INTERNATIONAL REAL ESTATE REVIEW

M&A in the Construction Industry -Wealth Effects of Diversification into Real Estate Life Cycle Related Services

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Since the late 1990s, the construction industry has undergone a change in business model, as contractors vertically expand their operations to other parts of the real estate life cycle. The question arises on whether construction companies have superior abilities as real estate service providers. We have examined the value implications of 106 large merger and acquisition (M&A) transactions in the construction industry worldwide from 1986 to 2006. We inquire if a vertical expansion of the construction value chain in the real estate life cycle through M&A leads to the creation of shareholder value. We find out that this is not the case. M&A success is mainly determined by industry-specific size effects and common agency conflicts.

Keywords

Construction industry; Cross-border acquisitions; Bidder gains; Global diversification

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1.   Introduction

Within the real estate life cycle which covers the development of three phases; construction, operation, and liquidation, construction can be viewed as an intermediate activity between the development and operation of the real estate infrastructure. [1] The construction business is characterized by very high operational risks, which can only be transferred to a limited extent to investors, subcontractors or insurance companies (Flanagan and Norman, 1993).Despite the significant amount of risk that are being taken by contractors, which exceeds the level of operational risk of many other industries, the sector, in particular, the contracting element, generally offers very low and unpredictable profit margins. The weak profitability is at least partly explained by the high degree of fragmentation of the industry which can be similarly observed in all important construction markets worldwide, e.g. the U.S., Japan, Australia or Europe, causing stiff competition among the contractors.

Ongoing globalization leads to additional competition among contractors, as most large construction and infrastructure projects are being commissioned across the globe. The aspiration of many contractors to improve their market position and overall business model has led to a strong increase in global merger and acquisition (M&A) activities in the construction sector over the last 15 years (Rice, 2006). This development is largely driven by the following M&A rationales and strategies:

a) many contractors have tried to rapidly boost their revenue base through acquisitions, as company size is regarded as one of the most important indicators of competence, reliability and capability in construction (Delaney and Wamuziri, 2004);

b) the requirement to cope with the ongoing globalization as well as the desire to become less dependent on public spending and the state of the economy in the home market has led to an increase in cross-border transactions; and

c) over the last ten years, a further M&A-rationale has boosted M&A activity - the intention of major builders to extend their operations to other parts of the real estate life cycle in order to achieve a vertical expansion of the construction value chain. Thereby, contractors try to reduce their dependence on traditional construction and grow their portions of earnings generated from services as these earnings are typically less volatile, recurrent and carry a higher gross margin (PWC, 2007).

In the interest of the shareholders M&A-transactions have – as for any strategic management decision – to create shareholder value (Choi and Russel,

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[1] Rice (2006) employs the concept of a construction value chain (develop → build → operate) in order to illustrate the vertical relationship of these activities.

2004). A respective commitment has become an integral part of the corporate policies outlined in annuals reports in the construction industry throughout the world. Cross-industry studies provide evidence that horizontal acquisitions are the most promising external growth strategy for a company. In the construction industry, however, recent trends in favor of vertical extensions of the value chain into the real estate life cycle challenge this credo. If vertical acquisitions are better performing transactions compared to horizontal deals, this finding would scrutinize today's real estate market structure because it would be a signal that integrated business models are superior to separated market-based solutions. In this light, we will examine whether different kinds of M&A-activities initiated by construction companies overall contribute to the creation of shareholder value and which kind of acquisition strategy is most promising. In contrast to other sectors of the economy, where the wealth effects of mergers and acquisitions have been extensively explored, very little empirical research has been devoted to the construction industry. Accordingly, the body of knowledge that concerns the circumstances under which a potential bidder should pursue an M&A transaction remains limited. To extend this knowledge basis, the two objectives of our study are:

- to document the overall wealth effects of M&A-transactions in the construction industry from the perspective of the acquirers, the targets and their combined entity, and
- to identify probable success determinants of M&A transactions – like the business focus on horizontal or vertical transactions – from the perspective of the acquirers.

The rest of the paper is organized as follows. After having outlined the objectives of the study, Chapter 2 provides an overview of prior empirical research on M&A wealth effects and the deduced research focus of this study. Chapter 3 describes the employed methodologies and data sample selection criteria. After the description of the data sample, the results for the full data sample are presented. Chapter 4 investigates the M&A success determinants from the perspective of the acquirers based on sub-sample and regression analyses. Chapter 5 provides a summary and a conclusion.

2.   Prior Research

The capital market-oriented way of assessing the success of M&A is the measurement of cumulative average abnormal returns (CAARs) in the period that surrounds the announcement of an M&A transaction through the means of an event study. Based on the assumption of efficient capital markets, this approach provides both an objective and a direct measure of the wealth implications on the market value of a firm (MacKinlay, 1997). The evidence of event studies about M&A-announcement effects on acquiring and target companies is extensive. Most of the studies do not have a specific industry

focus, but rather, exhibit a random sample of companies from different industries (Delaney and Wamuziri, 2004).

With respect to the wealth implications to the shareholders of acquiring firms, the studies with a comprehensive industry focus do not exhibit a consistent picture: Malatesta (1983), Charlety-Lepers and Sassenou (1994), Limmack and McGregor (1995), Boehmer and Löffler (1999) as well as Swanstrom (2006) identify negative abnormal returns for the acquirers whilst Firth (1997), Pettway and Yamada (1986), Fuller et al. (2002), Georgen and Renneboog (2004), Campa und Hernando (2004) as well as Moeller et al. (2005) find bidders' abnormal returns to be slightly positive. Bradley et al. (1983), Ruback (1983), as well as Eckbo and Thorburn (2000) report mixed results. In most of these studies, the observed abnormal returns for the acquirers turn out to be statistically insignificant while the shareholders of the target firms on average earn highly positive statistically significant returns (Asquith et al., 1983; Jensen and Ruback, 1983; Jarrel et al., 1988; Jandik and Makhija, 2005).

The unequal distribution of merger gains between the shareholders of acquiring and target firms is an intensively explored phenomenon (Gosh and Lee, 2000). Most explanations mainly focus on agency theory and the free-rider problem in the case of public tender offers. According to the agency theory, the disciplinary acquisition of poorly managed targets leads to high acquisition gains for the target firm shareholders (Jensen, 1986; Grossmann and Hart, 1980; Harrington and Prokob, 1993).

