To Merge or not to Merge – Five Essays analyzing Value Creation in Mergers and Acquisitions

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1. Introduction

The current state of knowledge about the market for corporate control is extended with five essays that look at different facets of value creation in mergers and acquisitions (M&A). The first three essays examine the role of investment banks as financial intermediaries advising serial bidders in consecutive acquisitions. The three essays presented in chapters 2 to 4 belong to the first research project. The second research project with two essays examines tax-related capital structure changes of newly acquired subsidiaries.

The first essay "Tracking M&A advisors' track record - The positive influence of their industry expertise and advisory relationships on serial bidders' acquisition performance" presented in chapter 2 is the initial idea from which the first research project emerged. The study investigates comparable to (Servaes & Zenner, 1996), (Hunter & Jagtiani, 2003), (Kale, Kini, & Ryan, 2003) and (Golubov, Petmezas, & Travlos, 2012) whether hiring banks as advisors with greater industry expertise and stronger client relationships is beneficial for the serial bidder. The study combines the theory of mergers and acquisitions as instruments to restructure and shift assets to their most productive use in an industry with the role of investment banks as financial intermediaries. Acquisition sequences are means to grow externally by integrating the assets of acquired targets. This leads over time to the redeployment of assets to the most productive companies with the best investment opportunities.

Banks' expertise in acquirers' and targets' industries are highly correlated, because most M&As occur within an industry. If the serial acquirer hires a bank as advisor with an average expertise in the target's industry of 2.06% the probability of 54.18% to make a good acquisition decision increases by 2.42%. The cumulative abnormal return CAR(-2, 2) is 22.52% larger on average, too. This increase of the announcement returns provides an equity gain of 2,458,400 dollar, given a median market value of equity of 878 million dollar two days before the announcement and average CAR(-2, 2) of 0.0124. If the advising bank's target industry advisory experience increases by one more deal over the past three years an additional value creation of 2,195,000 dollar for the bidder is expected. Compared to an average value creation of 10,807,200 dollar in advised and unadvised deals the skills of bank advisors pay off for the bidder. The observed practice of CEOs and CFOs to invite prospective banks and to award the advisory mandate to the bank with the best industry expertise and a good track record in the target's industry, to hunt performance, is economic rational, particularly if the target operates in an industry the CEO or CFO are unfamiliar with. Better skilled banks that are more familiar with the bidder and more experienced in the target's industry execute transaction on average 77 days faster as well. Finally the likelihood to complete the bid is also greater.

However, deal completion is valuable for the bidder and his shareholders only if the transaction is value increasing. The upside potential of positive announcement returns and deal completion is one side of a good advisory service skilled banks ought to provide. The protection from the downside is the other part of a good advisory service. Protection from the downside is necessary for instance if after the official deal announcement more bidders enter the contest and drive up the acquisition price with an increasing probability of the winning bidder suffering from the winner's curse of overpayment for the target (Boone & Mulherin, 2008). A skilled bank ought to help the bidder to structure the bidding and negotiation strategy as well as the due diligence process to minimize the threat of overpayment caused by the winner's curse or an ex-ante overestimation of the synergies. Avoiding value destroying transactions and completing value creating ones is modeled with the dummy GOODADVICE that is one if a bid with a positive CAR(-2, 2) is completed or if a bid with a negative CAR(-2, 2) is withdrawn. This new measure of acquisition and advisory performance is positively correlated with bank advisors' expertise and strength of their relationships with bidders. At the announcement date the bidder and his advisors do not know perfectly whether the deal will create value. The announcement returns however are assumed to reveal whether the takeover will create value according to the efficient market hypothesis of perfectly rational market participants (Fama E. F., 1970).

The economic effects are observed while controlling for selection. The study controls for selection effects with instrumental variable (IV) fixed effects panel regressions in which the advisory choice of no bank advisor, a non-bulge-bracket bank, or a bulge-bracket bank is modeled with the Tobit-type selection indicator ADVISORCHOICE according to (Vella, 1998) who explains this procedure suggested by (Heckman, 1978) and (Hausman, 1978). The Tobit-type selection combines the decision whether the deal is advised, modeled by (Kale, Kini, & Ryan, 2003) and (Servaes & Zenner, 1996), with the decision whether to hire a bulge-bracket or non-bulge-bracket bank modeled by (Golubov, Petmezas, & Travlos, 2012) into one model. The econometric models used to correct for Tobit-type selection in the panel taken from the econometrics and labor economics literature extend the methodology of sample selection correction with the classic Two-step Heckit estimator of (Heckman, 1976; 1979) suggested by (Li & Prabhala, 2007) and used by (Golubov, Petmezas, & Travlos, 2012).

