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Abhandlungen

Who Should Merge with Whom? Financial Benefits and Costs from Mergers and Acquisitions

By Christian Koziol, Hohenheim, and Markus Theis, Vallendar

I. Introduction

To evaluate the performance of mergers and acquisitions (M&A), long term-oriented measures such as the post-n-year stock return are regarded. These long-term measures, however, disregard immediate effects on equity and debt holders' wealth at the point in time when a merger or an acquisition takes place. This value impact stems from the fact that a new firm with a new asset and a new liability side arises, which has the following consequences: Firstly, debt obligations of the single firms are no longer backed by the corresponding assets, but the entire debt of both firms can be considered as a whole, being backed by the total assets of both firms after a deal. Secondly, the riskiness of assets of the new firm can be different from the riskiness of the initial firms due to diversification effects. Thirdly, the way of transaction financing, by raising new debt in contrast to an exchange of shares, can increase total assets as well as total liabilities of both firms involved. Depending on these multiple factors, the equity holders' wealth might be positively or negatively influenced by M&A activities even in the absence of (operating) synergies.

These economic owners, who can approve M&As or veto against them, should focus not only on the long-term effects of a deal, but must also account for the immediate price impacts on their positions. Since such wealth changes for the equity holders come from financial effects, we denote them as financial benefits in cases of gains of their positions and financial costs otherwise. Equity holders should anticipate these financial consequences associated with mergers and acquisitions. Apparently, the deal structure and the characteristics of the involved firms are major drivers of the financial benefits or costs. Hence, for a sound decision making process, it is crucial to know when M&As result in financial benefits and which cases lead to financial costs for the equity holders. In other words,

we want to shed light on the important question in corporate finance, which firms are well-suited candidates for M&As and which are not.

The goal of this paper is to analyze the financial benefits and costs of M&A deals. For this purpose, we capture the consequences when (i) two firms merge and (ii) a target firm is acquired by a company, that raises external funds via new debt. Our analysis is based on a capital structure model a la *Leland* (1994) in order to compute the wealth effect for equity holders, which is closely linked to the position of credit risky debt. Consequently, endogenous changes of credit risk are crucial for our analysis of the equity position in M&A deals. In particular, we consider the influences of operating synergies, target business risk as well as relative size and relative leverage of an acquirer and a target. M&A announcements thus not only affect stock price movements, but also the market for credit risk derivatives. A prominent example for immediate reactions of the latter was the $11bn takeover of *Organon Biosciences by Schering-Plough* in 2007. Within one day, *Schering-Plough* 5YR SEN CDS spreads widened by approximately 40 % (from 12.5 to 17.5 bps) as a result of the debt financed acquisition. We will use these theoretical relations to carry out an empirical test for the change of acquiring firm's debt values by an event study of corresponding CDS spreads.

The idea of financial synergies from mergers was first introduced by *Levy/Sarnat* (1970), *Lewellen* (1971) and *Lintner* (1971), who find a coinsurance effect for debt, when combining businesses whose cashflows are less than perfectly correlated. *Lewellen* (1971) argues that corporate diversification leads to tax benefits from an increased debt capacity. While *Scott Jr.* (1977) and *Sarig* (1985) introduce negative cash flow and thus financial effects from mergers, however, especially the wealth transfers between different claimholders are not obvious. *Ammann/Verhofen* (2006) are first to apply *Merton's* (1974) capital structure model to examine the conglomerate discount for equity holders. Well aware of the problems that arise when combining lognormally distributed cashflows, *Leland* (2007) limits his own structural model to a two period case a la *DeAngelo/Masulis* (1980) and *Kale/Noe/Ramirez* (1991) to explain purely financial synergies of separation in contrast to mergers. Other papers, such as *Morellec/Zhdanov* (2005, 2008) base comparative static analysis of mergers on reduced from modeling. In contrast to these authors, we explicitly formulate fundamental differences between mergers and acquisitions in a structural framework. A comparative static analysis allows us to identify well-suited partners under both types of deals.

The remainder of the paper is organized as follows: The structural framework to model mergers and acquisitions is introduced in the following section II. In section III, we demonstrate the economic effects of mergers and acquisitions for the acquirer's equity holders. Empirical observations from M&As are illustrated in section IV. Section V concludes.

II. Modeling Mergers & Acquisitions

Mergers and acquisitions are both prominent forms of transactions that lead to a change of corporate control. While various definitions exist to separate mergers from acquisitions, the fundamental difference lies in the disposition of target equity holders' co-determination rights. In corporate mergers, all claims of equity and debt holders against the merging firms survive a transaction. A deal initializing company usually issues new shares, equipped with exclusive subscription rights for the owners of its merger partner. An exchange of shares settles the deal in a way that the latter receive this additional equity claim against the newly arising company, which then combines the assets of both firms. The consequence for the shareholders of the acquiring firm is that their claims are backed by both companies' assets after the deal, however, their holding of the new firm is diluted (relative to the initial holding of the acquiring firm).

In contrast to that, an acquisition leads to a retirement of target equity holders' co-determination rights, since it is settled in cash as compensation for their former claims. On the one hand, this process prevents a dilution of acquirer shareholders' voting rights, because no additional equity position comes into play. On the other hand, however, the asset side of the acquiring firm is affected due to a cash outflow as acquisition currency.

As a result of the specific merger and acquisition deal structures, the new claims against an arising company are consequently backed by another asset composition than prior to a deal. This is of particular importance for the credit risky position of debt holders. In accordance with the early coinsurance intuition, it is a big difference whether the outstanding debt is aggregated in one new position and backed by the entire assets in comparison to two separate entities, where every debt position is only backed by one of the firms. For example, if one firm defaults and the other one is still solvent, the advantage for debt holders of the defaulting firm after a merger or an acquisition is that they might benefit at the

costs of the solvent firm. These wealth transfers are important effects in M&A deals, which have consequences not only for debt holders, but also for the equity holders of the firms.

For the analysis of wealth effects from M&A transactions, we apply a structural model for credit risk such as presented by *Leland* (1994). In line with *Merton* (1974), we understand claims towards a company as options on the asset value of a firm. While *Merton* (1974) and early extensions assume a world without frictions, *Fischer/Heinkel/Zechner* (1989) and *Leland* (1994) are first to derive tractable solutions, when taking corporate taxes and insolvency costs into account. The advantage of all these structural models is that they allow for an endogenous determination of credit risky debt values as well as of the corresponding credit spreads. Hence, they are well-suited for the analysis of mergers and acquisitions, since deal-specific changes of the underlying that have an immediate impact on equity and debt claims, backed by the latter, can endogenously be modeled. Tax effects and bankruptcy costs are meaningful for the analysis of the optimal capital structure. Since the focus of this paper is on the consequences of M&A deals for arbitrarily financed firms, however, taxes and bankruptcy costs play a minor role and will therefore be disregarded in our analysis. Given that the firm's assets U follow a geometric Brownian motion, markets are free of arbitrage, a constant risk-free rate r exists, and firms have perpetual debt outstanding, we can apply the following, prominent expressions for time-independent pricing of credit risky equity $S(U,C)$ and debt $D(U,C)$ as derived in *Black/Cox* (1973) or *Leland* (1994):

$$S(U,C) = U - \frac{C}{r} + \left(\frac{U}{U_B}\right)^{-\frac{2r}{\sigma^2}} \left(\frac{C}{r} - U_B\right) \tag{1}$$

$$D(U,C) = \frac{C}{r} + \left(\frac{U}{U_B}\right)^{-\frac{2r}{\sigma^2}} \left(U_B - \frac{C}{r}\right) \tag{2}$$

$$\text{where } U_B = \frac{C}{r + \frac{1}{2}\sigma^2}$$

Equity $S(U,C)$ and debt $D(U,C)$ claims against individual companies primarily depend on the current value of unlevered assets U and the coupon C of outstanding perpetual debt. In addition to that, the company-specific business risk σ (the instantaneous standard deviation of the asset value return) and the risk-free rate r have an impact on both positions. While the interest rate is the same for an acquiring and a target com-

pany, the combination of company-specific businesses will be key to our specification of a new firm that arises from a M&A transaction. We limit our analysis to complete changes of corporate control, which implies that 100 % of target equity is affected by the deal. Consequently, all acquirer and target assets are carried forward to the arising company.