The existing empirical evidence on M&A announcement effects in the construction industry is very limited. Delaney and Wamuziri (2004) analyze the wealth effects of M&A transactions in UK building materials and construction industry. The documented findings show positive abnormal returns for both the shareholders of the acquirer and the target firm. However, the statistical significance of the determined abnormal rates of return has not been tested and the sample size is rather small with only 46 acquirers and 33 targets which are not separated in building materials and the construction industry. Choi and Russel (2004) focus on the M&A wealth effects of acquirers in the U.S. construction industry. Here, a statistically significant CAAR of 3.1% for the bidder companies have been determined.

As an extension to the existing evidence with reference to the construction industry, our event study has not been limited to a specific regional market or a country-specific derivation of the buyer or target companies. Our focus is not only concentrated on intra-industry effects. We are specifically interested in extensions of the value chain along the real estate life cycle to understand whether construction companies are superior real estate service providers. Apart from the separate wealth effects of the acquiring and target firms, the wealth effects of the combined entity of acquirer and target firm are additionally analyzed. The success or failure of M&A transactions from the perspective of the acquirers is being analyzed based on explanatory variables,

which are derived from the financial literature and expected to deliver further insights on how to design successful M&A transactions in the future.

3.   Empirical Analysis of the Overall Wealth Effects

3.1   Methodologies

To assess the wealth effects of M&A transactions, this study employs the event study methodology which relies on the market model based approach by following Dodd and Warner (1983) and Brown and Warner (1985). The market model can be stated as follows:

$$R_{j,t} = \alpha_j + \beta_j * R_{m,t} + \varepsilon_{j,t} \tag{1}$$

The parameters α_j and β_j for each stock j are estimated during a period of 252 trading days prior to the event window based on an OLS-regression model. The normal returns are calculated based on the estimated parameters $\hat{\alpha}_j$ and $\hat{\beta}_j$:

$$\hat{R}_{j,t} = \hat{a}_j + \hat{\beta}_j R_{M,t} \tag{2}$$

The abnormal return of a stock j in the event window is calculated as the difference of the actual ex post stock return $R_{j,t}$ and the normal return of the stock $\hat{R}_{j,t}$:

$$AR_{j,t} = R_{j,t} - \hat{R}_{j,t} \tag{3}$$

The event window [e_1; e_2] comprises 41 trading days. It is considered broad enough to capture information leakage, short-term underreactions and overreactions around the announcement days, and inaccurate event dates. According to specified event windows, the cumulated abnormal returns (CARs) are calculated as follows:

$$CAR_j = \sum_{t=1}^{T} AR_{j,t} \tag{4}$$

Cumulative abnormal returns are averaged to derive CAAR:

$$CAAR_{e_1-e_2} = \frac{1}{N} \sum_{j=1}^{N} CAR_j \tag{5}$$

Apart from the separate wealth effects for the bidder and target firms, the combined wealth effect of the transaction is calculated by following the suggestion of Houston and Ryngaert (1994). An analysis of the combined entity reveals information on the net wealth creation of a transaction.

$$CAR_{e_1-e_2,CombinedEntity} = \frac{CAR_{e_1-e_{e,Bidder}} * MK_{Bidder} + CAR_{e_1-e_{2,Target}} * MK_{Target}}{MK_{Bidder} + MK_{Target}} \quad (6)$$

with: MK_{Bidder} = Market capitalization of bidder firm on last trading day of estimation period

MK_{Target} = Market capitalization of target firm on last trading day of estimation period

To test for significance of the derived abnormal and cumulated abnormal returns, the parametric test statistic according to Boehmer et al. (1991) is employed which is able to account for event induced changes in variance (Peterson, 1989). Additionally, we use the approach of Mikkelson and Partch (1988) for robustness purposes. To test mean differences, the test statistic used by Hawawini and Swari (1991) and Baradwaj et al. (1992) is applied. In particular for small sample sizes, where the assumption of normally distributed abnormal returns might be violated, the median-based non-parametric Wilxoxon-signed-rank-test is additionally conducted (Corrado and Zivney, 1992).

While the basic arguments of the analyses might be considered to be more defensible with a long-run performance analysis, long-term studies have some shortcomings. In accounting based performance studies, it is very difficult to control for changes in overall operational risk which can be expected to specifically exist in the case of vertical acquisitions. Accounting and capital market based long-run studies both also suffer from the problem of confounding events (like serial acquisitions or significant divestments) which cannot be excluded or completely controlled for. To offer a clear picture and only unbiased effects, we concentrate on short-run analyses.

3.2   Data Sample Selection Criteria

To identify M&A-transactions initiated by construction companies between 1986 and 2006, the M&A databases Thomson One Banker Deals and Bloomberg are used. The initial sample consisted of 683 transactions, where the bidder firm was classified as a construction company according to the standard industrial (SIC)-code scheme: 1500s, 1600s, and 1700s. As the SIC-classifications are partly imprecise or outdated, affiliation to the construction industry is verified through separate research, based on the respective annual reports and internet presences. For this, the construction industry is defined according to the industry classification of the European Union (NACE Code 45 construction). This division includes general construction and special trade construction for buildings and civil engineering, building installation and building completion. It includes new work, repair, additions and alterations, the erection of pre-fabricated buildings or structures on the site and also constructions of a temporary nature. In contrast to the North American Industry Classification of the construction industry (NAICS Code 23), the

NACE Code 45 does not include development companies. From a construction value chain perspective, the European industry classification is more focussed, as it solely includes pure construction activities. Target companies are not restricted to any industry classification, but later organized into subsamples along the construction industry value chain as horizontal, vertical or lateral transactions.

The final data sample of 106 transactions matches the following criteria:

1) the transaction was announced between January 1, 1986 and December 31, 2006;

2) the acquirer belongs to the construction industry in following the NACE Code 45;

3) both the acquirer and the target firms were listed on a public stock exchange for at least 252 trading days prior to the announcement;

4) the transaction volume exceeds USD 10 million;

5) the transaction has been completed; and

6) a change of control has taken place, i.e. the acquirer had less than 50% of the outstanding shares prior to the transaction and controlled a majority stake after deal completion.

