

Net Present Value of Acquisitions

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Abstract

This paper discusses sources of value in acquisitions. Using the discounted cash-flow valuation method, we develop a model that explains sources of economic gains that can be attained through mergers. The model identifies three major sources of value in mergers, each of which can reduce or contribute to the combined wealth effect of a takeover deal. The overall value of the deal is a sum of the impacts of these factors on the combined value. The main contribution of this study is to highlight the role of the difference between the combined firm's weighted average cost of capital and that of the acquirer and the target in value creation through mergers. The model suggests that this difference, along with the operating synergies, can explain total value effects of mergers.

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1. Introduction

What are the sources of value in mergers? This has been a leading question in the mergers literature for more than 40 years. Jensen and Ruback (1983) state that “knowledge of the sources of takeover gains still eludes us”. Although several studies have addressed this question since 1983, similar statements were reiterated by other scholars in the arena. For example, Andrade et al. (2001) state, “We hope that over the next decade merger research will move beyond the basic issue of measuring and assigning gains and losses to tackle the more fundamental question of how mergers actually create or destroy value”. In this paper we address the opening question in a different way by developing a discounted cash-flow model in order to explore the possible sources of merger wealth effects.

An influential body of research investigates the value effects of mergers. Yet, there is relatively little known about the mechanisms through which mergers influence shareholder wealth. Most prior investigations in this area focus on potential synergies and changes in expected cash-flows as factors that can explain the overall value-enhancing effect of mergers (Berkovitch and Narayanan, 1993; Bradley et al., 1983, 1988; Caron and Jeffrey, 1999; Chatterjee, 1992; Devos et al., 2009; Firth, 1978; Hackbarth and Miao, 2012; Harrison et al., 1991; Stan Xiao and Royston, 2004). However, as the discounted cash-flow model of valuation suggests, there is another important factor that can affect the value of mergers. This is the rate at which future cash-flows are discounted. This paper does not intend to analyse how the value created through mergers is divided between the acquirer and the target. Rather, it explains how mergers can create or destroy value as suggested by findings of prior empirical studies.

Prior empirical investigations provide evidence suggesting that, overall, mergers create value (Andrade et al., 2001; Healy et al., 1992; Lang et al., 1989; Wang and Xie, 2009). In other words, the combined wealth effect of mergers on the acquirer and target shareholders is positive, on average. A model of net present value of mergers is developed in this paper. The model yields predictions about the ways through which mergers can create value. Specifically, it demonstrates how discounting future cash-flows of a target at the rate of weighted average cost of capital (WACC) of the merged firm can be value enhancing.

A summary of studies on the combined wealth effects of takeovers is shown in Table 1. These findings show that although acquirers fail to enhance shareholder value through mergers, the average combined value gain to targets and acquirers is significantly positive. As Shleifer and Summers (1988) point out, if the value gains through mergers are merely transfers of wealth from other stakeholders to shareholders, they do not represent efficiency improvements. However, reviewing redistribution theories and related empirical studies, Jarrell et al. (1988) conclude that little evidence has been found to support substantial wealth transfers from any group. Andrade et al. (2001) support this argument. The question that this paper addresses is: if acquisitions generate value for shareholders and this value is not transferred from other stakeholders, then what are its possible sources?

[Insert table 1 here]

This paper is related to several other studies seeking sources of gains from mergers. Among recent studies, Devos et al. (2009) investigate three potential sources of merger gains, namely, productive efficiencies, tax savings and increased market power. Their findings suggest that the main source of gains from mergers is better

utilization of available resources in the economy rather than tax savings and exercising market power. Wang (2009) provide evidence that suggests transfer of control from poorly managed targets to well-governed acquirers is a source of synergistic gains in takeovers. Their findings are consistent with those of Lang et al. (1989) and Servaes (1991) who find well-managed acquirers with higher Tobin's Q compared to their targets generate higher total gains. Almeida et al. (2011) show that even in the absence of operational synergies, liquid firms acquire financially distressed firms in their industries in order to reallocate liquidity to firms that are otherwise inefficiently terminated.