In order to compute the combined asset value of two merging firms after a deal, we need to explicitly distinguish between mergers and acquisitions. The new asset value of a firm U_3 (unlevered firm value) after a merger is:

$$U_3 = U_1 + U_2 + syn, \tag{3}$$

which is the accumulated value of the assets of the initial firms plus additional operating synergies *syn*. This notation follows the idea of a deal initializing company potentially gaining more than simple target asset value from a transaction.

In case of an acquisition, the formal description is more complex due to the expiring target equity claims and a potential need for external capital so that the new asset value U_3 after an acquisition amounts to:

$$U_3 = U_1 + U_2 + syn - S_2 + D_{new} \tag{4}$$

Here, the new company is again based on the assets U_1 of the acquiring and U_2 of the target company. As key difference to a merger, however, the payment to target equity holders, who receive a compensation equal to the value of their claim S_2 against the target firm, needs to be deducted from this asset value. To finance the cash outflow, external transaction financing D_{new} is introduced in equation (4) by the second summand. While the amount of newly raised debt can be an arbitrary proportion of the required price S_2 of target equity, we will focus on the case of complete debt financing of an acquisition ($D_{new} = S_2$). This treatment implies that the asset value (4) for an acquisition is consistent with the value (3) for a merger. Under fair refinancing conditions, the coupon C_{new} of a newly issued bond can thus implicitly be obtained from the fair value of a claim:

$$D_{new} = \frac{C_{new}}{r} + \left(\frac{U}{U'_B}\right)^{-\frac{2r}{\sigma^2}} \left(\frac{C_{new}}{C_1 + C_2 + C_{new}} \cdot U'_B - \frac{C_{new}}{r}\right), \tag{5}$$

which must be equal to the required capital S_2 for the acquisition. The value D_{new} of the new debt claim with coupon C_{new} has coequal seniority

("pari passu") compared to already outstanding debt D_1 and D_2. Consequently, the company's total coupon payment obligation C_3 is equal to the sum C_1 and C_2 from the companies' earlier contracts, plus C_{new} after such refinancing in case of an acquisition:

$$C_3 = C_1 + C_2 + C_{new} \tag{6}$$

To compute the values of equity and debt after a merger or an acquisition, the volatility σ_3 of the new asset return is further needed. A simple combination of individual acquirer and target risk parameters σ_1 and σ_2 by the two-asset-case of the *Markowitz* (1952) portfolio theory would not be fully correct, as the sum of two underlying lognormally distributed, stochastic variables does no longer follow a logarithmic normal distribution. Since the numerical differences are marginal, we still assume that the new asset value U_3 follows a lognormal distribution, where the volatility σ_3 of the asset return results from the best fit for the sum of the unlevered asset value returns. We simulate the firm values assuming a 10 year horizon for given initial volatilities σ_1 and σ_2 as well as correlation ϱ.

III. Financial Benefits and Costs from M&As

Financial benefits and costs for equity and debt holders of the merging entities are derived from a comparison of their pre- and post-merger positions. While following the economic owners' perspective when looking for well-suited M&A candidates, the close interaction to corporate debt values needs to be highlighted first. Therefore, we want to decompose changes of the acquirers' equity holders wealth into separate components.

Assuming frictionless markets, a company's levered firm value must be equal to its unlevered asset value. Hence, the values of equity and debt of the merging firms sum up to the corresponding values U_1 and U_2:

$$U_1 = S_1 + D_1 \tag{7}$$

$$U_2 = S_2 + D_2 \tag{8}$$

Since the same must hold true for the asset value U_3 of a firm that arises from a corporate merger, the following relationship must be valid:

$$U_3 = S_3 + D_3 = S'_1 + D'_1 + S'_2 + D'_2, \tag{9}$$

where all equity and debt claims, that still exist after such a deal, are indicated by an apostrophe. For an acquisition, the corresponding relationship differs because of the cash outflow to the target equity holders and the newly issued debt D_{new} position:

$$U_3 = S_3 + D_3 = S'_1 + D'_1 + D'_2 + D_{new} \tag{10}$$

Wealth effects for acquirer ΔS_1 and target ΔS_2 equity holders result from the differences between the values of their positions before and after a deal:

$$\begin{aligned} \Delta S_1 &= S'_1 - S_1 \quad & \Delta S_1 &= S_3 - S_1 \\ \Delta S_2 &= S'_2 - S_2 \quad & \Delta S_2 &= 0 \end{aligned} \tag{11}$$

On the left-hand side in expressions (11), a simple difference between pre and post transaction equity values is sufficient to evaluate corporate mergers. For acquisitions, shown on the right-hand side, the acquirer owners' position must be related to all equity S_3 of the new company, because target equity is by assumption paid out at the fair price $\Delta S_2 = 0$. Since debt claims are assigned to the new company under both deal structures, their wealth effects ΔD_1 and ΔD_2 are analogously calculated by simple comparisons of their pre- and post merger values. Using the formal relations (7)–(11) and taking complete debt financing $D_{new} = S_2$ in case of an acquisition into account, we obtain the following relations:

$$\Delta S_1 = syn - \Delta D_1 - \Delta D_2 \ \text{(acquisition)} \tag{12}$$

$$\Delta S_1 + \Delta S_2 = syn - \Delta D_1 - \Delta D_2 \ \text{(merger)} \tag{13}$$

The first expression (12) describes the wealth effect for acquirer equity holders in case of an acquisition, where target equity holders are compensated at fair terms. The second expression (13) describes the total equity wealth effect in case of a merger. Since the equity holders of both parties become owners of the arising firm here, we assume that they are affected to the same relative amounts $\Delta S_1/S_1 = \Delta S_2/S_2$ which yields for the change of acquirer equity holders' wealth:

$$\Delta S_1 = \frac{S_1}{S_1 + S_2} \cdot \left(syn - \Delta D_1 - \Delta D_2\right) \quad \text{(merger)} \tag{14}$$

The corresponding formula for the change ΔS_2 of target equity proceeds in an analogous way. While operating synergies have a positive im-

pact on all claims towards the involved companies, the important interaction between the change of an acquirer's equity position ΔS_1 on the one hand, and corporate debt ΔD_1 and ΔD_2 on the other hand, becomes visible under both mergers and acquisitions in equations (12) and (14). Hence, for an increase $\Delta S_1 > 0$ of acquirer shareholders' wealth, positive synergies $syn > 0$ are not sufficient, but the wealth increase $\Delta D_1 + \Delta D_2$ of the debt holders also matters.