Return data on individual equities and market indices, and information about market capitalization is derived from Thomson Financial Datastream. For market returns $R_{M,t}$ the capital weighted Datastream Global-Market-Performance-Index of the respective country of origin is used. In order to assure a satisfactory comparability of additional accounting data (e.g. turnover, return on capital employed) the Worldscope database is exclusively used. The announcement days are verified through additional press research (e.g. Wall Street Journal, Financial Times).

3.3   Descriptive Statistics

Figure 1 gives an overview of the geographical distribution of the 106 identified M&A-transactions.

Figure 1   Geographic Distribution of the M&A Transactions

Bidders → Targets ↓	Europe															NA		Asia				Rest		Total
	BE	CZ	DK	GB	GE	GR	IT	FR	PD	PO	NE	NO	SP	SW	SZ	US	CA	JN	SK	MA	HK	AU	IN	Total
BE											1													1
CZ												1												1
DK											1													1
EE												1												1
GB				22			1					2				1								26
GE					1																			1
GR						6																		6
IT							1																	1
FR				1				4																5
PD								1	1			2												4
PO										1		1												2
NE											1	1												2
NO												1	1											2
SP													5											5
SW							1						1	1										3
SZ															1									1
US			1	1	2											15								19
CA																	1							1
JN																		11						11
SK																			2					2
MA																				2				2
HK																					1			1
AU					1																	6		7
IN																							1	1
Total	66															17		16				7		106

Note: Legend: NA: North America, Rest: Rest of the world, BE: Belgium, CZ: Czech Republic, DK: Denmark, GB: Great Britain, GE: Germany, GR: Greece, IT: Italy, FR: France, PD: Poland, PO: Portugal, NE: Netherlands, NO: Norway, SP: Spain, SW: Sweden, SZ: Switzerland, US: United States of America, CA: Canada, JN: Japan, SK: South Korea, MA: Malaysia, HK: Hong Kong, AU: Australia , IN: India.

The vast majority of the acquiring firms (93,4%) stem from the triad regions; Europe, North America or Asia. The transactions from the rest of the world (6,6%) almost exclusively concern construction companies from Australia. Noticeably, the North American, Asian and Australian construction companies have strongly focussed on national acquisitions, whereas one third of the deals initiated by European construction companies are cross-border transactions. Approximately one fifth of the European cross-border transactions represent intercontinental transactions, where the European

contractors concentrated on the US market. Table 1 provides an overview on the yearly development of transaction volume, as well as on the strategic and geographical focuses of the acquisitions.

Table 1   Overview of Transaction Volume, and Strategic and Geographical Focuses

Year	N	Horizontal	Vertical	Lateral	Cross-Border	Vol. in USD, mn.	Average Vol. USD, mn.
1986	3	1	1	1	1	754.9	251.6
1988	1	0	0	1	0	63.7	63.7
1990	1	1	0	0	0	31.6	31.6
1991	1	1	0	0	0	19.5	19.5
1993	1	0	1	0	0	57.2	57.2
1996	3	0	1	2	0	513.4	171.1
1997	5	4	1	0	1	1,468.4	293.7
1998	8	5	2	1	0	594.2	74.3
1999	13	7	4	2	5	1,621.6	124.7
2000	21	16	2	3	8	6,003.7	285.9
2001	9	7	2	0	0	5,278.9	586.5
2002	11	7	4	0	2	4,800.4	436.4
2003	7	4	2	1	3	4,589.5	655.6
2004	7	0	4	3	0	1,769.1	252.7
2005	10	7	3	0	0	20,750.4	2,075.0
2006	5	2	3	0	3	19,072.7	3,814.5
Total	106	62	30	14	23	67,389.1	-

The sample contains 62 horizontal, 30 vertical and 14 lateral transactions. Horizontal transactions represent M&A deals within the construction industry. Vertical transactions constitute acquisitions where a bidder from the construction industry extends its value chain forwards or backwards into real estate life cycle services, such as planning, development, financing, operation and intermediation of real estate infrastructure and assets. These vertical transactions became more important during the last decade as Figure 2 illustrates. In lateral transactions, the target company is active in industry sectors which are unrelated to the construction value chain, for e.g. oil and gas exploration, telecommunication or the heavy machinery industry. The sample distribution according to the strategic focus is comparable to the distributions observed in other construction related M&A-studies. Choi and Russel (2004), for instance, identify 56.7% horizontal, 21.1% vertical and 22.2% lateral transactions in the United States for the period 1980-2002.

The total sample transaction volume amounts to USD 67.4 billion. The average transaction volume strongly increased in 2005 and 2006. This development is predominantly due to some very large vertical acquisitions, which motivated this research. The French contractor Vinci acquired 73% of

the French motorway operator ASF for USD 16.4 billion by the end of 2005. In 2006, the Spanish contractor Ferrovial acquired a 62%-stake in the British airport operator BAA for USD 18.3 billion. Figure 2 illustrates the development of the number of yearly transactions as well as the proportion of vertical transactions. The linear trend component of the proportion of vertical transactions clearly indicates that the expansion of service activities through M&A acquisitions has strongly increased over the last decade. This trend is not biased by single transactions with very large transaction volumes, but based on the number of completed M&A-transactions.

Figure 2   Development of the Number of Transactions and Percentage of Vertical Transactions
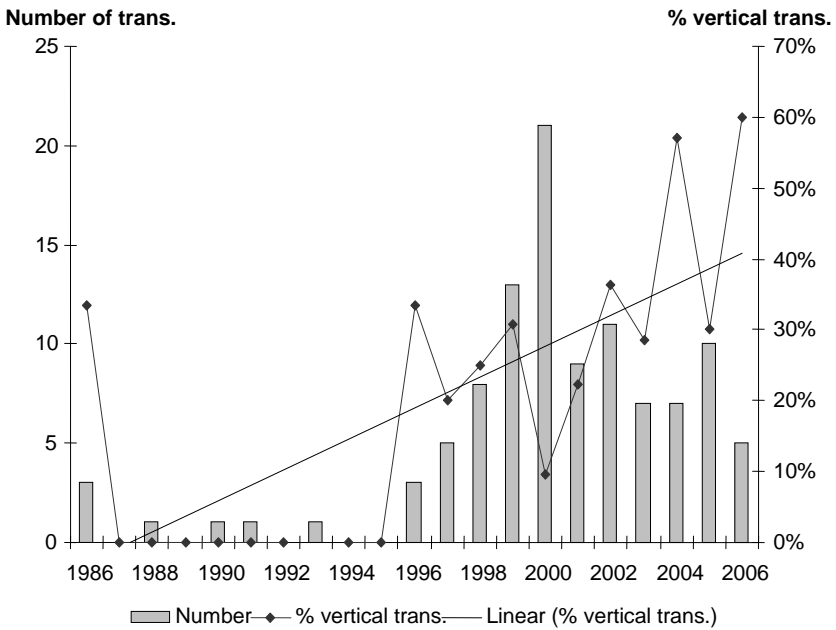

Table 2 provides an overview on turnover and profitability of the transaction partners. The average turnover of the bidder companies is more than four times the average target turnover (relative target size: 23%). The relative profitability of the target to the acquirer firms is expressed by the return on equity (ROE) and return on capital employed (ROCE) ratios. Both ratios indicate that acquirers are more profitable and more efficient than target firms.

