirers with below-median liquidity.

#### *4.4.2. Multivariate analysis*

The results documented in the uni-variate analysis suggest that estimated TVAs vary in the cross section in a manner consistent with prior research. We use multivariate regressions to

further investigate the cross-sectional patterns in the estimated TVAs. The findings are presented in table 11. The dependent variable is the TVA. The explanatory variables are deal and acquirer characteristics used in univariate analysis as well as size (market value) of the acquirer. Deal specific variables include relative size, relative WACC and two dummy variables that take the value 1 for diversifying acquisitions and cash acquisitions, and 0 otherwise. Four regression models are developed. Model (1) includes a complete set of explanatory variables. In 3 other models variables with more significant coefficients are included.

[insert table 11 about here]

If diversifying acquisitions are value-destroying and related acquisitions are value creating, the coefficient on the diversifying dummy variable is expected to be negative. On the contrary, if diversifying mergers create value and enhance the TVA, the coefficient on the diversifying dummy variable is expected to be positive. Moreover, if cash payment is value creating the coefficient on the cash dummy variable should be positive. In contrast, this coefficient is expected to be negative if cash payment decreases the TVA. Acquirer characteristics including leverage, liquidity, BTM ratio of equity and size (market value of equity) are used as control variables.

The multiple regressions show that diversification has a significant role in determining the TVAs of acquisitions. The coefficients on the diversifying dummy variable are negative in all models suggesting that diversification reduces the TVA. This is mainly because diversifying acquisitions generate negative earnings synergies with an absolute value greater than positive contribution of reduced cost of capital of the combined firm compared to the acquirer. Consistent with Rau and Vermaelen (1998), the coefficient on the BTM of equity of acquirer is positive, implying that value acquirers undertake better acquisitions.

Next, we investigate the relationship between components of the TVA and the explanatory variables. Table 12 reports the findings. The relationship between the value effect of the difference between the WACCs of the combined firm and the target and the explanatory variables are not reported in this table due to the fact that its effect is small compared to other components of the TVA. In fact, in untabulated results no significant relationship was found between the explanatory variables and this component of the TVA.

[insert table 12 about here]

Findings in table 12 show that diversification has a negative but statistically insignificant relationship with the value created because of the earnings synergies. However, diversification does not have a relationship with the effect of the difference between the WACCs of the combined firm and the acquirer. This confirms that while diversifying mergers are likely to destroy value due to negative earnings synergies, they are unlikely to reduce cost of capital of combined firms compared to acquire. In other words, the findings of multivariate analysis suggest that diversifying acquisitions are likely to be motivated by factors other than value creation. This is consistent with proposition of Amihud and Lev (1981) who suggest managers undertake conglomerate mergers to diversify their personal portfolio and reduce their "employment risk". This finding is also consistent with "entrenchment hypothesis" of Shleifer and Vishny (1989) that suggests managers make themselves valuable to shareholders and costly to replace by diversifying through acquisitions, and therefore decrease chances of being replaced.

The findings suggest that cash payments are related to negative earnings synergies. On the other hand, the results show a positive and significant relationship between cash payment and value effects of the difference between the WACCs of the combined firm and the acquirer. These observations suggest that acquisitions that are paid by cash destroy value because they

are more likely to decrease value of combined earnings. However, they may also create value as they are more likely to reduce cost of capital of the combined firm compared to the acquirer.

## 5. Conclusions

Prior studies find that on average, acquisitions add to the combined value of merging firms. Extant literature also suggests that a number of deal and acquirer characteristics such as diversification, method of payment are likely to affect the value outcome of mergers. However, it is still elusive that how mergers create or destroy value. The model developed in this study suggests that combined value effect of mergers can be decomposed into three parts: (1) earnings synergies discounted at the rate of the WACC of the combined firm; (2) value effect of the difference between the WACCs of the combined firm and the acquirer; and (3) the difference between the WACCs of the combined firm and the target. In a given mergers, each of these components may add to or deduct from the total value of the merger. Moreover, the combined value of an acquisition estimated using this model might be negative, suggesting that the acquisition destroys value, or positive, suggesting that the acquisition creates value. Nevertheless, empirical evidence provided in this research shows that combined value effect of acquisitions is positive and around 4%, on average. Aside from that, the results suggest that two first components of the model account for more than 90% of value effect of acquisitions.

This study further documents how diversification, method of payment and capital structure of the acquiring firm before the merger impacts value of acquisitions. Diversification has a negative effect on earnings synergies and does not have a relationship with value of two other components that capture the effect of changes in the WACC. Earnings synergies also

decrease in cash payments. In contrast, the value effect of the difference between the WACCs of the combined firm and the acquirer increases in cash acquisitions. In addition, the value effect of the difference between the WACCs of the combined firm and the acquirer decreases when the acquirer has a greater percentage of debt in its capital structure.

A few examples from our sample further explain how decomposing value effect of mergers based on the proposed model contributes to a better understanding about sources of value in acquisitions. In the first example the acquirer and the target are both from the healthcare industry. The TVA is 7.3% of the value of the acquirer and the target together, when the CAPM is used for estimating the cost of equity. The contributions of the three components of the TVA are 5%, 1% and 1% for components (1), (2) and (3), respectively. In this example value is created in all three components of the WACC where most contribution is by synergies in the earnings.