To answer the question which firms are well-suited candidates for M&As, we provide a comparative static analysis of our structural model extensions. Asset values in the base case scenario are $U_1 = 850$ and $U_2 = 100$, which stem from an empirical observation that acquiring companies are on average about 8.5 times bigger than target companies. We assume the acquirer to be 60 % levered with business risk σ_1 of 30 % in contrast to the target, bearing 70 % leverage and risk σ_2 of 40 %. These values follow the idea of a non-financial blue chip company, that were for example in Germany on average 57 % levered prior to the upcoming crisis on international credit markets in 2007, buying a smaller, generally riskier firm. The order of supposed business risks is in line with observations for many firms as reported by *Moody's KMV*. The correlation of income streams ϱ, is moderately positive ($\varrho = 0.3$) assuming horizontal or vertical integration, rather than conglomerate mergers. Being also subject to our ceteris paribus analysis, the base case scenario does not presume any operating synergies ($syn = 0$). Robustness checks, using higher and lower firm- and deal-specific parameter values led to similar economic findings.

Using these parameter values, table 1 documents economically significant wealth effects for all claims involved. Given our base case, there is a strong wealth transfer from equity $\Delta S < 0$ to debt $\Delta D > 0$ which results in a percentage loss of equity equal to 4.88 % due to a merger or 3.29 % due to an acquisition. This base case reveals the costs for equity holders involved in an M&A deal without any synergies. Their position is considerably affected because of a wealth transfer $\Delta D = \Delta D_1 + \Delta D_2$ to the debt holders. In the absence of synergies, it equals $\Delta S = \Delta S_1 + \Delta S_2$ for mergers and ΔS_1 for acquisitions as formulae (12) and (13) show. Hence, the financial costs from a M&A deal stem from an increase of total debt value. This finding $\Delta D > 0$ is intuitive for mergers and consistent to the expected coinsurance effect, where the assets of the formerly other firm now also serve as collateral for the debt. In the case of an acquisition, however, new debt is raised at fair terms. The positive wealth effect on

Table 1

Base Case (Merger vs. Acquisition)

	ΔS	ΔD	ΔS_1	(%)	ΔS_2	ΔD_1	(%)	ΔD_2	(%)
Mer.	−18.04	18.04	−16.58	−4.88	−1.46	−2.94	−0.58	20.99	29.98
Acq.	−11.18	11.18	−11.18	−3.29	0.00	−8.76	−1.72	19.94	28.49

Note: Wealth effects are calculated according to equations (11) to (14), using parameter values: $U_1 = 850$, $U_2 = 100$, $Lev_1 = 0.6$, $Lev_2 = 0.7$, $\sigma_1 = 0.3$, $\sigma_2 = 0.4$, $\varrho = 0.3$ and $syn = 0$. ΔS (equal to $-\Delta D$) denotes the total wealth transfer between equity and debt. ΔS_1 and ΔS_2 denote the individual effects on acquirer and target equity. ΔD_1 and ΔD_2 denote the individual effects on acquirer and target debt. Relative changes (%) always correspond to the preceding column on the left.

the debt value is thus partially reduced by a negative influence resulting from the issuance of this debt, which e.g. increases the danger of a default and reduces the recovery rate in the case of a default. Remarkably, we see that wealth transfers are only in favor of target debt but are negative for acquirer debt in both mergers and acquisitions. This is because the target debt is riskier than the acquirer debt, so that target debt benefits from a deal while acquirer debt becomes part of a comparably riskier claim.

1. Operating Synergies

Given the results of our base case scenario in table 1, the equity positions are loosing in mergers as well as in acquisitions. While this finding is consistent with empirical observations of falling acquirer stock prices, it raises the question what motives are opposed to these financial costs. In this context, operating synergies (*syn*) are most often proclaimed to be the reason for a corporate takeover. While potential sources of these synergies, such as economies of scale or an exploitation of market power, are manifold according to *Bradley/Desai/Kim* (1988), *Andrade/Mitchell/Stafford* (2001) or *Campa/Hernando* (2004), their post-merger realization obviously is the necessary prerequisite for additional gains. According to equations (12) and (13) of our model, synergies lead to supplemental firm value in addition to the simple sum of asset values U_1 and U_2, which should have a positive impact on all claims against the arising company.

Starting from our base case scenario $syn = 0$, table 2 shows the effect of synergies rising up to 50, which implies 50 % of target asset value U_2 in the regarded mergers and acquisitions, respectively. While a general wealth transfer from debt to equity occurs without synergies, additional

firm value is generated for positive synergies $syn > 0$ so that the positions of both, total equity and total debt, can benefit from a merger or an acquisition. For both deal types, synergies have a similar effect on the wealth increase ΔS of equity and ΔD of debt. Strong relative target debt gains $\Delta D_2(\%)$, however, are only slightly increased by additional synergies. Likewise, relative acquirer debt changes $\Delta D_1(\%)$ are still close to zero.

Table 2

Operation Synergies (Merger)

syn	ΔS	ΔD	ΔS_1	ΔS_2	(%)	ΔD_1	(%)	ΔD_2	(%)
0.0	−18.04	18.04	−16.58	−1.46	−4.88	−2.94	−0.58	20.99	29.98
10.0	−9.44	19.44	−8.68	−0.77	−2.55	−1.76	−0.34	21.20	30.28
20.0	−0.81	20.81	−0.75	−0.07	−0.22	−0.59	−0.12	21.41	30.58
20.9	0.00	20.94	0.00	0.00	0.00	−0.48	−0.09	21.43	30.61
30.0	7.85	22.15	7.21	0.64	2.12	0.54	0.11	21.61	30.87
40.0	16.53	23.47	15.19	1.34	4.47	1.66	0.32	21.81	31.16
50.0	25.25	24.75	23.20	2.05	6.82	2.74	0.54	22.01	31.44

Operating Synergies (Acquisition)

syn	ΔS	ΔD	ΔS_1	(%)	ΔS_2	ΔD_1	(%)	ΔD_2	(%)
0.0	−11.18	11.18	−11.18	−3.29	0.00	−8.76	−1.72	19.94	28.49
10.0	−2.68	12.68	−2.68	−0.79	0.00	−7.49	−1.47	20.17	28.82
13.2	0.00	13.15	0.00	0.00	0.00	−7.09	−1.39	20.24	28.92
20.0	5.85	14.15	5.85	1.72	0.00	−6.24	−1.22	20.39	29.13
30.0	14.42	15.58	14.42	4.24	0.00	−5.03	−0.99	20.61	29.45
40.0	23.01	16.99	23.01	6.77	0.00	−3.84	−0.75	20.83	29.75
50.0	31.64	18.36	31.64	9.31	0.00	−2.67	−0.52	21.03	30.05

Note: Wealth effects are calculated according to equations (11) to (14), using parameter values: $U_1 = 850$, $U_2 = 100$, $Lev_1 = 0.6$, $Lev_2 = 0.7$, $\sigma_1 = 0.3$, $\sigma_2 = 0.4$ and $\varrho = 0.3$. ΔS and ΔD denote the wealth effects on total equity and total debt. ΔS_1 and ΔS_2 denote the individual effects on acquirer and target equity. ΔD_1 and ΔD_2 denote the individual effects on acquirer and target debt. Relative changes (%) always correspond to the preceding column on the left. Only in case of a merger, $\Delta S_1\ (\%) = \Delta S_2\ (\%)$.

As a result of these debt value developments, we find that primarily the equity position(s) benefit in ΔS_1 (and ΔS_2) even from little synergies. They receive a large fraction of more than eighty percent of the total synergies ($syn = 50$), while less than twenty percent of the synergies are in

favor of the debt positions. Synergy hurdles for a worthwhile transaction (from the perspective of acquirer's equity holders), increase with higher debt gains from a takeover.