The minima of both ratios also documents that the sample contains both acquirers and targets which incurred operational losses in the year that preceded the announcement of the M&A-transaction.

Table 2   Overview on Turnover, ROE and ROCE of Acquirers and Targets

Characteristics	Acquirers	Targets	Ratio Target/Acquirer
Turnover in USD .000			
Average	3,482,352	791,325	0.227
Median	1,590,798	362,733	0.228
Standard deviation	4,039,379	1,297,387	
Min	44,303	9,564	
Max	26,633,347	8,397,951	
Return on Equity [a]			
Average	13.8%	9.1%	0.660
Median	14.5%	9.6%	0.657
Standard deviation	10.5%	8.6%	
Min	-19.0%	-21.7%	
Max	44.9%	26.7%	
Return on Capital Employed [b]			
Average	16.1%	12.2%	0.759
Median	15.0%	12.4%	0.831
Standard deviation	12.9%	21.9%	
Min	-20.6%	-17.0%	
Max	61.0%	43.2%	

Note: a: ROE is calculated as the ratio of net income after minorities and total equity including retained earnings as of December 31 of the financial year prior to the acquisition announcement. b: ROCE is calculated as the ratio of EBITDA and Capital Employed.

Figure 3   CAAR's Targets, Acquirers and Combined Entity
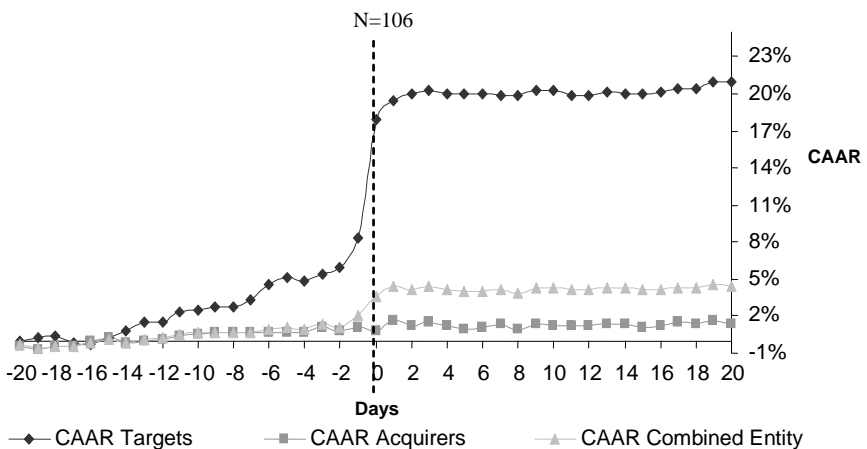
4.   Empirical Results

On average, bidders from the construction industry realized small but significant increases in market value while targets experienced a highly positive revaluation. Figure 3 illustrates the CAARs for the targets, acquirers and combined entity for the entire sample.

As documented in Table 3, the shareholders of the target firms earn highly significant and highly positive CAARs in all event windows considered.

Table 3   CAAR's Targets

N=106 Event Window	CAAR	Z-Value	Median	W-Value	Min	Max	Positive	Δ Value [USD mn.]
[-20;+20]	4.40%	3.114***	2.55%	5.688***	-30.48%	38.65%	62.26%	89.82
[-10;+10]	3.72%	3.842***	3.84%	6.056***	-24.17%	30.03%	65.09%	74.03
[-5;+5]	3.04%	3.883***	2.08%	6.036***	-16.08%	27.74%	65.09%	56.17
[-1;+1]	3.32%	3.940***	2.16%	6.992***	-12.73%	28.43%	73.58%	47.07

Note: This table summarizes the averages and medians of the CARs of 106 quoted target firms world wide, which have been acquired by a construction company in the period from 1986 to 2006. *, **, *** indicates the statistical significance to the 10%, 5% and 1%-levels, respectively. Positive expresses the percentage of firms with positive CARs in the sample. The value variation (Δ Value) is calculated as the mean of the products of the respective market capitalization prior to the event window [-20; +20] and the respective cumulated average abnormal return of the sample firms.

The CAARs for event window [-1; +1] amount to 13.5% and gradually increase to 21% for [-20; +20]. We interpret this moderate and hardly volatile performance during the first four weeks after the announcement as an indicator that investor reactions are not influenced by short-term misevaluations. Consistent with the results of former evidence, approximately one third of the value creation is applicable to the period [-20;-1] prior to the official announcement of the M&A transaction. This run-up can be explained by merger speculation of market participants, information leakage and advanced share purchases of the acquirer prior to the official announcement of the deal.

The absolute, average wealth creation for the target shareholders sums up to USD 44.2 million over the entire event window of 41 days. From the perspective of these shareholders, M&A transactions are thus on average, significantly value-enhancing. This finding is consistent with evidence of prior studies in the construction industry reported by Delaney and Wamuziri (2004) who find CAARs for event period [-20; +20] in the range of 20.9% to 23.3% for targets in the UK.

Table 4 documents that the shareholders of the acquirers also gain slightly positive abnormal returns.