In our second example, the acquirer is from the healthcare industry and the target is from the wholesales industry. This is a diversifying acquisition by a zero-debt acquirer where the settlement is 100% by stocks. In this acquisition the WACC of each of the merging firms is equal with their cost of equity. The TVA is -7.3% where its components are -6.0%, -10.7% and 9.3% for components (1), (2) and (3), respectively. In this example, value is destroyed in the first two components of the model suggesting negative synergy earnings and a greater WACC for the combined firm than the WACC of the acquirer. However, value is created in the third component implying that the WACC of the combined firm is smaller than the WACC of the target. This example shows how different components of the model may have opposite effects on the total value of an acquisition.

In the third example the TVA is 0.1% and the values of its three components are -3.4%, 2.0% and 1.5% of total value of the acquirer and the target together, respectively. This example is a

diversifying merger paid by cash payment in which cost of capital of the combined firm is reduced compared to the WACCs of the acquirer and the target causing value creation in parts (2) and (3) of the model. However, the created value disappears because of the negative earnings synergies that destroy value in part (1) of the model.

These examples illustrate how value-destruction and value-creation take place concurrently in an acquisition to determine the TVA. In fact, the three components of the TVA might countervail each other, or all contribute positively or negatively to the TVA of a given acquisition. Understanding the extent to which each of these components contribute to an acquisition helps practitioners to value an acquisition deal more accurately. This decomposition also contributes to finding mechanisms through which mergers create value by disentangling impact points of various deal and acquirer characteristics that are known to affect value of acquisitions. Each of these factors may have different effects on each component of the TVA. Once the TVA is decomposed to its components, it will be easier to detect the magnitude of the effect of each factor on a component as well as the factor's total impact. For instance, diversification may destroy value because of unrelated operation lines of the merging firms and concurrently reduce cost of capital of the combined firm compared to the acquirer and create value this way. The overall value effect then will depend on the extent to which these components countervail each other. Therefore, the value effect detected by measures such as abnormal announcement returns can't be used to determine associations between diversification and components of value effects that are likely to be affected by diversification.

While much emphasise is put on synergy gains from acquisitions by managers, analysts and researchers, the evidence provided in this study shows that the WACC of the combined firm and the merging firms may have a significant role on value effect of mergers. These findings suggest that changes in the capital structure of the combined firm compared to capital

structures of the acquirer and the target have a key role in determining value of an acquisition. For example, all the value created because of synergies between the operations of the acquirer and the target can be counterbalanced by raising too much debt for financing the acquisition which in turn increases risk of default and cost of capital of the combined firm. Moreover, reducing cost of capital of the combined firm compared to the merging firms is value creating even in the absence of operating synergies.

The empirical evidence provided in this study show that the component of value that is associated with the difference between the WACCs of the combined firm and the acquirer is mainly determined by leverage of the acquiring firm and the method of payment. While cash payment is value creating, high leverage of the acquirer prior to an acquisition can destroy value by rising cost of capital of the firm too much. This is especially important to managers at the stage of planning an acquisition. Although an acquisition might potentially create significant synergies in earnings, it may also increase the WACC of the combined firm. Then total value created or destroyed in that merger will depend on the extent to which value creating components and value-destroying components of an acquisition counteract and neutralise each other. In other words, the value created because of synergies in earnings might be countervailed, for example, by raising too much debt for financing the acquisition that in turn increases cost of capital to a value destroying level.

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# Appendix A: Construction of the model

Miller and Modigliani (1961) show that the value to an acquirer from acquiring an on-going concern can be expressed as the present value of the target's future cash-flows and the discounted growth opportunities the acquisition provides. As long as the expected rate of return on the growth opportunities is greater than the cost of capital, the acquisition creates value and should be undertaken. Conversely, when the expected rate of return on these growth opportunities is less than the cost of capital, the merged entity destroys value and the merger should not take place.

Assuming that a firm has a very long life, the general form of the discounted cash-flow model can be written as:

$$NPV = \int_{t=0}^{\infty} \frac{FCF_t}{(1+c)^t} \quad \text{(A.1)}$$

Where:

NPV = Net Present Value

$FCF_t = Future\ cash\ flow\ generated\ at\ period\ t$

t = Number of periods that $FCF_t$ is discounted for

c = Cost of capital

Therefore, value of an acquirer before acquisition can be calculated as:

$$NPV_A = \int_{t=0}^{\infty} \frac{FCF_{A,t}}{(1+c_A)^t} \quad \text{(A.2)}$$

Where:

$FCF_{A,t}$ = Expected future cash flow of target generated at period t

$c_A$ = Cost of capital of acquirer

Net present value of target can be calculated as:

$$NPV_G = \int_{t=0}^{\infty} \frac{FCF_{G,t}}{(1+c_G)^t} \quad \text{(A.3)}$$

Where:

$FCF_{G,t}$ = Expected future cash flow of target generated at period t

$c_G$ = Cost of capital of target

When acquiring a target, the acquirer's payment as initial investment ($FCF_{P,0}$) consists of current value of the target ($NPV_G$ ) plus an acquisition premium ($M_D$):

$$FCF_{P,0} = NPV_G + M_D \quad \text{(A.4)}$$

The future cash flow of the merged firm for each period will be the sum of expected future cash-flows of the acquirer ($FCF_{A,t}$), future expected cash-flows of the target ($FCF_{G,t}$), and also expected future cash-flows purely associated with the acquisition project ($FCF_{S,t}$), for example, due to synergy effects. On the other hand, cost of capital of the acquirer is subject to change after completion of the deal. Thus, for accurate estimation of net present value, future cash-flows of the merged firm must be discounted at the new rate of WACC ($c_P$). Therefore, net present value of the merged firm can be calculated as:

$$NPV_P = \int_{t=\mathbf{0}}^{\infty} \frac{FCF_{A,t}+FCF_{G,t}+FCF_{S,t}}{(1+c_P)^t} - FCF_{P,0} \quad \text{(A.5)}$$