The critical synergies hurdles are $syn = 20.9$ in case of a merger and $syn = 13.2$ in case of an acquisition respectively. Since the total surplus attributes to the acquirers' equity holders in an acquisition (while it is shared with the target equity holders in a merger), disproportionately high acquirer equity benefits indicate a strong wealth exploitation of the debt holders with regard to the additional synergies.

This finding of increasing firm value in a takeover, which comes primarily in favor of the equity position(s), explains real world observations, where especially the economic owners' managements motivate takeovers by potential synergies. Although operating synergies are not presumed in our base case scenario, the attractiveness of mergers and acquisitions can easily be shown, according to the results in table 2. Consequently, even negative results ΔS_1 and/or $\Delta S_2 < 0$ are no strict criterion against a transaction in the following ceteris paribus analysis.

Finding 1 (Operating Synergies): Although mergers and acquisitions might not be beneficial for equity holders without operating synergies, the existence of such synergies increases total firm value, primarily to the benefit of their wealth position.

As a consequence of the fact that the wealth effects of the debt holders are not strongly affected by synergies, we will disregard synergies in what follows. In particular, if the financial benefits or costs of a takeover are higher for some parameter values than for a different set of parameters, this relationship will be robust for different levels of synergies. Thus, we should not understand a negative change ΔS_1 of the acquirer's equity position as a signal to not carry out a takeover, because together with synergies it can be a worthwhile deal. However, if the financial costs are higher in some cases, the advantages of a takeover due to positive synergies will also be lower than in other cases.

2. *Target Business Risk*

In this subsection, we want to find out whether a given acquirer should seek for a target of similar business risk or for another firm with a less risky (or an even riskier) business model, when being concerned about the financial costs for the equity holders. The riskiness of the target is a

main driver for the total risk after a deal, so that it is supposed to have a major impact on the change ΔD of the total debt value and consequently on ΔS of the equity holders. Business risk is expressed by parameter σ, which is the instantaneous standard deviation of the return on firm value. In table 3, we alter σ_2 from 10 % to 90 % (all else being equal to the base case), which means from a rather low- to very high target risk.

Table 3

Target Business Risk (Merger)

σ_2	ΔS	ΔS_1	ΔS_2	(%)	ΔD_1	(%)	ΔD_2	(%)
0.1	−57.75	−53.07	−4.68	−15.61	61.74	12.11	−3.99	−5.70
0.2	−34.37	−31.59	−2.79	−9.29	37.31	7.32	−2.93	−4.19
0.3	−18.25	−16.77	−1.48	−4.93	12.85	2.52	5.40	7.72
0.4	−18.04	−16.58	−1.46	−4.88	−2.94	−0.58	20.99	29.98
0.5	−31.11	−28.58	−2.52	−8.41	−11.96	−2.35	43.07	61.53
0.6	−51.94	−47.72	−4.21	−14.04	−18.73	−3.67	70.67	100.95
0.7	−77.06	−70.81	−6.25	−20.83	−25.82	−5.06	102.88	146.97
0.8	−105.11	−96.59	−8.52	−28.41	−33.90	−6.65	139.02	198.59
0.9	−135.34	−124.36	−10.97	−36.58	−43.11	−8.45	178.45	254.92

Target Business Risk (Acquisition)

σ_2	ΔS	ΔS_1	(%)	ΔS_2	ΔD_1	(%)	ΔD_2	(%)
0.1	−53.22	−53.22	−15.65	0.00	57.67	11.31	−4.46	−6.37
0.2	−28.78	−28.78	−8.46	0.00	32.32	6.34	−3.54	−5.06
0.3	−11.90	−11.90	−3.50	0.00	7.30	1.43	4.60	6.57
0.4	−11.18	−11.18	−3.29	0.00	−8.76	−1.72	19.94	28.49
0.5	−23.81	−23.81	−7.00	0.00	−17.91	−3.51	41.72	59.60
0.6	−44.15	−44.15	−12.99	0.00	−24.79	−4.86	68.94	98.48
0.7	−68.69	−68.69	−20.20	0.00	−31.99	−6.27	100.68	143.82
0.8	−96.03	−96.03	−28.24	0.00	−40.21	−7.88	136.25	194.64
0.9	−125.42	−125.42	−36.89	0.00	−49.58	−9.72	175.00	250.00

Note: Wealth effects are calculated according to equations (11) to (14), using parameter values: $U_1 = 850$, $U_2 = 100$, $Lev_1 = 0.6$, $Lev_2 = 0.7$, $\sigma_1 = 0.3$, $\varrho = 0.3$ and $syn = 0$. ΔS (equal to $-\Delta D$) denotes the total wealth transfer between equity and debt. ΔS_1 and ΔS_2 denote the individual effects on acquirer and target equity. ΔD_1 and ΔD_2 denote the individual effects on acquirer and target debt. Relative changes (%) always correspond to the preceding column on the left. Only in case of a merger, ΔS_1 (%) = ΔS_2 (%).

For both mergers and acquisitions, target debt holders benefit if they have a claim against a riskier target company prior to the deal. This is because the riskier the claim of the target debt holders is, the stronger they benefit from merging their debt contract with a less risky debt position of the acquirers. Clearly, the more secure the contract of the acquirer's debt holders is in comparison to the target debt, the stronger the target debt holders will benefit. Conversely, the acquirers' debt holders increasingly suffer in the business risk σ_2 of the target firm increasing.

Despite these opposing effects, the change ΔD of the total debt value (which is equal to $-\Delta S$) is a decreasing function in σ_2 first, then it obtains its minimum for σ_2 slightly higher than σ_1, and increases again for high σ_2. Hence, we can see that the total debt value is least positively affected when both firms are of almost identical risk. In other words, if the debt claims of the two involved firms exhibit a different riskiness, the value of these debt claims is strongly affected by their merging, which in total results in a relatively high increase ΔD of the debt value.

Since the change ΔD of total debt value carries forward to the equity holder(s) ΔS_1 (and ΔS_2), firms of similar or slightly higher business risk appear to be ideal partners for mergers and acquisitions when regarding the financial costs of the deal. Remarkably, the financial losses ΔS_2 for a target with relatively low or high business risk can be much more pronounced than in our base case. A target with a low business risk $\sigma_2 = 10\,\%$ causes a loss of the equity value by more than fifteen percent. A high business risk $\sigma_2 = 90\,\%$, results in an even higher loss of more than thirty five percent. Hence, these findings explain that potential target firms might have a high risk preference as it acts like a "poisson pill" that makes a hostile takeover especially expensive for an acquirer, when she has to pay a takeover price that compensates these costs.

Finding 2 (Target Risk): An acquirer should seek for targets of similar or slightly higher risk, since both targets of very low- or very high business risk result in higher financial costs so that the equity position(s) suffer, while total debt benefits.

Changing σ_1 of an acquirer ceteris paribus (not shown in a table) leads to analogous consequences for equity and debt. The intuition that risk diversification comes primarily to the benefit of a comparably riskier debt position, is valid in this case again.

3. Relative Size of Acquirer and Target

The base case scenario of our analysis follows the intuition of a takeover between a large, established company and a smaller firm, from a somewhat related industry. In recent M&As, however, smaller acquirers, eating much bigger targets, were observable as well. Although not being successful, a very prominent example from the German automotive industry was the attempted acquisition of *Volkswagen* by its smaller competitor *Porsche*.