Although our model includes possible sources of synergies proposed by prior studies it is different in four specific ways. First, it sees merger gains as an accumulation of different sources of gains that may vary in extent across merger deals, rather than looking for a single dominant source that can explain the wealth creating character of mergers. Second, it does not assume that the sum of the elements that affect acquisition value is positive for every takeover in the population. Third, rather than focusing on abnormal operating performance measures as evidence of synergistic gains, it explains that the net present value of acquisitions is affected by changes in both future cash-flows and cost of capital. Improvements in operating performance of a firm do not necessarily result in a greater present value, as the cost of capital may increase simultaneously, for example due to higher risk of investment in the combined firm. Finally, this study suggests a novel source of gain, which is related to the difference between cost of capital of the target company and the combined entity.

The remainder of the paper is organized as follows. Section 2 constructs a discounted cash-flow model which identifies main sources of value in mergers.

Section 3 discusses implications of the model in relation to prior empirical studies. Three subsections provide discussions about synergies, reduction in cost of capital of the acquirer, and discounting prospect cash-flows of the acquired firm at a lower rate as three main sources of value. Section 4 Draws the key issues raised in the paper and draws conclusions.

2. 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:

$$NPV = \lim_{T \rightarrow \infty} \sum_{t=0}^T \frac{FCF_t}{(1+c)^t} \quad (1)$$

Where:

NPV = Net Present Value

FCF_t = Future cash flow generated at period t

t = Number of periods that FCF_t is discounted for

T = Total number of periods

c = Cost of capital

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

$$NPV_A = \lim_{T \rightarrow \infty} \sum_{t=0}^T \frac{FCF_{A,t}}{(1+c_A)^t} \quad (2)$$

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:

$$NPV_G = \lim_{T \rightarrow \infty} \sum_{t=0}^T \frac{FCF_{G,t}}{(1+c_G)^t} \quad (3)$$

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):

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

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:

$$NPV_P = \lim_{T \rightarrow \infty} \sum_{t=0}^T \frac{FCF_{A,t} + FCF_{G,t} + FCF_{S,t}}{(1+c_P)^t} - FCF_{P,0} \quad (5)$$

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:

$$NPV_D = NPV_P - NPV_A \quad (6)$$

Or²,

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

Rearranging equation (7) we have:

$$\begin{aligned} NPV_D = & \\ & \left(\sum_{t=0}^T \frac{FCF_{S,t}}{(1+c_P)^t} - M_D \right) + \\ & \left(\sum_{t=0}^T \frac{FCF_{A,t}}{(1+c_P)^t} - \sum_{t=0}^T \frac{FCF_{A,t}}{(1+c_A)^t} \right) + \left(\sum_{t=0}^T \frac{FCF_{G,t}}{(1+c_P)^t} - \sum_{t=0}^T \frac{FCF_{G,t}}{(1+c_G)^t} \right) \end{aligned} \quad (8)$$

Combined value of an acquisition is sum of NPV_D and M_D :

$$\begin{aligned} NPV_D + M_D = & \\ & \sum_{t=0}^T \frac{FCF_{S,t}}{(1+c_P)^t} + \\ & \left(\sum_{t=0}^T \frac{FCF_{A,t}}{(1+c_P)^t} - \sum_{t=0}^T \frac{FCF_{A,t}}{(1+c_A)^t} \right) + \left(\sum_{t=0}^T \frac{FCF_{G,t}}{(1+c_P)^t} - \sum_{t=0}^T \frac{FCF_{G,t}}{(1+c_G)^t} \right) \end{aligned} \quad (9)$$

Equation 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 ($\sum_{t=0}^T \frac{FCF_{S,t}}{(1+c_P)^t}$); (2) the difference between pre- and

² For brevity $\lim_{T \rightarrow \infty} \sum$ is written as \sum hereafter.

post-merger present value of future cash-flows of the acquirer $(\sum_{t=0}^T \frac{FCF_{A,t}}{(1+c_A)^t} - \sum_{t=0}^T \frac{FCF_{A,t}}{(1+c_A)^t})$; and (3) the difference between pre- and post-merger present value of future cash flows of the target $(\sum_{t=0}^T \frac{FCF_{G,t}}{(1+c_P)^t} - \sum_{t=0}^T \frac{FCF_{G,t}}{(1+c_G)^t})$. 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.