Net present value of an acquisition deal ($NPV_D$) can be calculated as post-acquisition value of the merged firm ($NPV_P$) minus pre-acquisition value of the acquirer:

$$NPV_D = NPV_P - NPV_A \quad \text{(A.6)}$$

Or,

$$NPV_D = \left(\int_{t=0}^{\infty} \frac{FCF_{A,t}+FCF_{G,t}+FCF_{S,t}}{(1+c_P)^t} - \left(\int_{t=0}^{\infty} \frac{FCF_{G,t}}{(1+c_G)^t} + M_D\right)\right) - \int_{t=0}^{\infty} \frac{FCF_{A,t}}{(1+c_A)^t} \quad \text{(A.7)}$$

Rearranging equation (B.7) we have:

$$NPV_D = \left(\int_{t=\mathbf{0}}^{\infty} \frac{FCF_{S,t}}{(1+c_P)^t} - M_D\right) + \left(\int_{t=\mathbf{0}}^{\infty} \frac{FCF_{A,t}}{(1+c_P)^t} - \int_{t=0}^{\infty} \frac{FCF_{A,t}}{(1+c_A)^t}\right) + \left(\int_{t=\mathbf{0}}^{\infty} \frac{FCF_{G,t}}{(1+c_P)^t} - \int_{t=0}^{\infty} \frac{FCF_{G,t}}{(1+c_G)^t}\right)$$

(B.8)

Total value of an acquisition (TVA) is sum of $NPV_D$ and $M_D$:

$$TVA = NPV_D + M_D = \int_{t=\mathbf{0}}^{\infty} \frac{FCF_{S,t}}{(1+c_P)^t} + \left(\int_{t=\mathbf{0}}^{\infty} \frac{FCF_{A,t}}{(1+c_P)^t} - \int_{t=0}^{\infty} \frac{FCF_{A,t}}{(1+c_A)^t}\right) + \left(\int_{t=\mathbf{0}}^{\infty} \frac{FCF_{G,t}}{(1+c_P)^t} - \int_{t=0}^{\infty} \frac{FCF_{G,t}}{(1+c_G)^t}\right) \quad \text{(A.9)}$$

Equation A.9 shows that the combined value of a merger, i.e. sum of the value effects on acquirer and the target ($NPV_D + M_D$) comprises three components: (1) merger benefits such as synergy gains ($\int_{t=\mathbf{0}}^{\infty} \frac{FCF_{S,t}}{(1+c_P)^t}$); (2) the difference between pre- and post-merger present value of future cash-flows of the acquirer ($\int_{t=\mathbf{0}}^{\infty} \frac{FCF_{A,t}}{(1+c_P)^t} - \int_{t=0}^{\infty} \frac{FCF_{A,t}}{(1+c_A)^t}$); and (3) the

difference between pre- and post-merger present value of future cash flows of the target ($\int_{t=0}^{\infty} \frac{FCF_{G,t}}{(1+c_P)^t} - \int_{t=0}^{\infty} \frac{FCF_{G,t}}{(1+c_G)^t}$). This model provides a novel framework for analysis of value creation through mergers and suggests variables and parameters that may affect the extent of impact of the deal on the combined value effect of the parties. The next section analyses the model.