In table 4, we alter the asset value of a risky target from little more than 5 % to over 200 % of the merger-initializing, unlevered firm value. A higher asset value of the target has two main consequences. Firstly, due to the given debt ratio, the target firm brings a higher absolute amount of debt into play. Secondly, the business risk of the new firm, measured by the standard deviation σ_3 of the return of the merged assets, increases, because the relatively risky assets U_2 represent a higher proportion of the total assets U_3 after the deal. As a consequence of these two effects, a transaction reduces the acquirer debt holders' wealth the stronger, the larger the target firm is. This is, first of all, due to the fact that the new firm bears more risk. Secondly, more target debt additionally dilutes the new debt claim and therefore the acquirer debt holders' wealth.

In the case of a merger (first part of table 4), target debt holders benefit the stronger from a takeover, the bigger the target firm is. While the absolute ΔD_2 change is increasing in U_2, the relative increase $\Delta D_2(\%)$ declines. Intuitively, the more debt a target company has, the more the debt holders benefit. Nevertheless, these target debt benefits shrink per unit of debt volume. Strong wealth changes ΔD_2 outweigh ΔD_1 changes so that the total debt position still benefits $\Delta D > 0$. Due to an increasing total debt value with U_2, we obtain absolute and relative losses of equity ΔS_1 and ΔS_2 monotonously increasing with bigger targets in mergers. Remarkably, if an acquirer wants to merge with a target of about equal size, the equity holders loose more than fifteen percent of their wealth.

The second part of table 4 illustrates the effects of relative target size in case of an acquisition, where the deal-specific higher debt burden, as expected from equation (10), is visible at once. ΔD_1 losses are stronger in both absolute and relative terms. Relative $\Delta D_2(\%)$ benefits decline stronger in U_2 increasing, which can even lead to a decline in absolute terms for very large target firms. This important difference to the case of a merger stems from the fact that the acquirer issues new debt to finance

Table 4

Relative Target Size (Merger)

U_2	ΔS	ΔS_1	ΔS_2	(%)	ΔD_1	(%)	ΔD_2	(%)
50	−10.21	−9.78	−0.43	−2.88	−0.50	−0.10	10.71	30.61
250	−38.71	−31.72	−7.00	−9.33	−10.40	−2.04	49.12	28.07
450	−62.96	−45.07	−17.90	−13.26	−18.73	−3.67	81.69	25.93
650	−84.98	−54.01	−30.97	−15.88	−25.32	−4.97	110.31	24.24
1050	−124.70	−64.73	−59.97	−19.04	−35.09	−6.88	159.79	21.74
1450	−160.72	−70.51	−90.21	−20.74	−41.99	−8.23	202.71	19.97
1850	−194.24	−73.79	−120.45	−21.70	−47.18	−9.25	241.41	18.64

Relative Target Size (Acquisition)

U_2	ΔS	ΔS_1	(%)	ΔS_2	ΔD_1	(%)	ΔD_2	(%)
50	−6.92	−6.92	−2.03	0.00	−3.53	−0.69	10.44	29.83
250	−19.75	−19.75	−5.81	0.00	−23.49	−4.61	43.25	24.71
450	−25.39	−25.39	−7.47	0.00	−39.52	−7.75	64.91	20.61
650	−26.87	−26.87	−7.90	0.00	−52.15	−10.23	79.02	17.37
1050	−22.00	−22.00	−6.47	0.00	−70.70	−13.86	92.69	12.61
1450	−10.75	−10.75	−3.16	0.00	−83.62	−16.40	94.38	9.30
1850	4.44	4.44	1.30	0.00	−93.17	−18.27	88.73	6.85

Note: Wealth effects are calculated according to equations (11) to (14), using parameter values: $U_1 = 850$, $Lev_1 = 0.6$, $Lev_2 = 0.7$, $\sigma_1 = 0.3$, $\sigma_2 = 0.4$, $\varrho = 0.3$ and $syn = 0$. ΔS (equal to $-\Delta D$) denotes the total wealth transfer between equity and debt. ΔS_1 and ΔS_2 denote the individual effects on acquirer and target equity. ΔD_1 and ΔD_2 denote the individual effects on acquirer and target debt. Relative changes (%) always correspond to the preceding column on the left. Only in case of a merger, ΔS_1 (%) $= \Delta S_2$(%).

the acquisition. Since D_{new} is fairly priced, the earlier debt holders suffer from this additional claim (of coequal seniority). As a result, the total change of the initial debt value $\Delta D = \Delta D_1 + \Delta D_2$ first increases with U_2 but then declines (and even becomes negative). Again, the increase is driven by the high amount of additionally outstanding debt. Thus, for high values U_2 of the target, ΔD declines as a large amount of new debt is required, which dilutes the value of outstanding debt. Since the change ΔS_1 of the acquirers' equity position is the inverse of the change ΔD of total debt in case of an acquisition, we see that the financial costs from an acquisition are relatively low either for very small target companies

(similar as for mergers) or for very large target companies (in contradiction to mergers). Remarkably, for both types of deals, a target firm of equal size results in relatively high financial costs.

Finding 3 (Relative Size): The financial costs for the acquirer's equity holders in mergers and acquisitions are relatively low for small target companies. Only in acquisitions, the financial costs decline again for very large targets as well.

This analysis also reveals the important role of refinancing. Since refinancing is implicitly contained in the deal structure of an acquisition, a wealth transfer $\Delta D > 0$ to total debt can be strongly reduced and even become negative with a high refinancing volume.

4. Relative Leverage of Acquirer and Target

Besides the relative size of acquirer and target, their relative leverage also needs to be taken into account for the performance measurement of corporate takeovers. Leverage (*Lev*) is defined as the ratio of the market value of debt to the total firm value. It is of particular importance since e.g. a strategically acting acquirer has the possibility to focus on target companies with a specific debt ratio. On the other hand, potential target firms might choose a certain debt ratio in order to prevent a takeover because the incurred financial costs for the acquirer were too high.

The first part of table 5 summarizes our results for different debt ratios Lev_2 of the target firm in a merger. The main driver for the wealth effects is similar to the section about target firm size, as both a higher leverage and a bigger target imply a higher initial debt value D_2 of the target company. As a difference, final business risk σ_3 is not affected when changing target leverage, because the target's asset value remains constant.

These preconsiderations are reflected in the case of a merger, where the change ΔD_1 of the acquirer debt declines with higher Lev_2 because the debt position D_1 is merged with more (risky) target debt. Conversely, the debt position of the target firm benefits the stronger, the higher the target debt ratio Lev_2 is. Here the absolute volume D_2 of the claim that benefits from a merger is bigger. Aggregating the two debt changes to the change ΔD of total debt, we can see in table 5 that it first declines in Lev_2, but then increases as well. The effect for a high debt ratio is in line with that for a larger target size, since the target debt volume rises in both cases. For a low leverage Lev_2, the total debt position ΔD benefits

Table 5

Relative Target Leverage (Merger)

Lev_2	ΔS	ΔS_1	ΔS_2	(%)	ΔD_1	(%)	ΔD_2	(%)
0.1	−11.93	−9.44	−2.50	−2.78	12.52	2.46	−0.59	−5.92
0.2	−10.46	−8.47	−1.99	−2.49	10.61	2.08	−0.15	−0.75
0.3	−9.79	−8.11	−1.67	−2.39	8.50	1.67	1.29	4.29
0.4	−9.98	−8.48	−1.50	−2.50	6.15	1.21	3.83	9.57
0.5	−11.21	−9.77	−1.44	−2.87	3.53	0.69	7.68	15.37
0.6	−13.74	−12.29	−1.45	−3.62	0.54	0.11	13.20	22.00
0.7	−18.04	−16.58	−1.46	−4.88	−2.94	−0.58	20.99	29.98
0.8	−25.03	−23.64	−1.39	−6.95	−7.19	−1.41	32.23	40.28
0.9	−37.11	−36.05	−1.06	−10.60	−12.90	−2.53	50.01	55.57