3. Implications of the model

3.1 Synergy gains

We start with synergy gains which are reflected in the model as the component including all changes in future cash-flows of the combined firm that occur due to the acquisition. Prior studies suggest several sources for such changes. Operating cash-flows may increase due to increase in revenues or reduction in production and distribution costs. Theory suggests that this may occur either as a result of efficiency improvements or through exercise of market power by the merged firm. However, an improvement in market power is not supported by most prior empirical research. Theory also suggests that efficiency improvements might be related to better post-merger governance or eliminating inefficient management. Wang and Xie (2009) find that synergy gains from acquisitions have a positive relationship with stronger acquirer's shareholder rights relative to the target's. They conclude

that acquisition of firms with poor corporate governance by well-governed firms creates greater combined value.³

Operating cash-flows can also improve because of economies in capital expenditures and decrease in working capital. Devos et al. (2009) show that these types of investment cutbacks have a significant impact on operating synergies in mergers. Mergers can also improve future cash-flows of the combined firm through offering new investment opportunities. Wang and Xie (2009) argue that when a bidder with good investment opportunities acquires a target with poor investment opportunities, the combination may create value because after the transaction, the target's assets will be used to exploit the better investment opportunities available to the bidder. John et al. (2008) suggest that better investor protection could lead corporations to undertake riskier but value enhancing investments. Their argument is consistent with findings of Wang and Xie (2009) regarding the difference between shareholder rights of the acquirer and the target in relation to acquisition synergies.

Enhancement in operating cash-flows is especially important in the case of related mergers where merging firms are likely to enhance their combined operating income or reduce their operating costs through merging their operational activities. Rhodes-Kropf and Robinson (2008) suggest that similarity and asset complementarity motivate mergers. Hoberg and Phillips (2010) provide evidence that acquiring firms that offer asset complementarities but are also different from rival firms in the industry, provide significant synergy gains. If present value of

³ Better governance can also reduce cost of capital. We discuss this issue in the next section: "Mergers and cost of capital of the combined".

future cash-flows generated through such synergies is greater than zero then the merger is value creating, *ceteris paribus*. However, diversifying mergers are unlikely to reduce operating costs or enhance operating incomes significantly (Maquieira et al., 1998). Thus, in such mergers, this part of the model is negligible. In fact, it is not able to explain value creation through diversifying mergers, which were especially popular in 1960s, where findings of prior empirical studies show that the combined value effects of such mergers are positive as well and even greater (e.g. Bradley et al., 1988). If synergy gains cannot explain acquisition returns completely, then we need to question what the other possible sources of value in mergers are.

3.2 Mergers and cost of capital of the combined firm

Holmstrom and Kaplan (2001) point out that leveraged takeovers in the 1980s forced managers to recognize the cost of capital. They argue that it was no longer possible for managers to treat capital as costless because of the strong financial discipline imposed on them by the high amount of debt incurred in the leveraged takeovers during the 1980s. This situation is in contrast with the perceived cost of capital in firms with a low degree of leverage. Holmstrom and Kaplan (2001) suggest that this change in perception of cost of capital motivated the creation of performance metrics like Economic Value Added (EVA) and Total Business Return (TBR), which measure returns net of the cost of capital. Managers are then monitored and compensated on the extent to which the return on capital exceeds the cost of capital.

Jensen and Ruback (1983) suggest that financial motivations including underutilized tax shields, increased leverage, and other types of tax advantages can drive mergers. Hayn (1989) provides empirical evidence that shows tax attributes of

target firms are significant in explaining abnormal returns. She finds that the amount of net operating loss which may be carried forward is the most important tax attribute in tax-free acquisitions during the period 1970-1985⁴. Recently, Devos et al. (2009) report that the interest tax shield accounts for 17% of synergy gains realized in their sample of 246 large US mergers from 1980 to 2004.