Table 4   CAAR's Acquirers

N=106 Event Window	CAAR	Z-Value	Median	W-Value	Min	Max	Positive	ΔValue [USD mn.]
[-20;+20]	1.35%	0.729	1.20%	4.411***	-33.80%	41.02%	53.77%	45.59
[-10;+10]	0.78%	0.863	0.99%	4.566***	-33.43%	21.87%	54.72%	33.06
[-5;+5]	0.26%	0.130	0.25%	4.093***	-29.11%	30.18%	51.89%	18.92
[-1;+1]	0.84%	1.166	0.60%	5.152***	-26.86%	27.46%	58.49%	17.10

Note: This table summarizes the averages and medians of the CARs of 106 quoted acquirer firms in the construction industry world wide, which carried out a M&A transaction in the period from 1986 to 2006. *, **, *** indicates the statistical significance to the 10%, 5% and 1%-levels. Positive expresses the percentage of firms with positive CARs in the sample. The value variation (Δ Value) is calculated as the mean of the products of the respective market capitalization prior to the event window [-20; +20] and the respective cumulated average abnormal return of the sample firms.

The magnitude of the identified CAARs for the acquirers is limited and only the Wilcoxon-test indicates the existence of significantly positive CAARs. The absolute, average wealth creation for the bidder shareholders amounts to USD 45.6 million for [-20; +20] and is thus comparable in size to the average wealth creation of the target shareholders.

As the CAR of the acquirer and target companies are weighted according to their market capitalization, the combined CAR of an M&A transaction is determined.

Table 5   CAAR's Combined Entity

N=106 Event Window	CAAR	Z-Value	Median	W-Value	Min	Max	Positive	ΔValue [USD mn.]
[-20;+20]	4.40%	3.114***	2.55%	5.688***	-30.48%	38.65%	62.26%	89.82
[-10;+10]	3.72%	3.842***	3.84%	6.056***	-24.17%	30.03%	65.09%	74.03
[-5;+5]	3.04%	3.883***	2.08%	6.036***	-16.08%	27.74%	65.09%	56.17
[-1;+1]	3.32%	3.940***	2.16%	6.992***	-12.73%	28.43%	73.58%	47.07

Note: This table summarizes the averages and medians of the CAR of 106 combined entities in the construction industry world wide, which were involved in an M&A transaction in the period from 1986 to 2006. *, **, *** indicates the statistical significance to the 10%, 5% and 1%-levels. Positive expresses the percentage of firms with a positive CAR in the sample. The value variation (Δ Value) is calculated as the mean of the products of the respective market capitalization prior to the event window [-20; +20] and the respective cumulated average abnormal return of the sample firms.

Over all event windows observed, the combined CAARs range between 3.0 and 4.4%. More than 60% of all transactions are positively evaluated by the capital markets. Both the mean test according to Boehmer et al. (1991) and the Wilcoxon-test of the medians lead to highly significant results. The combined wealth effects have not yet been analyzed by any other event study with reference to the construction industry. The majority of cross-industry event studies also show significant positive CAARs for the combined entity. This is interpreted as a strong indication for the existence of synergy and efficiency potentials exploitable by M&A transactions (Weston, Mitchell and Mulherin 2003).

In the following, the robustness of the present results is tested for various sub-samples to illustrate how the time period of the acquisition, geographical origin of the acquirer, and activity focus of the transaction influence the overall success of M&A transactions in the construction industry.

a) Sub-samples According to the Time Period

Table 6 outlines the sub-sample analysis results according to the time period.

The entire period under consideration of 21 years has been divided into three sub-periods of seven years. In each of the time periods, the target shareholders gain highly significant positive abnormal CAARs. With exception of the first period 1986-1992, between 50% and 60% of all transactions are also positively viewed from the acquirer's perspective.

b) Sub-samples According to the Geographic Origin of the Acquirers

To examine the importance of the acquirer's geographic origin, we build three sub-samples according to their affiliation in one of the three triad regions of Asia, Europe, and North America. With a total of 66 M&A transactions, the European acquirers represent the largest subsample. Table 7 outlines the market reactions depending on the geographic origin.

Again, irrespective of the geographic origin of the acquirers, the shareholders of target firms earn highly significant positive CAARs. Whereas the sub-samples for Europe and Asia are very similar, the CAARs for targets located in North America are considerably higher. Only for European acquirers, at least the medians of the CAARs indicate significantly positive market reactions to the acquisition announcements. However, as all other acquirer subsample CAARs remain insignificant, we interpret this finding as an indication that the geographic origin is not vale relevant for M&A transactions in the construction industry.

Table 6   **Overview of Subsample Results for Various Time Periods**

	1986-1992 N=6			1993-1999 N=30			2000-2006 N=70		
Targets									
Event window	**CAAR**	**Median**	**Positive**	**CAAR**	**Median**	**Positive**	**CAAR**	**Median**	**Positive**
[-20;+20]	35.32% ***	37.09% **	100.00%	26.54% ***	24.99% ***	93.33%	17.37% ***	12.45% ***	77.14%
[-10;+10]	32.97% ***	32.67% **	100.00%	17.99% ***	17.70% ***	83.33%	16.61% ***	10.91% ***	80.00%
[-5;+5]	30.12% ***	32.56% **	100.00%	16.51% ***	14.69% ***	83.33%	13.66% ***	9.89% ***	75.71%
[-1;+1]	18.54% ***	15.46% **	100.00%	12.50% ***	6.27% ***	83.33%	13.48% ***	7.27% ***	85.71%
Acquirers									
Event window	**CAAR**	**Median**	**Positive**	**CAAR**	**Median**	**Positive**	**CAAR**	**Median**	**Positive**
[-20;+20]	-6.02%	-5.80%	33.33%	2.60%	2.33% *	60.00%	1.45%	1.08% **	52.86%
[-10;+10]	-6.47%	-5.14%	16.67%	-0.15%	0.95%	56.67%	1.18%	1.75% ***	57.14%
[-5;+5]	-5.52%	-3.29%	33.33%	0.81%	0.18%	50.00%	0.35%	0.39% **	54.29%
[-1;+1]	-3.92%	-2.26%	33.33%	2.21%	0.56% *	60.00%	0.43%	0.63% ***	60.00%
Combined Entity									
Event window	**CAAR**	**Median**	**Positive**	**CAAR**	**Median**	**Positive**	**CAAR**	**Median**	**Positive**
[-20;+20]	4.45%	4.00%	66.67%	5.04% ***	6.29% **	66.67%	4.12% *	1.49% ***	60.00%
[-10;+10]	3.49% *	4.00% *	83.33%	2.35% ***	4.76% **	63.33%	4.32% ***	3.39% ***	64.29%
[-5;+5]	4.24% **	4.73%	66.67%	2.89% ***	1.74% **	63.33%	3.00% ***	2.08% ***	65.71%
[-1;+1]	2.38% ***	1.91%	66.67%	3.89% ***	2.07% ***	76.67%	3.15% ***	2.16% ***	72.86%

Note: This table summarizes the averages and medians of the CAR of 106 targets, acquirers and combined entities in the construction industry world wide, which were involved in an M&A transaction in the period from 1986 to 2006. *, **, *** indicates the statistical significance to the 10%, 5% and 1%-levels. Positive expresses the percentage of firms with a positive CAR in the sample.