Relative Target Leverage (Acquisition)

Lev_2	ΔS	ΔS_1	(%)	ΔS_2	ΔD_1	(%)	ΔD_2	(%)
0.1	5.46	5.46	1.60	0.00	−4.56	−0.89	−0.90	−8.99
0.2	5.32	5.32	1.56	0.00	−4.59	−0.90	−0.73	−3.65
0.3	4.35	4.35	1.28	0.00	−4.83	−0.95	0.48	1.60
0.4	2.45	2.45	0.72	0.00	−5.31	−1.04	2.85	7.14
0.5	−0.55	−0.55	−0.16	0.00	−6.06	−1.19	6.61	13.21
0.6	−4.93	−4.93	−1.45	0.00	−7.17	−1.41	12.10	20.16
0.7	−11.18	−11.18	−3.29	0.00	−8.76	−1.72	19.94	28.49
0.8	−20.25	−20.25	−5.96	0.00	−11.10	−2.18	31.35	39.19
0.9	−34.57	−34.57	−10.17	0.00	−14.88	−2.92	49.45	54.95

Note: Wealth effects are calculated according to equations (11) to (14), using parameter values: $U_1 = 850$, $U_2 = 100$, $Lev_1 = 0.6$, $\sigma_1 = 0.3$, $\sigma_2 = 0.4$, $\varrho = 0.3$ and $syn = 0$. ΔS (equal to $-\Delta D$) denotes the total wealth transfer between equity and debt. ΔS_1 and ΔS_2 denote the individual effects on acquirer and target equity. ΔD_1 and ΔD_2 denote the individual effects on acquirer and target debt. Relative changes (%) always correspond to the preceding column on the left. Only in case of a merger, ΔS_1 (%) = ΔS_2 (%).

primarily because of the acquirer debt holders' benefit from a comparably low target debt volume, which reduces the riskiness of total debt. As a result, we find that the financial costs for the equity holders in a merger obtain their minimum for medium target debt ratios. For a high target debt ratio, its own debt holders strongly benefit, while a low target debt ratio favors the position of the acquirer debt holders.

In the case of an acquisition (second part of table 5), the main effects are overlapped by the financing effect of the acquisition. Since the total equity S_2 of the target firm is financed by additional debt, this financing effect is especially pronounced for a low target debt ratio Lev_2. Since outside financing imposes a severe reduction of the debt holders wealth, we can see why the total position of the initial debt holders ΔD primarily suffers for low target debt ratios. Aggregating the main effect as in the case of a merger and this financing effect, we see that a lower target debt ratio favors the position of the acquirers' equity at the costs of the initial debt holders' wealth.

Finding 4 (Relative Leverage): The financial costs for the acquirer's equity holders in a merger are minimal for medium debt ratios of the target company. In acquisitions, however, the financing effect also matters so that target firms with a lower debt ratio have low financial costs.

IV. Empirical Observations

When analyzing the financial benefits and costs from M&As, we have found that the success of a deal for the shareholders is primarily driven by the relationship to the position of the debt holders. Hence, this section aims at analyzing the wealth effects for debt holders involved in M&A deals. This allows us to focus on the important wealth transfer effects in favor of the debt holders, which are the main effects considered in our paper. The drawback of the potential alternative (to regard returns of the equity position) is that other effects besides a change of credit risk in the total debt position, such as market sentiments, corporate governance aspects, negotiation power, etc. also affect those returns.

1. Testable Hypotheses

Our findings strongly suggest to distinguish on a first level between a merger and an acquisition. Then, on a second level, it makes a difference whether the debt is from the acquirer or from the target company.

As illustrated in figure 1, we expect an acquiring firm's debt position to lose in zero-synergy mergers and acquisitions, implying rising credit spreads. In contrast to that, the target debt value increases or equivalently the credit spread falls under both mergers and acquisitions. In real world, however, M&A deals are (supposed to be) motivated by positive

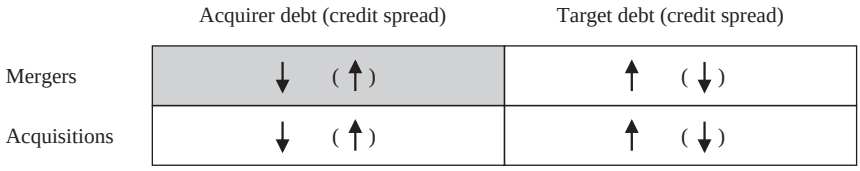

Figure 1: Expected Wealth Effects, no Synergies

synergies. Under such non-negligible synergies, especially the debt holders of an acquirer are affected in mergers (highlighted box in figure 1). As key difference to our base case scenario results, their position gains even under minor synergies, equivalently implying falling credit spreads.

Hypothesis 1 (Mergers): Given non-negligible synergies, mergers lead to gains for the debt holders, i.e falling credit spreads, of the involved targets as well as of the involved acquirers.

Hypothesis 2 (Acquisitions): While the debt holders of an acquirer lose in acquisitions, i.e. rising credit spreads, target debt holders gain in acquisitions, i.e. falling credit spreads.

2. Data Description

To empirically analyze the debt effects in M&A deals, we have data from the *Mergermarket* M&A Database, which provides us with 627 mergers and 3.252 acquisitions of non-financial companies, bearing a volume of at least EUR 10m in the time of 07/2003 to 06/2007, prior to the upcoming financial crisis in late 2007. As a measure for a consistent valuation of the credit spread of the involved debt positions, we consider the corresponding CDS spreads from *Thomson DataStream*. Unfortunately, 5YR SEN CDS spreads are not available for any arbitrary firm. In particular for the comparably small target firms, the number of accessible CDS quotes does not allow for a meaningful analysis. Still, we have the important CDS spreads of acquiring firms in 20 mergers and 293 acquisitions. This is a promising starting point to (i) document debt value effects in M&A deals and (ii) to evaluate differences between mergers and acquisitions.

3. Methodology

We apply standard event study technique as proposed by *Brown/Warner* (1980, 1985) and others to analyze abnormal CDS spread differences $AD_{i,t}$ for the acquirers i at deal announcement day t (= event date). While actual differences $D_{i,t}$ of the CDS spreads are observed, expected differences $\widehat{K}_{i,t}$ are derived from a constant mean difference model in an estimation window starting in $t_0 = -100$ days before an announcement and ending in $t_1 - 1$:

$$AD_{i,t} = D_{i,t} - \widehat{K}_{i,t}, \text{ where } \widehat{K}_{i,t} = \frac{1}{t_1 - t_0} \cdot \sum_{t=t_0}^{t_1-1} D_{i,t} \tag{15}$$

Abnormal differences are aggregated over different event window lengths from t_1 to t_2 and across acquirers i yielding cumulative abnormal differences CAD_{i,t_1,t_2} and average abnormal differences AAD_{t_0} respectively:

$$CAD_{i,t_1,t_2} = \sum_{t=t_1}^{t_2} AD_{i,t} \tag{16}$$

$$AAD_{t_0} = \frac{1}{N} \cdot \sum_{i=1}^{N} AD_{i,t_0} \tag{17}$$

Cumulative average abnormal differences $CAAD_{t_1,t_2}$ are also computed:

$$CAAD_{t_1,t_2} = \frac{1}{N} \cdot \sum_{i=1}^{N} \sum_{t=t_1}^{t_2} AD_{i,t} \tag{18}$$

4. Empirical Results

The graphical output of calculated *CAADs* from the given data sample is shown in figure 2 for a time window of 20 days prior and after the announcement of mergers and acquisitions. It is visible at first sight, that mergers lead to falling CDS spreads, while rising CDS spreads are the consequence of an acquisition. Non-standardized $CAAD_{-20,+20}$ fall here by almost 10 bps in mergers, whereas an increase of about 3 bps is observable in acquisitions. These findings confirm the predictions of acquirer debt losses (and thus rising credit spreads) in acquisitions for non-negligible synergies and acquirer debt gains in the case of mergers.