The focus on serial acquisitions is attributed to the potential win-win situation that a good acquisition performance supported by skilled bank advice has for the bidder and the bank. Banks as partners of serial bidders have not been considered in the recent corporate finance literature that examines acquisition sequences (Aktas, Bodt, & Roll, 2009; 2011; Ahern, 2008; Klasa & Stegemoller, 2007; Fuller, Netter, & Stegemoller, 2002). The bidder benefits from the skilled advice in terms of a greater likelihood to make value creating acquisition to exploit his set of investment opportunities, the number of profitable acquisition targets. The bank benefits in terms of strengthening its client relationship with the serial bidder who might hire the bank in a future transaction with the bank earning the advisory fees (McLaughlin, 1990; 1992; Hunter & Walker, 1990).

This idea of a mutually beneficial bidder-bank relationship leads to the hypothesis analyzed in the second essay "The bidder's selection and retention of his bank advisor - Its positive effect on the extension of acquisition sequences and formation of a hierarchical investment banking market" presented in chapter 3. If banks advice acquirers successfully they learn from the advisory experience, accumulate skills and client relationships. The accumulation of skills and relationships leads to a separation of the M&A advisory market with the most skilled banks at the top of a hierarchy advising the most complex transactions of the most frequent and largest bidders. The banks benefit from the higher advisory fees that are determined by the deals' size. The bidders with the best investment opportunities benefit from the advisory support to exploit these opportunities over several rounds of interacting with bank advisors they hire and retain. The idea of a round based game has been formulated theoretically by (Chemmanur & Fulghieri, 1994) and (Anand & Galetovic, 2006). The second essay investigates empirically the mechanisms of the round based interaction between banks and bidders that is repeated along acquisition sequences. It is indeed the case that banks with better advisory skills are more likely to be initially hired and then retained as advisors, enabling them to accumulate further advisory skills and client relationships. In the end the most skilled banks with the strongest client relationships, the bulge-bracket banks, dominate the M&A advisory market for large and complex transactions that require banks' expertise.

If a bank advised one more deal in the target's industry in the last three years its chance to be hired increases by 9.15% in the first step of the circular process or repeated game. If a bank advised the bidder in one more bid in the past three years its selection likelihood increases by 33.32% additionally. Reputation matters as well, because a standard deviation higher market share increases a bank's visibility in the SDC M&A Top-50 League Tables and advisory market and thus its selection probability by 28.26%. To be selected from the set off all banks in the SDC M&A universe with 45 to 392 banks per year the unconditional probability is 0.36 percentage points. To be initially selected improves the advising bank's unconditional probability by 4.53% to be retained as advisor. A more intensive client relationship of one more transaction advised in the past three years increases a bank's probability to be retained relatively by 60.47%.

Being aware of these effects banks also pitch deals to familiar bidders and are retained as advisors if the bidder accepts the deal proposal. The interrelatedness implies a simultaneous decision of acquisition sequence continuation and advisor retention. Familiarity with the acquirer from previously advised deals in terms of a standard deviation greater client relationship increases the retention probability in the current bid by 11.89% and the unconditional probability of a successor bid of 66.59% relatively by 5.25%. A standard deviation greater target industry expertise increases the retention probability by 27.29% and the probability to continue the acquisition sequence by 12.04%. The bank's advisory relationship strength and target industry expertise influence the bidder's M&A series continuation indirectly as well through the probability to be retained, which itself increases the probability of a successor deal by 15.65%. Finally retention as familiar advisor improves the bank's expertise in the target industry by 34.47%.

Going back to the first step of the repeated game the improved expertise increases the bank's probability to be initially selected as M&A advisor among all possible bank advisors and then to be retained. Besides the effects of banks' skills and familiarity with the bidders on sequence continuation those bidders with profitability investment opportunities above industry average who operate in large industries are in general more likely to make additional acquisitions (Jovanovic & Rousseau, 2002; Servaes, 1991; Lang, Stulz, & Walkling, 1989; Klasa & Stegemoller, 2007).