Table 7   Subsample Analysis According to the Geographic Origin of the Acquirers

	Europe N=66			North America N=17			Asia N=16		
Targets									
Event window	CAAR	Median	Positive	CAAR	Median	Positive	CAAR	Median	Positive
[-20;+20]	19.89% ***	17.03% ***	81.82%	32.20% ***	26.55% *	94.12%	17.25% ***	14.63% *	81.25%
[-10;+10]	17.55% ***	13.44% ***	80.30%	32.37% ***	23.02% *	94.12%	14.23% ***	6.54% *	81.25%
[-5;+5]	14.81% ***	10.81% ***	77.27%	33.85% ***	25.09% *	94.12%	8.73% ***	3.44%	68.75%
[-1;+1]	14.26% ***	7.27% ***	83.33%	25.65% ***	13.64% *	94.12%	7.91% ***	5.73% *	81.25%
Acquirers									
Event window	CAAR	Median	Positive	CAAR	Median	Positive	CAAR	Median	Positive
[-20;+20]	1.86%	0.88% ***	51.52%	3.31%	9.67%	58.82%	1.86%	3.75%	62.50%
[-10;+10]	0.41%	1.03% ***	56.06%	2.58%	5.05%	58.82%	1.62%	1.75%	56.25%
[-5;+5]	0.02%	0.48% ***	53.73%	0.68%	0.72%	52.94%	1.21%	-0.55%	43.75%
[-1;+1]	0.52%	0.54% ***	57.58%	-1.49%	-2.02%	41.18%	3.75%	1.21%	75.00%
Combined Entity									
Event window	CAAR	Median	Positive	CAAR	Median	Positive	CAAR	Median	Positive
[-20;+20]	4.34% **	1.59% ***	63.64%	9.64% **	11.29%	70.59%	3.49%	1.76%	56.25%
[-10;+10]	3.02% ***	3.84% ***	65.15%	8.89% **	8.32% *	82.35%	3.25%	1.01%	50.00%
[-5;+5]	2.23% ***	1.53% ***	62.12%	8.32% **	6.40% *	88.24%	2.04%	-0.22%	50.00%
[-1;+1]	2.63% ***	1.91% ***	75.76%	5.07%	4.73%	64.71%	4.60% *	2.21%	75.00%

Note: This table summarizes the averages and medians of the CAR of 99 targets, acquirers and combined entities in the construction industry world wide, which were involved in an M&A transaction in the period from 1986 to 2006. *, **, *** indicates the statistical significance to the 10%, 5% and 1%-levels. Positive expresses the percentage of firms with a positive CAR in the sample.

c)   Sub-samples According to the Business Focus
Table 8 presents, as a first indicator for our main question of interest, the subsample results according to the activity focus of the M&A transactions. Again, target shareholders gain highly significant abnormal returns. However, divergences between horizontal acquisition targets and targets that cover earlier or later parts of the real estate life cycle remain statistically insignificant.

The first wealth impressions of the business focus for the shareholders of the acquirer firms are ambiguous. All mean CAARs remain statistically insignificant while some median values indicate negative returns for horizontal and lateral deals, and positive value effects for vertical acquisitions. Mean difference tests, however, give no indication that acquirer returns deviate between acquirers with different business focuses.
For the combined entity of acquirers and targets, horizontal and vertical transactions lead to a significant creation of shareholder wealth while lateral transactions show no value implications.

5.   Determinants of Successful M&A Transactions from the Perspective of the Acquirers

In order to gain a deeper understanding of the determinants that influence the success of M&A transactions in the construction industry from the perspective of the acquiring companies and specifically, the value potential of vertical acquisitions, further explanatory variables that represent potential success determinants will be introduced. In the following, these determinants are categorized into strategy, selection, financing and payment related determinants.Table 9 summarizes the determinants and respective explanatory variables employed. Beyond the reported variables, we also examine the influence of the growth focus, relative ROE, and market valuation of the target firm. As these examinations resulted in consistently insignificant findings, we do not report them here.

(D1) Activity Focus
According to the monopoly theory, horizontal acquisitions are carried out in order to increase market power. Due to the high fragmentation of the construction industry worldwide and the global competition on large construction and infrastructure projects, the attainment of a dominant market position by one single contractor seems questionable. Size is nevertheless considered as one of the most critical success factors in the construction industry. The reputation, reliability and perceived technical competence of a construction firm are highly correlated to its size. In construction, critical mass is important in particular with respect to large and complex projects as they necessitate significant financial, technological and human resources (Hillebrandt and Cannon, 1990).

Table 8   Subsample Analysis According to the Business Focus

	Horizontal N=62			Vertical N=30			Lateral N=14		
Targets									
Event window	**CAAR**	**Median**	**Positve**	**CAAR**	**Median**	**Positive**	**CAAR**	**Median**	**Positive**
[-20;+20]	17.54% ***	17.59% ***	83.87%	26.46% ***	17.50% ***	90.00%	24.92% ***	25.23% *	85.71%
[-10;+10]	14.97% ***	12.17% ***	79.03%	21.30% ***	15.14% ***	86.67%	22.18% ***	24.36% *	85.71%
[-5;+5]	11.02% ***	9.89% ***	72.58%	20.98% ***	13.10% ***	86.67%	20.63% ***	24.92% **	92.86%
[-1;+1]	9.70% ***	6.86% ***	83.87%	16.15% ***	10.28% ***	90.00%	15.92% ***	20.37% *	85.71%
Acquirers									
Event window	**CAAR**	**Median**	**Positive**	**CAAR**	**Median**	**Positive**	**CAAR**	**Median**	**Positive**
[-20;+20]	1.46%	-0.05%	50.00%	4.93%	5.34% ***	73.33%	-6.80%	-9.87% *	28.57%
[-10;+10]	-0.04%	-0.32%	48.39%	3.72%	1.83% **	70.00%	-1.93%	-0.69%	50.00%
[-5;+5]	-0.87%	-0.59% *	46.77%	3.23%	1.98% **	70.00%	-0.78%	-1.10%	35.71%
[-1;+1]	0.37%	0.54% **	58.06%	2.67%	1.71% **	70.00%	-1.00%	-1.16%	35.71%
Combined Entity									
Event window	**CAAR**	**Median**	**Positive**	**CAAR**	**Median**	**Positive**	**CAAR**	**Median**	**Positive**
[-20;+20]	4.65% ***	1.96% ***	61.29%	6.88% ***	6.42% ***	73.33%	-1.91%	-4.27%	42.86%
[-10;+10]	3.17% ***	4.22% ***	58.06%	5.71% ***	4.10% ***	83.33%	1.73%	2.28%	57.14%
[-5;+5]	2.22% ***	1.27% ***	59.68%	5.02% ***	2.98% ***	76.67%	2.24%	1.50%	64.29%
[-1;+1]	3.03% ***	1.92% ***	70.97%	4.45% ***	3.07% ***	80.00%	1.99%	1.93%	71.43%