**Figure 1- Measurements timeline**

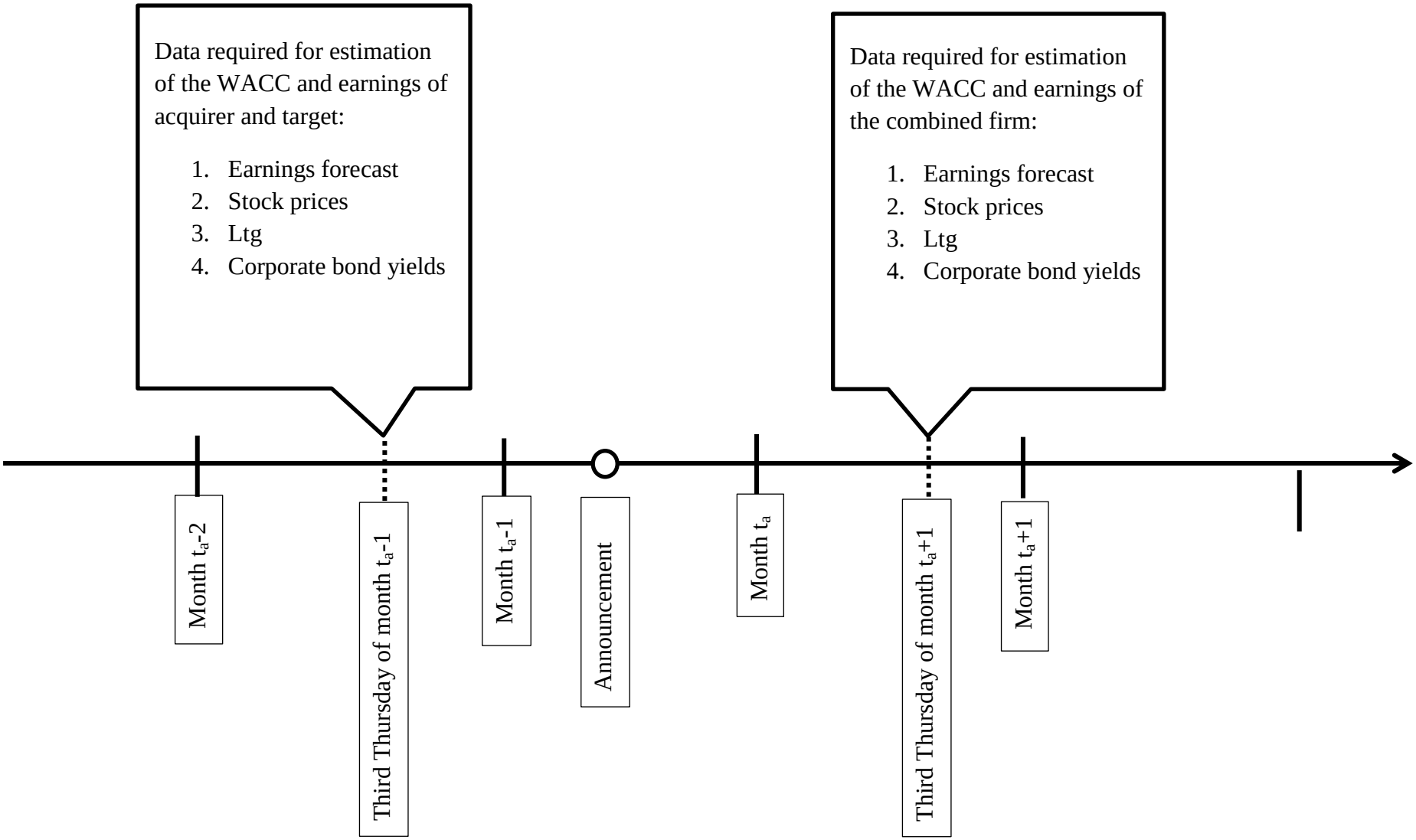

**Figure 2- Factors influencing total value of acquisitions**

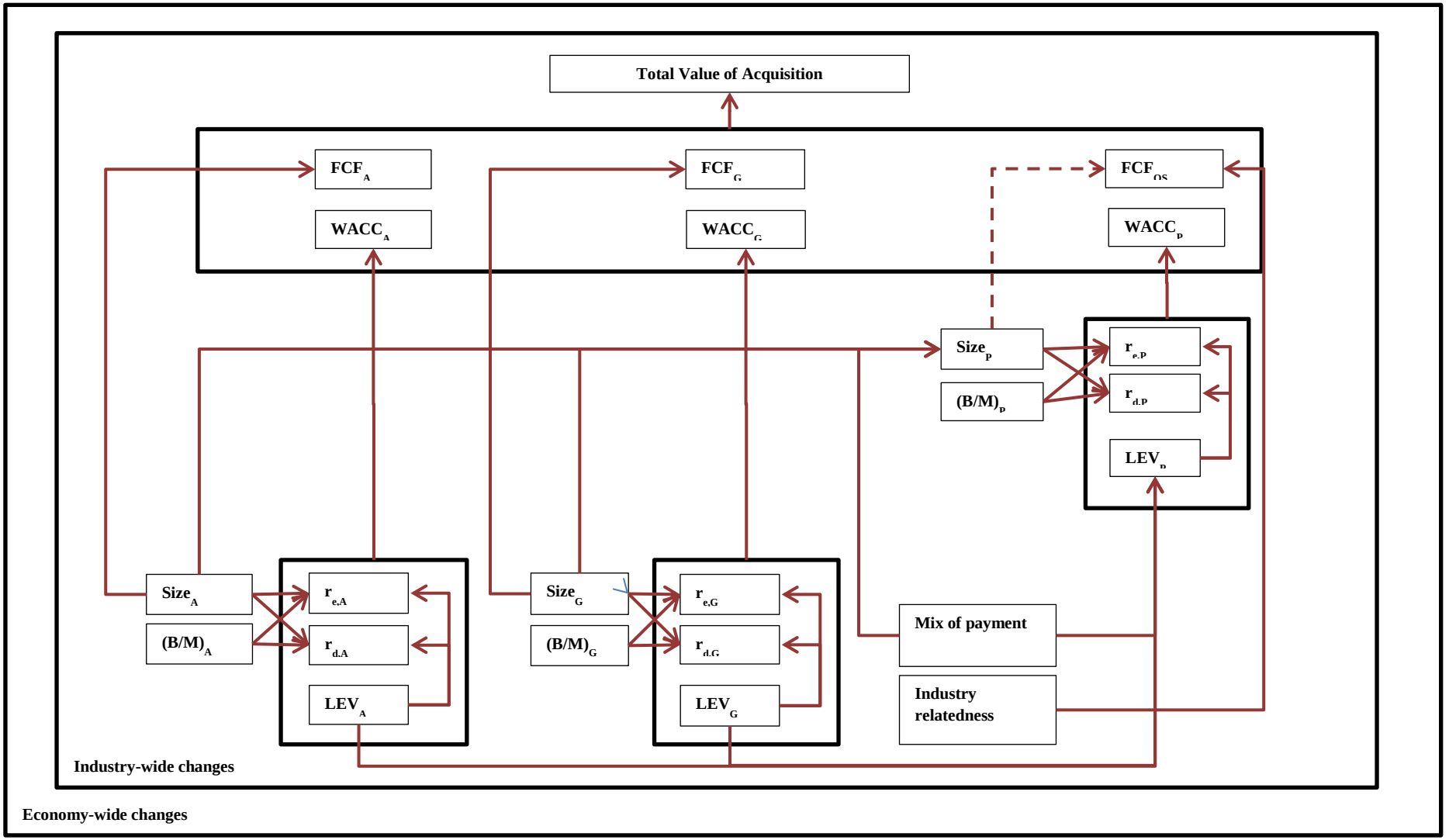

**Table 1 - Summary statistics**

Panel A: merging firms characteristics

| | Mean | Median | Q1 | Q3 |
|---|---|---|---|---|
| Deal Value ($ million) | 6,337.874 | 1,447.515 | 248.741 | 4,732.713 |
| Acquirer characteristics | | | | |
| MV ($ million) | 15,500 | 2,629.756 | 679.162 | 1,290 |
| Leverage (%) (Ex. zero-debt) | 22.78 | 19.03 | 7.21 | 35.43 |
| Liquidity (%) | 29.06 | 20.83 | 5.93 | 50.51 |
| BTM of equity | 0.52 | 0.42 | 0.16 | 0.61 |
| Target characteristics | | | | |
| MV ($ million) | 4,678.197 | 913.121 | 164.736 | 4,194.273 |
| Leverage (%) (Ex. zero-debt) | 29.89 | 24.74 | 14.25 | 36.57 |
| Liquidity (%) | 31.41 | 22.41 | 4.20 | 53.14 |
| BTM of equity | 0.59 | 0.37 | 0.20 | 0.69 |

Panel B: Characteristics of sample mergers

| | % Yes | % No |
|---|---|---|
| All-cash | 27.9 | 72.1 |
| Diversifying merger | 42.6 | 57.4 |
| Tender offer | 10.8 | 89.2 |

Panel C: Distribution of sample through period of investigation

| Period | 1998-01 | 2002-04 | 2005-07 | 2008-11 |
|---|---|---|---|---|
| % in period | 25.7 | 24.3 | 29.7 | 20.3 |

**Table 2 - Analyst forecasts for acquirer, target, and combined firm**

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Acquirer | Target | Combined firm | %Δ (3) , (1+2) |
| *Panel A: Fiscal year 1 forecasted earnings scaled by total assets* | | | | |
| Mean | 8.9657*** | 7.3958*** | 8.3706*** | 6.02* |
| [t stat.] | [8.39] | [2.85] | [8.50] | [1.78] |
| Median | 6.7512 | 3.7084 | 7.1838 | 0.53 |
| Q1 | 3.8151 | 2.0231 | 3.5736 | -1.82 |
| Q3 | 12.8010 | 9.8450 | 10.4494 | 9.51 |
| #of Observations | 68 | 68 | 68 | 68 |
| *Panel B: Fiscal year 2 forecasted earnings scaled by total assets* | | | | |
| Mean | 10.6785*** | 10.7288*** | 10.2611*** | 4.29** |
| [t stat.] | [8.57] | [3.70] | [8.83] | [2.23] |
| Median | 7.9773 | 5.7061 | 8.5182 | 0.89 |
| Q1 | 5.3393 | 3.5484 | 4.7049 | -1.42 |
| Q3 | 13.1926 | 11.5614 | 13.6333 | 8.63 |
| #of Observations | 68 | 68 | 68 | 68 |
| *Panel C: Forecasted long-term growth rate (Ltg)* | | | | |
| Mean | 16.7390*** | 16.6891*** | 16.8438*** | 2.72 |