The repeated game starts all over, being a circular process or loop of interrelated and simultaneous self-enforcing interactions. Similar to the arguments of (Anand & Galetovic, 2006) and (Chemmanur & Fulghieri, 1994) the banks with the strongest client relationships and greatest industry expertise move to the top. The majority of specialized non-bulge-bracket banks or boutiques compete in a few industries at arm's length. Goldman Sachs advised 4,472 deals in the SDC M&A sample and in the final sample of 8,886 bid-bank matches 654 deals. It is followed by Merrill Lynch with 514 advised transactions. The Top-10 bank advisors account for 3,335 of the 8,886 bid-bank matches, or 37.53%. This is a very high concentration among the 274 banks that advise more than one deal in the subsample of 8,886 bid-bank matches.

The analyses of the two hypotheses revealed the econometric problem of double selection. In particular bulge-bracket banks are selected or select themselves into the largest transactions, which is observed for advised takeovers only. The selection problems in the two essays are solved with selection models and instrumental variable models for panel data taken from the econometrics and labor economics literature. The task however was to apply these models to a simplified selection process in a large corporate finance panel, which works well after all. Still the problem of double selection in panel data persists and inspired the development of a Three-step Heckit estimator for panel data with fixed effects. The first research project's third essay "A Three-step Heckit estimator for panel data with fixed effects - An application to bidders' advisor choice and returns in acquisition sequences" presented in chapter 4 develops the econometric model and applies it to the panel of serial acquisitions. In the end the Three-step Heckit estimator is an extension of the Two-step Heckit estimator for panel data developed by (Wooldridge, 1995). The mathematical derivation of the estimator turned out to be simpler than expected, because the first step univariate probit regression of the selection equation in the Two-step Heckit estimator is replaced by a bivariate probit model with selection of two selection equations. The problem of double selection has been discussed in the econometrics and labor economics literature since the 1980s, beginning with the development of the idea by (Tunali, Behrman, & Wolfe, 1980) and the formalization of the bivariate probit model with selection by (van de Ven & van Praag, 1981).

However, extension of the idea to use bivariate probit models' inverse mills ratios to correct for double selection in large panels with fixed effects is new. The derivation of the Three-step Heckit estimator's properties shows that the Two-step Heckit estimator of (Wooldridge, 1995) is just a special case of the more general Three-step estimator. If the correlation between the two selection equations approaches zero at most one selection equation is significant with the bivariate inverse mills ratios converging to the univariate inverse mills ratios of the Two-step Heckit estimator of (Heckman, 1976; 1979) adapted to panel data by (Wooldridge, 1995).

The Three-step Heckit estimator is flexible and general enough to allow the modeling of three types of double selection in panel data. Sequential double selection in the first two steps is estimated with the bivariate probit model with selection of (van de Ven & van Praag, 1981). Partially observed double selection occurring parallel can be estimated with the model of (Poirier, 1980). Finally partially observable sequential double selection is estimated with the model of (Abowd & Farber, 1982). From all three bivariate probit models bivariate inverse mills ratios, or in the case of zero correlation between the selection equations univariate inverse mills ratios, are computed and inserted as correction factors in the third step structural equation estimated with fixed effects on the subsample affected by selection.

Applied to the research project's panel of 30,908 M&As in acquisition sequences the particular bank advisor selection turns out to be significant regarding its selection effect in the estimation of the bank advisor choices' effects on serial bidders' returns. Selecting a bank advisor with a one more deal greater target industry expertise results in an additional equity gain of 965,800 to 1,668,200 dollar for the bidder. Hiring a familiar bank as advisor that assisted in one additional deal of the serial acquirer in the past three years has an equity effect of 790,200 to 1,053,600 dollar. Similar to the first essay's relative economic effects choosing a better skilled and familiar bank as advisor is beneficial compared to an average equity value creation of 7,463,000 dollar around the acquisition announcement. The estimated economic effects corrected for sequential double selection in the subsample of 8,886 bidder-bank matches are smaller than the economic effects estimated in the first essay. The first essay includes in the sample of 31,954 observations the counterfactual of no additional value creation in unadvised deals, whereas unadvised deals on average create more value indicated by higher announcement returns.

The three studies share the same sample of 30,908 US M&As from 1979 until 2006 with 718 investment banks of which 395 appeared in the SDC Top-50 M&A League Tables over the 28 year period. Furthermore, the major explanatory variables are shared by the three essays as well. The variables' description is combined in table C in the statistical appendix instead of presenting three almost identical tables. Tables A and B are also shared between the three essays. The primary independent bank variables of the industry expertise and advisory relationships strength are shared as well. Nevertheless, the depended variables, econometric models and research designs of the three essays differ, because the hypotheses address different issues arising in the assessment of the role of banks as serial bidders' advisors and their influence on value creation.