Note: This table summarizes the averages and medians of the CAR of 106 targets, acquirers and combined entities in the construction industry world wide, which were involved in an M&A transaction in the period from 1986 to 2006. *, **, *** indicates the statistical significance to the 10%, 5% and 1%-levels. Positive expresses the percentage of firms with a positive CAR in the sample.

Table 9   Overview Probable Success Determinants

Strategy related determinants	Variables
(D1) Activity focus	(V1) Horizontal
	(V2) Vertical
	(V3) Lateral
(D2) Geographical focus	(V4) National vs. cross-border
(D3) Relative size	(V5) Turnover target/turnover acquirer
Selection related determinants	**Variables**
(D4) Rel. return on capital employed (ROCE)	(V6) ROCE target / ROCE acquirer
Financing related determinants	**Variables**
(D5) Gearing	(V7) Net debt to equity ratio acquirer
(D6) Cash balance ratio	(V8) Cash to total assets ratio acquirer
Payment related determinant	**Variable**
(D7) Method of payment	(V9) Cash vs. share deal

Vertical M&A transactions which gained higher importance over the last years and are of main interest in this examination are most often motivated by the generation of cross-selling synergies. Industrial companies and services providers are concentrating on their core competencies which lead to an increasing demand of external complete solutions with respect to real estate infrastructure needs. These needs can more easily be conceived and provided by vertically integrated construction firms as they have direct access to the necessary know how and resources (Kepler & Greenwood, 2007).

The increasing popularity of public private partnerships (PPP) also contributes to the attractiveness of expanding the construction value chain as PPP projects regularly involve the financing, design, construction, operation and maintenance of public facilities (Li et al., 2005). Construction companies hope to profit from the extension of the value chain forwards into real estate services because these services typically carry a higher margin and lower operational risk. Furthermore, service revenues are generally recurrent as they are often based on long-term contracts. However, it remains an open question whether construction companies are able to generate shareholder value by vertical acquisitions for their owners. Only if construction companies are able to exploit synergies which might result from this extension of the value chain, this vertical consolidation trend can be considered as economically effective.

Cross-industry M&A studies often explain lateral acquisition strategies with personal objectives of the management, e.g. the volition to increase their sphere of influence or the wish to secure their own job in case of an underperformance of the existing business (Amihud and Lev, 1981; Morck, Shleifer and Vishny, 1990). We especially expect to find an indication for the existence of cross-selling synergies which can be generated by offering a wider and complimentary range of non real estate related services to the clients.

(D2) Geographical Focus

Rice (2006) argues that the primary motive for cross-border transactions is to lower the dependency on public spending and the state of the economy in the home market. However, the more complex integration of foreign companies and possible cultural conflicts can easily offset the benefits gained from a cross-border diversification. We analyze the geographical focus of the transaction by differentiating between national and cross-border transactions. A separate analysis of transcontinental acquisitions is not made due to the fact that the sample only contains 5 intercontinental deals.

(D3) Relative Size

If the overall company size is a critical success factor in the construction industry (Hillebrandt and Cannon, 1990), the acquisition of larger targets should positively influence the creation of shareholder wealth. Due to the project driven business in the construction industry and the highly decentralized organization structures, the increase in complexity when acquiring very large targets is inferior to other sectors, e.g. the process industry where next to administrative processes, a multitude of operational processes need to be harmonized in order to realize synergy potentials.

(D4) Relative Return on Capital Employed

According to the efficiency hypothesis, M&A transactions are carried out in case that existing resources, client contacts and corporate development possibilities are inefficiently utilized by the management of the target company. An exchange of the management team and/or the implementation of improved processes by the acquirer can then contribute to a significant appreciation of the target company. The efficiency hypothesis assumes that the acquirer firms are more efficient and more profitable than the target firms.

The efficiency hypothesis is tested based on the explanatory variable relative ROCE. ROCE measures the overall efficiency of the capital invested in a company irrespective of its specific financing structure. The variable compares the ROCE of the target firm to that of the acquirer in the year prior to the announcement of the M&A transaction.

(D5) Gearing

According to the free cash-flow hypothesis developed by Jensen (1986), one major cause of takeover activity is the existence of agency costs linked to conflicts between managers and shareholders over the payout of free cash-flows. Instead of paying out free cash-flows in form of dividends or share buy-backs, management might be tempted to retain earnings within the company, even in cases where presently only investments with negative net present values are available. An incentive for management to efficiently use

free cash flows is an increase of the gearing of a company (Jensen, 1986). The gearing measures the amount of net debt/net cash of a company in relation to its equity.

(D6) Cash Balance Ratio

The free cash-flow hypothesis can also be examined by the cash balance ratio of the acquirer as it gives an indication to which extend free cash has not been employed in order to pay out dividends or repurchase shares. Harford (1999) documents evidence that cash-rich firms are more likely to attempt acquisitions and that these acquisitions are on average, value decreasing.

(D7) Method of Payment

Previous empirical research that studied the role of the method of payment in explaining abnormal returns to acquiring firms documents significant differences between cash and stock transactions. Asquith et al. (1983) and Brown and Ryngaert (1991) show that returns to bidders in stock acquisitions are overall significantly negative and not significant in cash transactions. These empirical findings are mainly explained by signaling arguments. As described by Myers and Majluf (1984), acquirers tend to employ own stock to finance an M&A transaction when they perceive their stock to be currently overvalued (Yook, 2003).