| [t stat.] | [10.45] | [9.95] | [10.69] | [1.05] |
| Median | 14.5500 | 15.2850 | 14.8409 | 0.00 |
| Q1 | 10.0000 | 9.8750 | 11.1172 | -3.61 |
| Q3 | 19.3300 | 18.6200 | 18.0000 | 3.13 |
| #of Observations | 68 | 68 | 68 | 68 |

This table reports analyst earnings forecasts and the changes in average forecasts subsequent to acquisitions. Column (1) of the table reports summary statistics for acquirers. Besides, Column (2) provides statistics for target firms. Moreover, statistics of combined firms are reported in column 3. Finally, column (4) reports the difference between forecasts for the combined firms and a portfolio of acquirer and target prior to announcement of the acquisition. The table is organised in three panels. Panel A provides statistics for fiscal year 1 average forecasted earnings that is scaled by total assets of firms. Panel B reports statistics for fiscal year 2 average forecasted earnings scaled by total assets of firms. Lastly, Panel C provides statistics of forecasted growth rates for sample firms of this study.

**Table 3 - Cost of debt of firms involved in mergers**

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | Acquirer | Target | Combined firm | %Δ (3) , (1) | %Δ (3) , (2) |
| Mean | 6.2282*** | 7.2249*** | 6.6817*** | 5.85*** | - 5.69** |
| [t stat.] | [24.34] | [21.32] | [24.22] | [3.34] | [-2.21] |
| Median | 6.0958 | 6.6547 | 6.3668 | 5.38 | -6.61 |
| Q1 | 5.2506 | 6.1221 | 5.5583 | -1.14 | -11.73 |
| Q3 | 6.9969 | 8.7719 | 7.2729 | 12.82 | -0.12 |
| #of observations | 42 | 42 | 42 | 42 | 42 |

This table reports findings about cost of debt of firms involved in mergers. Column (1) and (2) of the table provide statistics about cost of debt of acquirers and target firms, respectively. Column (3) reports statistics for cost of debt of combined firms. In column (4) percentage difference between combined firm's mean cost of debt and that of the acquirer prior to the merger is calculated. Similarly, in column (5) percentage difference between combined firm's mean cost of debt and that of the target prior to the merger is calculated. While mean cost of debt of combined firms is 5.9% greater than acquirers, it is 5.7% smaller compared to the mean cost of debt of targets. Both differences are significant.