Prior studies focus on leverage and tax benefits of mergers. Using a related but different approach we analyse the impact of acquisitions on components of WACC including leverage and interest tax shields. We suggest that a tax shield is only one of the components of WACC that can be affected by merger activity. Mergers' impact on WACC is complex and the aggregate impact may vary in different acquisitions. We define WACC as:

$$c = w_d(1 - T)r_d + w_e r_e \quad (10)$$

Where

c = weighted average cost of capital

T = tax rate

w_d = weight of debt

r_d = cost of debt

w_e = weight of equity

r_e = cost of equity

⁴ Tax Reform Act of 1986 strictly restricted the use of net operating loss carry-forwards in mergers which may partially explain the decline observed in combined abnormal returns of mergers reported by studies which investigate post-1986 samples as presented in Table 1.

Our model suggests that once an acquisition is completed, net present value of the combined firm is determined through discounting future cash-flows at the rate of WACC of the new combined entity. This new discount rate is different from WACC of the acquirer and the target. It can be affected by leverage ratio of the combined firm, the new tax rate applied to incomes of the firm, revised cost of debt and revised cost of equity. We argue that these factors are subject to dramatic changes around mergers and can be very different from that of the merging firms, when it is determined for the resulting combined firm. Consequently, the appropriate discount rate of the discounted cash-flow model for the combined firm is different from the discount rates of the merging firms. We specifically emphasize the influence of method of payment on WACC of the combined firm.

The magnitude of change in components of WACC may vary across acquisitions and depends on a number of decisions made by acquirers regarding the merger, mainly choice of target and method of payment. Target characteristics such as beta, size and leverage influence WACC of the combined firm. *Ceteris paribus*, acquiring riskier assets generally increases expected return on equity, and therefore cost of equity capital of the combined firm would be relatively higher than that of the acquirer. Size and leverage of the target firm in conjunction with method of payment affects size of the combined firm and its leverage. The larger the target, the greater either the size of the combined firm or its leverage. Consequently, cost of capital is affected as size and leverage are two determinants of WACC.

Prior studies suggest that characteristics of the acquirer, industry and economy-wide conditions may affect choice of target and method of payment. For example, acquirers prefer targets with similar market-to-book ratios as their own (Rhodes-Kropf and Robinson, 2008). Moreover, smaller firms and firms with lower levels of

debt are more likely to be acquired (Garvey and Hanka, 1999). Besides, in choosing a target firm and planning method of payment, acquirers consider current variation from their target leverage (Harford et al., 2009; Uysal, 2011). García-Feijóo et al. (2012) show that method of payment is affected by industry structure. Moreover, empirical studies suggest that stock payments are more common during high stock valuation periods (Jovanovic and Rousseau, 2001; Maksimovic and Phillips, 2001).

These factors that influence acquirer decisions are related to WACC of the combined firm. Leverage is determined by weight of debt and weight of equity in the capital structure of a firm. Thus, it is affected by changes in either debt or equity. It increases (decreases) with the level of debt (equity) in the capital structure. According to the trade-off theory of capital structure, firms have target debt levels which are reached when they trade off tax benefits of debt financing against financial distress costs (Modigliani and Miller, 1963) and agency costs of debt (Jensen and Meckling, 1976). We argue that in the case of acquisitions, target leverage of the combined firm, where WACC is minimized, is not necessarily the same as target leverage of the acquirer. Since method of payment is the most effective tool in hand that can be used to adjust the capital structure of the combined firm, it takes an influential role in determining its WACC and therefore NPV of the acquisition.