6.   Regression Results

The preceding sections have introduced a number of probable success determinants. In Table 10, these explanatory variables are tested based on a linear regression analysis for the event window [-1; +1]. In order to derive the regression model, the backward elimination variable selection procedure has been applied. Table 10 depicts the outcome of the analyses.

The Durbin-Watson indicator as well as the variance inflation factor indicate that the regression models do not suffer from autocorrelations. As stated in Table 10, the elimination procedure leads to the immediate removal of 2 out of a total of 8 explanatory variables. The relative ROCE (Var6) as well as the method of payment (Var9) do not contribute to the explanation of the total variance of the CAR. Also, the vertical transactions of the variables (Var2), lateral transactions (Var3), geographical focus (Var4) and cash balance ratio acquirer (Var8) remain statistically insignificant, while the relative size of the transaction (Var5) and the gearing of the acquirer (Var7) both have a significant impact on the CAR of the acquirer.

Table 10 Results of the Multivariate Regression Model [-1; +1]

No.	N	Adj. R² (F-value)	Constant (t-value)	Explanatory Variables							
				Vertical Transactions	Lateral Transactions	Geo-graphical Focus	Relative Size	Relative ROCE	Gearing Acquirer	Cash Balance Ratio Acquirer	Method of Payment
				(Var2)	(Var3)	(Var4)	(Var5)	(Var6)	(Var7)	(Var8)	(Var9)
1	106	2,6%* (2.723)	0.0011 (0.140)	0.1600* (1.653)							
2	106	5,1%*** (6.646)	0.1840 (4.846)		-2.4500*** (2.578)						
3	106	1.1% (0.126)	0.0052 (0.279)			0.0400 (0.355)					
4	85	2,7%* (3.340)	0.0084 (1.038)				0.1970* (1.828)				
5	85	1.2% (0.014)	0.0121 (1.504)					0.0130 (0.120)			
6	104	3,7%** (4.915)	0.0066 (0.956)						0.2140* (2.217)		
7	104	0.7% (0.252)	0.0049 (0.397)							0.0500 (0.502)	

(Continues…)

(Table10 Continued)

No.	N	Adj. R² (F-value)	Constant (t-value)	Explanatory Variables							
				Vertical Transactions	Lateral Transactions	Geo-graphical Focus	Relative Size	Relative ROCE	Gearing Acquirer	Cash Balance Ratio Acquirer	Method of Payment
				(Var2)	(Var3)	(Var4)	(Var5)	(Var6)	(Var7)	(Var8)	(Var9)
8	85	1.1% (0.084)	0.0061 (0.421)								0.0320 (0.290)
9	81	6.5%* (1.924)	-0.014 (-0.668)	0.110 (0.972)	-0.109 (-0,955)	0.054 (0.483)	0.207* (1,863)		2.499** (2.263)	0.131 (1,160)	
10	81	7.4%** (2.285)	-0.006 (-0.471)	0.111 (0.987)	-0.105 (-0.927)		0.198* (1.819)		0.251** (2.294)	0.123 (1.103)	
11	81	7.6%** (2.647)	-0.010 (-0.764)	0.137 (1.264)			0.205* (1.882)		0.258** (2.358)	0.106 (0.969)	
12	81	7.7%** (3.218)	-0.002 (-0.205)	0.139 (1.287)			0.216** (1.998)		0.240** (2.229)		
13	81	6.9%** (3.967)	0.004 (0.514)				0.201* (1.863)		0.231** (2.138)		
Durbin-Watson		2.097		**Maximum VIF of the explanatory variables** 1.098							

Note: This table summarizes the results of the multivariate linear regression model for the event window [-1; +1]. *, **, *** indicates the statistical significance to the 10%, 5% and 1%-levels, respectively.

Vertical transactions (Var2) do not provide shareholders with superior M&A success. We interpret this observation as an indicator that construction companies are not able to exploit synergy potential which is not given to other service providers along the real estate life cycle. Obviously, capital market participants are skeptical about the abilities of construction companies to offer better services to real estate users than the separated market-oriented business units.

Instead, we find support for one construction-industry specific and one very general factor that explain the M&A performance: the relative size of the target positively influences the success of M&A transactions. We interpret this finding as support for the idea that the overall size of a construction company is helpful to signal reputation, reliability and technical competence. Acquisitions aimed to rapidly increase the overall size of a construction company can thus contribute to the creation of shareholder wealth. Due to the project driven business in the construction industry and the highly decentralized organization structures, the increase in complexity by the acquisition of large targets is smaller than other sectors. As the significant impact of the gearing of acquirer firms has shown the existence of agency conflicts in the construction industry with regard to the efficient usage of free cash flows is likely, an increase of the financial leverage of a construction company is thus likely to have a positive impact on management attitude towards the pursuit of value-enhancing M&A transactions.

7.   Conclusion

From an overall perspective, M&A transactions in the construction industry are clearly value enhancing. Consistent to prior empirical research in this industry, the announcement of M&A transactions generates highly positive capital market reactions for the shareholders of the target firms. The shareholders of bidder companies also slightly benefit from the acquisitions. This finding is in line with former evidence for the construction industry by Choi and Russel (2004).

If capital markets would perceive construction companies to be superior facility managers, then vertical acquisitions along the real estate value chain should result in significant positive announcement returns. However, our regression analyses show that the focus on vertical acquisitions does not significantly contribute to M&A success. We interpret this observation as an indicator that construction companies are not able to exploit synergy potential which is not given to other service providers along the real estate life cycle. Instead, we find support for one construction-industry specific and one very general factor that explain M&A performance:

Relative size and gearing significantly contribute to the explanation of M&A success. The relative size of the target positively influences the success of M&A transactions. This finding supports the idea that the overall size of a construction company is one of the most important indicators of its reputation, reliability and technical competence. Acquisitions aimed to rapidly increase the overall size of a construction company can thus contribute to the creation of shareholder wealth. The significant impact of the gearing of acquirer firms has shown the existence of agency conflicts in the construction industry with regard to the efficient usage of free cash flows is likely. An increase of the financial leverage of a construction company is thus likely to have a positive impact on management commitment towards the pursuit of only value-enhancing M&A transactions.

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