**Table 4 - Cost of equity of the firms involved in mergers using the CAPM**

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | Acquirer | Target | Combined firm | %Δ (3) , (1) | %Δ (3) , (2) |
| Mean | 10.9256*** | 11.5927*** | 10.1793*** | 0.99 | -4.16 |
| [t stat.] | [11.11] | [11.52] | [12.60] | [0.29] | [-0.70] |
| Median | 9.5625 | 10.3631 | 9.8098 | -3.52 | - 10.79 |
| Q1 | 5.8482 | 6.1055 | 5.7379 | -9.34 | - 26.46 |
| Q3 | 15.4563 | 15.2383 | 13.6470 | 6.20 | 7.42 |
| # of Observations | 68 | 68 | 68 | 68 | 68 |

This table reports findings regarding cost of equity of firms involved in mergers. Column (1) and (2) of the table provide statistics about cost of equity of acquirers and target firms, respectively. Column (3) reports statistics for cost of equity of combined firms. In column (4) percentage difference between combined firm's mean cost of equity and that of the acquirer prior to the merger is calculated. Similarly, in column (5) percentage difference between combined firm's mean cost of equity and that of the target prior to the merger is calculated. The evidence shows that cost of equity of combined firms is 1.0% greater than cost of equity of acquirers, and 4.2% smaller than cost of equity of targets, on average.

**Table 5 - WACCs of combined firms, acquirers and targets**

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | Acquirer's WACC | Target's WACC | Combined firm's WACC | %Δ (3) , (1) | %Δ (3) , (2) |
| Mean | 10.3583*** | 10.8329*** | 9.5042*** | - 1.71 | -5.24 |
| [t stat.] | [10.60] | [11.18] | [11.78] | [-0.57] | [-0.95] |
| Median | 7.9786 | 8.8099 | 8.0692 | - 3.81 | -10.11 |
| Q1 | 5.7655 | 5.5448 | 5.4497 | -8.86 | -26.53 |
| Q3 | 13.8760 | 14.2426 | 12.0282 | 6.20 | 8.80 |
| # of observations | 68 | 68 | 68 | 68 | 68 |

This table reports findings of this study regarding the WACC of acquirers, targets and combined firms. Column (1) and (2) of the table provide statistics about the WACC of acquirer and target firms, respectively. Column (3) reports statistics for the WACC of combined firms. In column (4) percentage difference between combined firm's WACC and that of the acquirer prior to the merger is calculated. Similarly, in column (5) percentage difference between combined firm's WACC and the WACC of targets prior to the merger is calculated. The evidence suggests that WACC of combined firms is 1.7% smaller than WACC of acquirers, and 5.2 % smaller than WACC of targets, on average.

**Table 6 - TVA and its components**

| | TVA | Earnings synergies | Effect of $WACC_{P-A}$ | Effect of $WACC_{P-G}$ |
|---|---|---|---|---|
| Mean | 4.0649** | 2.0038 | 1.7393** | 0.3217 |
| [t] | [2.02] | [0.79] | [2.23] | [0.40] |
| Median | 2.6302 | 0.2245 | 1.3684 | 0.8667 |
| Q1 | -3.7148 | -3.8448 | -1.2839 | -0.0472 |
| Q3 | 12.0676 | 8.6773 | 3.7843 | 2.5862 |
| % > 0 | 61.8 | 52.9 | 67.6 | 66.2 |

This table reports the estimates of TVA and its components where the CAPM is used for estimating cost of equity. The value effects are deflated by the market value of equity of the respective firms in order to make an apple-to-apple comparison possible. The table reports the mean and median value effects along with respective t statistics and p-values.

*Significance at 10% level.

**Significance at 5% level.

***Significance at 1% level.

**Table 7 - Announcement abnormal returns**

| | Acquirer (%) | Target (%) | Combined (%) |
|---|---|---|---|
| Mean | 0.1625 | 19.4536*** | 4.4556*** |
| [t stat.] | [0.09] | [7.02] | [2.73] |
| Median | -0.5863 | 16.1879 | 4.4373 |
| Q1 | -8.5533 | 9.6215 | -3.0562 |
| Q3 | 9.3611 | 30.7627 | 12.1280 |
| # of observations | 68 | 68 | 68 |

This table reports abnormal announcement returns of acquirers, targets and combined firms. First column of the table reports summary statistics for acquirer abnormal returns over a 21-day window around announcement of acquisitions. The second column provides statistics for target abnormal returns over the same period. The third column reports combined abnormal returns. Mean, median, first and third quartile announcement abnormal returns as well as numbers of observations are reported in this table.

**Table 8 - Stock returns, the TVA and market driven acquisitions CAPM**

| | **Coefficient** | ***t* statistic** |
|---|---|---|
| intercept | 0.112*** | 3.78 |
| $\beta_1$ | 0.124 | 0.93 |
| $\beta_2$ | 0.012 | 0.12 |
| $\beta_3$ | -0.061* | -1.80 |
| $\beta_4$ | -0.108** | -2.43 |
| $R^2$ | 0.16 | |
| # of observations | 68 | |

$RTRN = \beta_1 \times TVA \times MDA + \beta_2 \times TVA \times NonMDA + \beta_3 \times MDA + \beta_4 \times RelSize.$

An OLS regression is used to estimate the relationship between combined abnormal announcement returns (RTRN) and the TVA. The dependent variable in this regression is the combined abnormal announcement return. The explanatory variables are two interaction terms: TVA × MDA and TVA × NonMDA. TVA is estimated by equation 5.4-1 where the CAPM is used for estimating cost of equity. MDA takes the value of 1 for market driven acquisitions and zero for other acquisitions. Conversely, NonMDA takes the value of 1 for other acquisitions and 0 for market driven acquisitions. MDA and relative size (RelSize) are included as control variables. The variables are winsorized at 1% and 99% to prevent distortions by outliers.