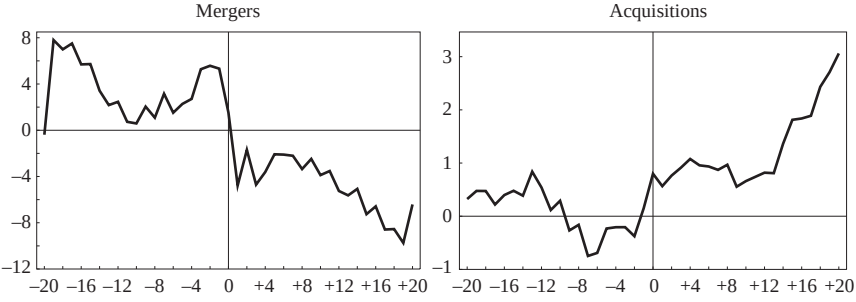

Figure 2: Acquirer CAADs [−20/+20] (bps)

Statistical tests as summarized by *Boehmer/Masumeci/Poulsen* (1991) underline these observations. According to table 6, however, not all the results are statistically significant. While the signs of the average abnormal differences *AAD* and the cumulative average abnormal differences *CAAD* fit to our expectation for mergers, neither the traditional (t_{TR}) nor the cross-sectional (t_{CS}) test results are statistically significant. This is primarily driven by the small data sample of only 20 deals. Nevertheless, increasing CDS spreads in acquisitions are highly significant under both test statistics. In line with our intuition of efficient credit derivatives markets, especially shorter event windows bear better results:

Table 6

Acquirer Event Study Results

	Mergers (N = 20)			*Acquisitions (N = 293)*		
	AAD	*(t_{TR})*	*(t_{CS})*	*AAD*	*(t_{TR})*	*(t_{CS})*
	−0,225	(−0,975)	(−1,061)	0,172	(2,944)***	(1,754)*
Event Window	*CAAD*	*(t_{TR})*	*(t_{CS})*	*CAAD*	*(t_{TR})*	*(t_{CS})*
[−2/+2]	−0,239	(−0,463)	(−1,107)	0,515	(3,931)***	(3,206)***
[−5/+5]	−0,031	(−0,040)	(−0,107)	0,586	(3,007)***	(2,866)***
[−10/+10]	−0,031	(−0,029)	(−0,055)	0,604	(2,196)**	(1,873)*

Note: Average Abnormal Difference (AAD) according to equation (17) and Cumulative Average Abnormal Difference (CAAD) based on abnormal differences from equation (15) standardized by standard deviation from estimation period. Traditional *t*-values (t_{TR}). Cross-sectional *t*-values (t_{CS}). Significance levels: *** 1%, ** 5%, * 10%.

Given the observation of figure 2, which is underlined by the statistical results from table 6, the economic significance still rests somewhat questionable. Rising CDS spread differences in acquisitions reach even within 20 days prior and after the deal on average only 3 bps, while falling CDS spreads in mergers stay on average below a range of some 10 bps in the same event window. Looking at the individual acquirers' short window $CAD_{i,-2,+2}$ in figure 3, however, offers very insightful results.

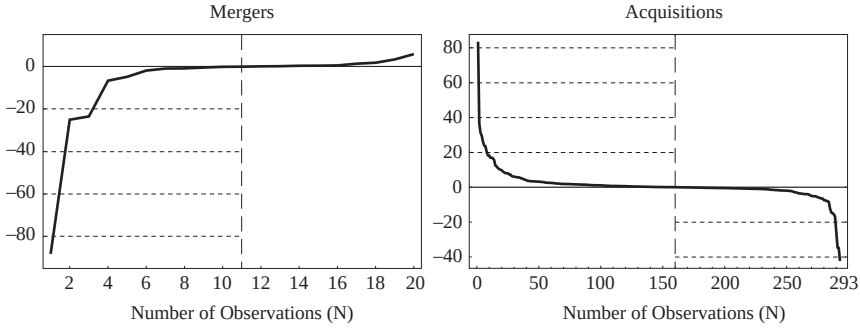

Figure 3: Acquirer (sorted) CADs [−2/+2] (bps)

Having sorted these cumulative abnormal differences $CAD_{i,-2,+2}$ by size, we find tremendously stronger individual CDS spread adjustments. For a broad range of deals, there is almost no effect. This could be a result of missing the relevant date where the deal information goes into the CDS spread adjustments. Still, at least 15 % of CDS spreads fall by more than 20 bps (up to −88 bps) in mergers, where increasing CDS spreads carry almost no weight. Looking at the *CADs* in acquisitions, a similar relationship holds true. Although unexpected negative adjustments reach down to −42 bps here, increasing CDS spreads of up to 83 bps outweigh the latter, in line with our theory, by far. Although CDS spread movements might appear economically insignificant on average, these results show far stronger individual effects that can be explained by the interaction of our theoretically analyzed transaction parameters.

Summing up, the empirical observations show strong evidence for an effect on the debt values due to M&A deals as suggested by theory. Remarkably, the debt position of the acquiring company is in a merger (on average) affected in the opposite way than in an acquisition.

V. Conclusion

The fact that corporate takeovers might result in positive synergies in a way that additional value is created, does not necessarily mean that they are worthwhile transactions. From the perspective of the decision makers, i.e. the acquirer's equity holders, a M&A transaction might not be beneficial despite positive synergies or vice versa. The primary reason is that the debt holders' position is also affected, when a merger or an acquisition takes place, which triggers important wealth transfers between equity and debt. Generally speaking, the total debt value primarily benefits from a coinsurance effect, which better secures the claims after a merger. In case of an acquisition, however, additional debt is raised which might mitigate this effect and even result in a loss of the total debt value.

We denote a loss of the equity position(s) from a takeover with zero synergies as financial costs. To analyze these financial costs in M&As, we introduce a continuous-time model with credit risky debt, but without any frictions such as bankruptcy costs or tax shields. For reasonable parameter choices, we find economically significant financial costs of transactions, which should be taken into conscientious consideration. In our base case scenario, these costs are about five percent for mergers and about three percent for acquisitions. However, the costs can strongly increase, especially when targets of different business risks, of similar firm sizes or with high debt ratios are acquired.

As a result, our observations allow us to understand how acquirers should select potential target companies in order to mitigate financial costs from the takeovers. We find that firms should merge with targets that have about the same business risks, that are rather small and have comparably low (but not too low) debt ratios. In the case of an acquisition, where the purchase price is debt financed, we find two differences. Firstly, an acquirer could also seek for large targets and secondly, low target debt ratios could also be beneficial.