When acquisitions are paid by cash, their source of funding is usually debt. This method of payment retires equities of the target firm and replaces them with debt for the combined firm. As a result, leverage of the combined firm resides in at a higher level compared to that of the acquirer. Stock-paid acquisitions have an opposite impact. They increase the portion of stocks in the combined firm's capital structure. However, it does not necessarily mean that leverage of the combined firm is lower

than the acquirer, because the combined firm will still have the debt of the target firm in its capital structure. In fact, the leverage ratio of the combined firm can be estimated as weighted average of leverage ratios of the acquirer and the target. The mix of payments by cash and stock can tune the impact that the method of payment has on the leverage of the firms. Harford et al. (2009) show that when planning large acquisitions, acquirers take into account their target leverage. When a bidder's debt level is over its target level, the bidder is less likely to finance the acquisition with debt and more likely to finance the acquisition with equity. Their finding supports our proposition about the role of method of payment when adjusting capital structure of the combined firm.

Other components of WACC can also be affected by takeovers. Tax rates applied to corporate incomes can make a difference in WACC. Especially, in cases of cross-border mergers where tax rates may essentially vary from country to country and international double taxation increases the amount of tax applied to the combined firm's income. For example, Huizinga and Voget (2009) show that the international tax system systematically affects the choice of parent country in cross-border mergers in a parent-subsidiary relationship framework. In fact, merging firms choose the parent entity in a way that minimizes their international double tax liabilities. Huizinga and Voget's finding emphasizes the fact that tax considerations affect value of acquisitions, and therefore, decisions of the acquirers.

Another element of WACC that can be influenced by merger activity is cost of debt. Cost of debt is expected to increase with the level of debt as the credit rating of a firm downgrades with higher risk of default and potentially bankruptcy where the firm is unable to repay its debt to creditors. That is, debt holders of firms with higher leverage expect higher yields. Therefore, if a merger drives the cost of debt

beyond its optimum level, according to trade off theory of capital structure, an acquisition can be value destroying as it increases the cost of capital. Likewise, if it deleverages the combined firm in a way that pushes interest tax shields below or increases agency costs of debt to points above the optimum point, it may destroy value as well.

In addition, cost of equity capital, measured as expected return on equity, can be affected by risk factors, such as beta in the capital asset pricing model (CAPM) (Black, 1972; Da et al., 2012; Lintner, 1965; Sharpe, 1964) and the size and book-to-market ratio (B/M) of a firm (Fama and French, 1992, 1993). Beta, as a measure of relative risk, is a conventional determinant of expected return, i.e. the higher the beta, the higher the expected return. Although, the validity of CAPM in estimation of expected returns on equity of firms has been criticized by several studies, Da et al. (2012) show that the empirical evidence against CAPM based on stock returns does not invalidate its use for estimating the cost of capital for projects in making capital budgeting decisions. A difficulty is that the beta of the combined firm is not immediately available on completion of a merger because historical data on its stock prices do not exist. However, it can be calculated as beta of a pseudo portfolio of the acquirer and the target, i.e. weighted average beta of the merged parties. This can range between betas of the acquirer and the target and typically tends to be similar to that of the acquirer due to its greater weight in the pseudo portfolio. Acquiring riskier assets (target firms) means the combined firm will be riskier than the acquirer and therefore the expected return on its equity (i.e. its cost of equity) will be greater than the expected return on acquirer's equity and vice versa.

Size, or market value of equity, is another determinant of expected return. Generally, smaller firms are expected to provide greater returns. Size of the

combined firm depends on size of the acquirer, size of the target, and also method of payment. Acquisitions, typically, increase size of the acquirers. Thus, the return on equity of the combined firm is generally expected to be lower than that of the acquirer. However, when the acquirer uses cash as medium of exchange, the size of the combined firm remains equal with the size of the acquiring firm. Therefore, size may not affect the difference between expected returns of the acquirer and the combined firm in this case. In mixed acquisitions, where payment is made through a combination of cash and stock, ratio of cash-to-stock payment can be used as a tool to adjust size of the combined firm.

Book-to-market ratio (B/M) is the other factor that is suggested to explain expected return on a firm's equity. Prior investigations suggest that firms with higher B/M typically have greater expected returns. B/M of the combined firm depends on B/M of the acquirer and target and also method of payment. In cash-paid takeovers, B/M ratio of the combined firm is expected to be smaller than that of the acquirer, because the merger adds to the market value but not to the book value of common equity of the acquirer. In stock-paid acquisitions both book value and market value of the combined firm can be estimated as sum of the respective values of the acquirer and the target. Nevertheless, since B/M ratios of the parties are normally similar (Rhodes-Kropf and Robinson, 2008) we do not expect significant differences in B/M between the acquirer and the combined firm in stock acquisitions. Similar to its effect on size, cash-stock combination determines B/M of the combined firm in mixed-paid acquisitions.