*Significance at 10% level.

**Significance at 5% level.

***Significance at 1% level.

**Table 9 - Stock returns, the TVA and diversifying acquisitions**

| | **TVA** | **Earnings synergies** | **Effect of $WACC_{P-A}$** | **Effect of $WACC_{P-G}$** |
|---|---|---|---|---|
| | **(1)** | **(2)** | **(3)** | **(4)** |
| intercept | 0.044 | 0.048 | 0.048 | 0.049 |
| | [1.24] | [1.76] | [1.45] | [1.36] |
| $\beta_1$ | 0.004 | 0.009 | 0.776** | -0.638** |
| | [0.03] | [0.06] | [2.36] | [-2.16] |
| $\beta_2$ | 0.146 | 0.144 | 0.180 | 1.092 |
| | [1.16] | [1.08] | [0.28] | [0.92] |
| $\beta_3$ | 0.051 | 0.047 | 0.027 | 0.049 |
| | [1.48] | [1.40] | [0.75] | [1.36] |
| $\beta_4$ | - 0.079* | - 0.080* | -0.067* | -0.095** |
| | [-1.79] | [-1.77] | [-1.56] | [-2.20] |
| $R^2$ | 0.17 | 0.14 | .22 | .22 |
| # of observations | 68 | 68 | 68 | 68 |

$RTRN = \beta_1 \times TVA \times DIV + \beta_2 \times TVA \times NonDIV + \beta_3 \times DIV + \beta_4 \times RelSize.$

Four OLS regressions are used to estimate the relationship between combined abnormal announcement returns (RTRN) and value effects of acquisitions. The dependent variable in these regressions is the combined abnormal announcement return. The explanatory variables in the first regression are two interaction terms: TVA × DIV and TVA × NonDIV. In three other regressions TVA is replaced by that regression's respective component of TVA. TVA and its components are estimated by equation 5.4-1 where the CAPM is for estimating cost of equity. DIV takes the value of 1 for diversifying acquisitions and zero for non-diversifying acquisitions. Conversely, NonDIV takes the value of 1 for non-diversifying acquisitions and 0 for diversifying acquisitions. DIV and relative size (RelSize) are included as control variables. The variables are winsorized at 1% and 99% to prevent distortions by outliers.

*Significance at 10% level.

**Significance at 5% level.

***Significance at 1% level.

**Table 10 - Factors affecting TVA**

| | TVA (%) | Earnings synergies (%) | Effect of $WACC_{P-A}$ (%) | Effect of $WACC_{P-G}$ (%) |
|---|---|---|---|---|
| **Panel A: Diversifying versus related acquisitions** | | | | |
| Related (N=29 ) | 8.56* | 6.13 | 0.98 | 1.46*** |
| [t stat.] | [1.89] | [1.43] | [1.17] | [3.17] |
| Diversifying (N= 39) | 0.78 | -1.01 | 2.29* | -0.05 |
| [t stat.] | [0.22] | [-0.34] | [1.90 | [-0.37] |
| Difference | 7.79 | 7.14 | -1.32 | 1.96 |
| [t stat.] | [1.38] | [1.41] | [-0.83 | [1.20] |
| **Panel B: Cash versus non-cash acquisitions** | | | | |
| Cash (N=19 ) | 2.15 | -2.23 | 4.90** | -0.05 |
| [t stat.] | [0.40] | [-0.44] | [2.92] | [-0.39] |
| Non-cash (N= 49) | 4.84 | 3.73 | 0.05 | 0.67 |
| [t stat.] | [1.45] | [1.28] | [0.59] | [0.66] |
| Difference | -2.70 | -5.96 | 4.45*** | -1.19 |
| [t stat.] | [-0.43] | [- 1.07] | [2.78] | [-0.66] |
| **Panel C: Relative size** | | | | |
| <Median relative size (N = 34) | 7.36*** | 3.95* | 1.68 | 1.73** |
| [t stat.] | [3.32] | [1.89] | [1.55] | [2.06] |
| >Median relative size (N = 34) | 0.62 | -0.03 | 1.80 | -1.15 |
| [t stat.] | [0.12] | [-0.01] | [1.57] | [-0.84] |
| Difference | 6.74 | 3.98 | -0.12 | 2.87* |
| [t stat.] | [1.20] | [0.78] | [-0.07] | [1.81] |
| **Panel D: Relative WACC** | | | | |
| <Median relative WACC (N = 34) | 0.91 | -1.09 | 2.82** | -0.83 |
| [t stat.] | [0.23] | [-0.33] | [2.43] | [-0.56] |
| >Median relative WACC (N = 34) | 7.36* | 5.23 | 0.61 | 1.52** |
| [t stat.] | [1.88] | [1.37] | [0.61] | [2.69] |
| Difference | -6.45 | -6.31 | 2.21 | -2.35 |
| [t stat.] | [-1.15] | [-1.26] | [1.44] | [-1.46] |
| **Panel E: Acquirer's book to market of equity** | | | | |
| <Median BTM of equity (N = 34) | 3.40 | 1.97 | 0.56* | 0.87 |
| [t stat.] | [0.96] | [0.17] | [1.80] | [0.83] |
| >Median BTM of equity (N = 34) | 4.76 | 1.50 | 3.51 | -0.26 |
| [t stat.] | [1.06] | [0.90] | [1.32] | [-0.20] |
| Difference | -1.36 | 0.47 | -2.96 | 1.13 |
| [t stat.] | [-0.24] | [0.30] | [-0.58] | [0.69] |
| **Panel F: Acquirer's leverage** | | | | |
| <Median acquirer leverage (N = 34) | 6.49** | 3.08 | 3.13*** | 0.28 |
| [t stat.] | [2.52] | [1.38] | [2.82] | [0.43] |
| >Median acquirer leverage (N = 34) | 1.53 | 0.88 | 0.28 | 0.37 |
| [t stat.] | [0.30] | [0.19] | [0.27] | [0.24] |
| Difference | 4.96 | 2.20 | 2.85* | -0.09 |
| [t stat.] | [0.88] | [0.43] | [1.88] | [-0.06] |
| **Panel G: Acquirer's liquidity** | | | | |
| <Median acquirer liquidity (N = 34) | 2.91 | 1.89 | 0.57 | 0.45 |
| [t stat.] | [0.58] | [0.42] | [0.56] | [0.30] |
| >Median acquirer liquidity (N = 34) | 5.27* | 2.12 | 2.97** | 0.19 |
| [t stat.] | [2.04] | [0.92] | [2.57] | [0.28] |
| Difference | -2.36 | -0.23 | -2.39 | 0.26 |
| [t stat.] | [-0.41] | [-0.04] | [-1.56] | [0.16] |