Empirical observations support the relevance of the wealth effects of the debt position suggested by the model. They also reveal that the debt position of the acquiring firm is affected in different directions, depending on whether a merger or an acquisition takes place.

References

Acharya, V. V./Amihud, Y./*Litov,* L. P. (2008): Creditor Rights and Corporate Risk-Taking. SSRN Working Paper Series. – *Ammann,* M./*Verhofen,* M. (2006): The Conglomerate Discount: A New Explanation Based on Credit Risk. International Journal of Theoretical Applied Finance, Vol. 9 (8), pp. 1201–1214. – *Andrade,* G./*Mitchell,* M./*Stafford,* E. (2001): New Evidence and Perspectives on Mergers. Journal of Economic Perspectives, Vol. 15 (2), pp. 103–120. – *Black,* F./*Cox,* J. C. (1976): Valuing Corporate Securities: Some Effects of Bond Indenture Provisions. Journal of Finance, Vol. 31 (2), pp. 351–367. – *Boehmer,* E./*Masumeci,* J./*Poulsen,* A. B. (1991): Event-Study Methodology under Conditions of Event-Induced Variance. Journal of Financial Economics, Vol. 30 (2), pp. 253–272. – *Bradley,* M./*Desai,* A./*Kim,* E. H. (1988): Synergistic gains from corporate acquisitions and their division between the stockholders of target and acquiring firms. Journal of Financial Economics, Vol. 21 (1), pp. 3–40. – *Brown,* S. J./*Warner,* J. B. (1980): Measuring Security Price Performance. Journal of Financial Economics, Vol. 8 (3), pp. 205–258. – *Brown,* S. J./*Warner,* J. B. (1985): Using Daily Stock Returns: The Case of Event Studies. Journal of Financial Economics, Vol. 14 (1), pp. 3–31. – *Campa,* J. M./*Hernando,* I. (2004): Shareholder Value Creation in European M&As. European Financial Management, Vol. 10 (1), pp. 47–81. – *DeAngelo,* H./*Masulis,* R. W. (1980): Optimal Capital Structure under Corporate and Personal Taxation. Journal of Financial Economics, Vol. 8 (1), pp. 3–29. – *Fischer,* E. O./*Heinkel,* R./*Zechner,* J. (1989): Dynamic Capital Structure Choice: Theory and Tests. Journal of Finance, Vol. 44 (1), pp. 19–40. – *Kale,* J. R./*Noe,* T. H./*Ramirez,* G. G. (1991): The Effect of Business Risk on Corporate Capital Structure: Theory and Evidence. Journal of Finance, Vol. 46 (5), pp. 1693–1715. – *Leland,* H. E. (1994): Corporate Debt Value, Bond Covenants, and Optimal Capital Structure. Journal of Finance, Vol. 49 (4), pp. 1213–1252. – *Leland,* H. E. (2007): Financial Synergies and the Optimal Scope of the Firm: Implications for Mergers, Spinoffs, and Structured Finance. Journal of Finance, Vol. 62 (2), pp. 765–807. – *Levy,* H./*Sarnat,* M. (1970): Diversification, Portfolio Analysis and the Uneasy Case for Conglomerate Mergers. Journal of Finance, Vol. 25 (4), pp. 795–802. – *Lewellen,* W. G. (1971): A Pure Financial Rationale for the Conglomerate Merger. Journal of Finance, Vol. 26 (2), pp. 521–537. – *Lintner,* J. (1971): Expectations, Mergers and Equilibrium in Purely Competitive Securities Markets. American Economic Review, Vol. 61 (2), pp. 101–111. – *Markowitz,* H. M. (1952): Portfolio Selection. Journal of Finance, Vol. 7 (1), pp. 77–91. – *Merton,* R. C. (1974): On the Pricing of Corporate Debt: The Risk Structure of Interest Rates. Journal of Finance, Vol. 29 (2), pp. 449–470. – *Modigliani,* F./*Miller,* M. H. (1958): The Cost of Capital, Corporation Finance and the Theory of Investment. American Economic Review, Vol. 48 (3), pp. 267—297. – *Morellec,* E./*Zhdanov,* A. (2005): The dynamics of mergers and acquisitions. Journal of Financial Economics, Vol. 77 (3), pp. 649–672. – *Morellec,* E./*Zhdanov,* A. (2008): Financing and Takeovers. Journal of Financial Economics, Vol. 87 (3), pp. 556–581. – *Sarig,* O. H. (1985): On Mergers, Divestments and Options: A Note. Journal of Financial Quantitative Analysis, Vol. 20 (3), pp. 385–389. – *Scott Jr.,* J. H. (1977): On the Theory of Conglomerate Mergers. Journal of Finance, Vol. 32 (4), pp. 1235–1250.

Summary

Who Should Merge with Whom?
Financial Benefits and Costs from Mergers and Acquisitions

Mergers and acquisitions are prominent forms of transactions that combine two firms in a way that one unit with a new asset and a new liability side arises. Since both the equity and the debt positions of the merging entities are affected by such a deal, it is not clear whether positive synergies are equivalent to an improvement of the acquirer equity holders' position, who initiate the takeover decision. We introduce a frictionless, continuous-time model to compute the financial costs for the acquirers' equity value, when carrying out a zerosynergy takeover. This allows us to identify the characteristics of potential target companies that are especially well-suited to reduce these financial costs (and thus make a deal worthwhile for given synergies). We find that firms should consider targets having about the same business risks and relatively low debt ratios. While targets are supposed to be small in mergers, they can also be comparably large in debt financed acquisitions. Empirical observations support the relevance of the wealth effects of the debt position suggested by the model and additionally reveal that the acquirers' debt position is affected in different directions depending on whether a merger or an acquisition takes place. (JEL G32, G34)

Zusammenfassung

Wer sollte mit wem fusionieren?
Finanzielle Synergien und Kosten aus Mergers und Akquisitionen

Mergers und Akquisitionen sind weitreichende Transaktionen, die zwei Unternehmen zu einer Einheit mit neuen Aktiva und neuen Passiva verbinden. Da sowohl die Eigenkapital- als auch die Fremdkapitalpositionen beider fusionierender Unternehmen betroffen sind, müssen positive operative Synergien nicht gleichbedeutend mit einem Vermögenszuwachs für die Eigenkapitalgeber des übernehmenden Unternehmens sein, welche eine Transaktion üblicherweise initiieren. Um finanzielle Kosten ihrer Position frei von Synergien darzustellen, führen wir ein zeitstetiges Modell in einer friktionslosen Umgebung ein. Auf diese Weise können wir Charakteristika von potenziellen Zielunternehmen identifizieren, die finanzielle Kosten minimieren (und bei gegebenen operativen Synergien somit zu lohnenswerten Transaktionen führen). Zielunternehmen sollten demnach gering verschuldet und einem ähnlichen Geschäftsrisiko ausgesetzt sein wie das übernehmende Unternehmen. Während darüber hinaus verhältnismäßig kleine Zielunternehmen in Mergers von Vorteil sind, dürfen sie in fremdfinanzierten Akquisitionen auch deutlich größer sein als das akquirierende Unternehmen. Empirische Beobachtungen bestätigen die modelltheoretisch abgeleitete Bedeutung der Fremdkapital-Vermögenseffekte und enthüllen darüber hinaus, dass die Fremdkapitalposition eines übernehmenden Unternehmens in Mergers und Akquisitionen gegenläufigen Effekten ausgesetzt ist.