3.3. Post-merger NPV of target's cash-flows

Another fact that has received even less attention is that when calculating NPV of mergers, future cash-flows of the target should be discounted at the rate of WACC

of the acquirer once the acquisition is complete. If WACC of the combined firm is greater than WACC of the target then the merger destroys value in this part of our model. In contrast, when WACC of the combined firm is smaller than WACC of the target, the acquisition can be value-creating even in absence of operating synergies and reduction in WACC of the acquirer. Here again, pre-merger size and leverage of the acquirer and the target, along with method of payment, determine the new appropriate discount rate for future cash-flows of the acquired firm. Lower risk, larger size or lower B/M of the combined firm, compared to the target firm, results in lower cost of equity which in turn enhances the present value of future cash-flows of the target. Likewise, if the target is underleveraged and has unutilized debt capacity, a debt financed acquisition can utilize this capacity and create value. Moreover, when the target firm is overleveraged, the acquirer can use stock or its cash reserves to retire part of the debt of the acquired firm, resulting in minimum cost of capital of the combined firm and value creation. In this sense, it is possible to create wealth through mergers even without generating synergistic cash-flows. The greater the difference between WACC of the combined firm and the target, the greater the value created in a merger through reallocation of capital. This is consistent with the neoclassical view of mergers which suggests mergers reallocate capital to value enhancing activities.

Counter scenarios are also possible, perhaps due to the agency problem on the acquirer side, or because of misestimating the extent of value-creation by the acquirer managers. For example, an incorrect combination of the medium of exchange, unsuitable sources for financing a takeover deal, or selecting a target firm with inappropriate size or leverage - whatever the underlying motivation - destroys value. If these counter scenarios take place, we expect the acquisition to decrease

value of the prospect cash-flows of the acquired firm. This, in turn, results in lower total value of the acquisition.

Improvement in quality of governance can also reduce cost of capital and result in higher valuation of the prospect cash-flows of the acquired firm. Thus, if the combined firm provides better governance than the acquired firm, and everything else being equal, we expect higher value for its future cash-flows as part of the cash-flows of the combined firm. Prior studies in this area investigate the effect of investor protection on the cost of capital (Castro et al., 2004; Shleifer and Wolfenzon, 2002). These studies suggest that better investor protection reduces cost of capital. In this sense, acquisition of firms located in countries with poor minority investor protection by firms from countries with strong investor protection decreases cost of capital and creates value. This value cannot be attributed to improvements in operating profits nor to lower cost of capital of the combined firm relative to the acquirer. Such value creations solely result from the difference between cost of capital of the combined firm and cost of capital of the target.

4. Concluding remarks

We present a discounted cash-flow model for the combined value effect of acquisitions. Our model explains how mergers can create or destroy value depending on synergy gains and the relative WACC of the combined firm compared to WACC of the acquirer and the target. Value effect of mergers consists of three main components. The first component of value effect comprises different synergy effects of acquisitions discounted at the rate of WACC of the combined firm. This includes efficiency improvements resulting from economy of scale and scope, better governance, and new investment opportunities. The second component is merely

related to the discount rates at which the future cash-flows of the acquirer should be discounted prior and subsequent to the merger. The third component of value effect is a function of the difference between WACC of target and that of the combined firm. Our model suggests that the total value effect of any given merger is equal with the aggregate impact of these three components.