This table reports estimations of value effects when the CAPM is used to estimate the cost of equity. Each panel reports mean value effects of two groups that are separated based on a factor that is likely to determine value effects of mergers. Differences between mean value effects of the groups are also reported. Panel A reports the difference between value effects of diversifying and related acquisitions. Panel B reports the difference between mean value effects of cash and non-cash acquisitions. Panels C and D present differences between value effects of acquisitions with below and above median relative size, and relative WACC of target to acquirer, respectively. Panels E, F, and G report differences between average value effects of acquisitions with below and above median acquirer's BTM of equity, leverage and liquidity, respectively. Four columns of the table report TVA, earnings synergies, value effect of the difference between the WACCs of the combined firm and the acquirer ($WACC_{P-A}$), and finally, value effect of the difference between the WACCs of the combined firm and the target ($WACC_{P-G}$).

*Significance at 10% level, **Significance at 5% level, ***Significance at 1% level.

**Table 11 - Relationship between estimated TVA and deal and firm characteristics**

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Intercept | 0.137 | 0.122 | 0.132* | 0.102* |
| | [1.01] | [1.24] | [1.75] | [2.00] |
| *Deal characteristics* | | | | |
| Diversifying acquisition | -0.093 | -0.089 | -0.090 | -0.083 |
| | [-1.41] | [-1.42] | [-1.51] | [-1.44] |
| Cash | -0.138 | -0.005 | | |
| | [-0.18] | [-0.08] | | |
| Relative WACC | 0.011 | 0.007 | | |
| | [0.28] | [0.19] | | |
| Relative size | -0.029 | | | |
| | [-0.28] | | | |
| *Acquirer characteristics* | | | | |
| Leverage | -0.158 | -0.164 | -0.171 | -0.109 |
| | [-0.66] | [-0.75] | [-0.80] | [-0.61] |
| Liquidity | -0.086 | -0.081 | -0.086 | |
| | [-0.47] | [-0.49] | [-0.54] | |
| BTM of equity | -0.012 | | | |
| | [-0.10] | | | |
| Size | 0.000 | | | |
| | [0.15] | | | |
| $R^2$ | | | | |
| *N* | | | | |

Four regression models are presented in this table. First estimation includes all seven variables that are reported in table 6.9-2 plus market value of equity. Column (2) reports estimations for the second regression model. Five variables with more significant coefficients from model (1) are included in this model. Column (3) presents estimations for the third regression model. In this model three more significant independent variables from model (2) are used. Finally, column (4) report coefficient estimations for the last model in which only two independent variables, including Diversifying and Leverage are used. Diversifying is a dummy variable that takes value of 1 if acquirer and target are from different 4 digits SIC industries and 0 otherwise. Cash is a dummy variable that takes value of 1 if an acquisition is paid 100% by cash and 0 otherwise. RelWACC is the ratio of WACC of target to the WACC of acquirer. RelSize is the ratio of market value of equity of the target to the market value of equity of the acquirer on third Thursday of the month preceding month of acquisition announcement. Leverage is the ratio of long-term debt of acquirer to market value of equity of the acquirer. Liquidity is the ratio of cash and short-term investments of the acquirer deflated by total assets of the acquirer. BTM is book to market equity ratio of the acquirer. Size is market value of equity of the acquirer on third Thursday of the month preceding month of acquisition announcement. The variables are winsorized at 0.1% and 99% levels to prevent distortions by outliers. *t*-statistics are reported in brackets and p values are reported in parentheses.

* significance at 10% level.

**Table 12 - Components of the TVA, diversification and acquirer's leverage**

| | (1) | (2) |
|---|---|---|
| | **Earnings synergies** | **Effect of $WACC_{P-A}$** |
| Intercept | 0.087* | 0.017* |
| | [1.74] | [1.74] |
| Diversifying | -0.0631 | |
| | [-1.17] | |
| Cash | -0.047 | 0.046*** |
| | [-0.81] | [3.01] |
| Leverage | | -0.102** |
| | | [-2.38] |
| Liquidity | -0.075 | |
| | [-0.63] | |
| $R^2$ | 0.07 | 0.25 |
| *N* | 68 | 68 |

This table reports findings regarding relationship between value effects and the factors that best explain them. Column (1) reports relationships between earnings synergies and the independent variables. Column (2) reports relationships between value effect of $WACC_{P-A}$ and the independent variables.

*Significance at 10% level.

**Significance at 5% level.

***Significance at 1% level.