The model does not make any prediction about the outcome of the mergers and the magnitude of their effect on the combined value of the merging firms. Instead, it explains how mergers can be value creating or value-destroying. It proposes that three key elements of the model in relation to characteristics of the target, such as size and leverage, and industry and economy-wide conditions determine the extent to which mergers create or destroy value. However, since non value-creating mergers are less likely to be launched, it is plausible that undertaken mergers create value, on average. In any given set of industry or economic conditions, there are at least two variables as adjustment tools in the hands of decision makers which can determine the total value of acquisitions: choice of target, and method of payment. While characteristics of the targets available for merger determine the limits of profitability of any takeover activity, significant influence of method of payment on leverage, size and B/M of the combined firms gives it a key role in determining WACC of the combined firm.

Our model is consistent with the neoclassical theory of mergers (Harford, 2005; Mitchell and Mulherin, 1996) which explains how industry and economy-wide shocks, such as technology developments and deregulation, can cause merger waves. In the absence of such shocks possible gains from undertaking acquisitions are generally less than expected costs. Takeover activity thus remains at a low level waiting for a change in the macro environment. Economy-wide and industry shocks

bring opportunities for value creation through mergers and trigger the waves. Under the new conditions, the combination of acquirer and target firms is an option to utilize these opportunities and take advantage of synergies or reductions in the cost of capital. For example, Andrade et al. (2001), among others, emphasise the role of deregulation as a key driver of merger waves. Ovtchinnikov (2010) shows that deregulation affects leverage decisions of firms in the deregulated industries as well as the determinants of capital structure. She suggests that following deregulation, overleveraged firms are likely to issue equity and reduce leverage. One of the possible ways through which the new issued equities can be used is undertaking acquisitions. This is consistent with an increase in number of the equity-paid takeovers during the merger waves reported by prior empirical studies (e.g. Rosen, 2006).

The discounted cash-flow model of this study has a number of empirical implications which are not yet tested. First, method of payment influences the combined value effect of mergers. The direction and magnitude of this impact varies across mergers and is conditional upon size and leverage of the merging firms and the environmental conditions. Second, when acquirers use stock as a medium for payment in mergers, it is likely that the combined firm would otherwise be overleveraged. Finally, highly leveraged targets are less likely to be acquired by cash.

The model can be extended considering that acquirers can plan multiple acquisitions to maximize value of the combined firm. In such multiple acquisition plans, synergy gains and cost of capital of the combined firm will depend on characteristics of the acquirer and all targets. The combined firm can also take advantage of synergies between the multiple target firms even if one-on-one acquisition of each of the

targets does not create synergies. Cost of capital of the combined firm will depend on the leverage and other factors that determine cost of capital of the acquirer and the targets, and also method of payment and value of multiple deals.

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Table 1**Key extant studies addressing overall wealth effect of mergers**

Author(s)	Period	Sample Size	Event window	CAARs (%)		
				Acquirer	Target	Combined
Wang and Xie (2009)	1990- 2004	396	(-5, +5)	-2.91 ^a	21.52 ^a	0.97 ^b
Bhagat et al. (2005)	1962-2001	1018	(-5, +5)	0.18	30.01 ^a	5.27 ^a
Andrade et al. (2001)	1973-79	598	(-1, +1)	-0.3	16.0 ^a	1.5
	1980-89	1,226		-0.4	16.0 ^a	2.6 ^a
	1990-98	1,864		-1.0	15.9 ^a	1.4 ^a
Mulherin and Boone (2000)	1990-99	281	(-1, +1)	-0.37	21.2 ^a	3.56 ^a
Smith and Kim (1994)	1980-86	177	(-5, +5)	0.50	30.19 ^b	8.88 ^b
Healy et al. (1992)	1979-84	50	(-5, close)	-2.2	45.6 ^a	9.1 ^a
Franks et al. (1991)	1975-84	399	(-5, +5)	-1.02 ^c	28.04 ^a	3.90 ^a
Lang et al. (1989)	1968-86	87	(-5, +5)	0.01	40.30 ^a	11.31 ^a
Bradley et al. (1988)	1963-68	74	(-10, +20)	4.09	18.92 ^a	7.78 ^a
	1968-80	127		1.30	35.29 ^a	7.08 ^a
	1981-84	203		-2.93 ^a	35.34 ^a	8.00 ^a

^a significance at 1% level.

^b significance at 5% level.

^c significance at 10% level.