Besides the advice of skilled banks that creates value another source of value creation in M&As is the optimization of the newly acquired subsidiary's capital structure to save taxes. The second research project looks in two essays in chapters 5 and 6 at the influence of taxes and tax-related factors unique to M&As on the change of newly acquired subsidiary's capital structure. The first essay "The influence of taxes and tax factors on debt shifting in mergers and acquisitions" in chapter 5 is a study that examines debt shifting between the acquirer and new subsidiary. Former studies of (Desai, Foley, & Hines Jr., 2004) and (Huizinga, Laeven, & Nicodeme, 2008) take the structure of the conglomerate with its subsidiaries and parent holding at a point in time as given when analyzing taxes' effects on the capital structure. This essay examines the incentives to shift debt when the structure of the conglomerate changes by acquiring and including a new subsidiary. The takeover is a break in the structure of the enlarged conglomerate with adjustments to the capital structure of the newly acquired subsidiary and the parent company. To analyze the capital structure adjustments occurring during and after the M&A completion year the empirical analysis combines an event study with a window of at least (-3, 3) years around the M&A with a capital structure panel analysis according to (Flannery & Hankins, 2013).

The incentives to shift debt are modeled with four constructs according to the tax-based trade-off theory of (Kraus & Litzenberger, 1973), (Miller, 1977), and (DeAngelo & Masulis, 1980). The first major independent variable is the statutory tax rate difference between the bidder and target. The economic effect of a standard deviation larger tax rate difference of 0.54 percentage points more leverage of the new subsidiary is comparable to the tax effects of debt shifting between subsidiaries found by (Huizinga, Laeven, & Nicodeme, 2008) in the static case.

The tax rate difference is extended to incorporate differences in overall bankruptcy risk, collateral and debt carrying capacity, and interest and debt repayment capability. The first measure TAX_INCENTIVE_T_A is the tax rate difference effect interacted with differences in total assets between the target and acquirer. It is the multilateral measure of (Huizinga, Laeven, & Nicodeme, 2008), to model debt shifting between a conglomerate's subsidiaries, changed into a bilateral measure of differences between the new subsidiary and the acquiring conglomerate as one entity. Total assets are a general proxy for debt capacity and bankruptcy risk. Therefore, the size related tax incentive to shift debt is extend to the collateral related tax-tangibles measure TAX_TANGIBLES_T_A. The more tangible assets the acquiring parent or taken over target has, the better is its ability to exploit the interest tax shield by carrying more debt. Particularly to finance asset growth the availability of collateral is significant positively correlated with a higher leverage ratio. The ability to pay interest and principal to exploit a comparative tax advantage is measured with the tax-profitability measure TAX_PROFITABILITY_T_A. The comparative tax-profitability advantage is significant only for the shifting of financial debt, long-term and short-term interest bearing external debt. The ability to carry more interest-bearing debt is important to spread the financial debt used to finance the acquisition within the extended conglomerate's structure to optimize the overall tax-shield and bankruptcy trade-off. The trade-off theory based tax incentives' economic effects of 0.40 to 1.91 percentage points on new subsidiary's leverage are usually greater than the effect of the tax rate difference alone. Except for the profitability related tax incentives to shift debt the overall size and tangible assets related debt shifting incentives are mostly relevant for the total debt-to-assets ratio only and significantly less relevant for adjusted net debt or financial debt. The insight into the debt shifting process is the form of debt shifted within the internal capital market. The debt shifting between the newly acquired subsidiary and parent occurs through the accounts payable and receivable as a form of trade credit, which is included in the definition of total debt and excluded from the definitions of adjusted net debt and financial debt.

Furthermore, the use of holding companies, or "conduits", by financial investors in cross-border acquisitions, particularly to acquire loss-making companies, has an economic effect on target's leverage of 7 to 8 percentage points. The effect in the international setting is comparable to the effect observed in German multinationals by (Ruf, 2011) and (Mintz & Weichenrieder, 2010). The analysis of financial investors and holdings is difficult, because the analysis is restricted to 2.4% of transactions involving holdings. Unrestricted loss compensation of new subsidiary's loss carry forwards has a crowding-out effect on leverage, because it reduces the tax shield of debt. After the takeover the new subsidiary's debt-to-assets ratio decreases significantly.

Given that debt shifting between the acquirer and new subsidiary occurs during and after the M&A completion year in line with the trade-off theory the question remained how fast the capital structure of the new subsidiary is adapted. The effects of taxes during the M&A completion year and on the post-merger convergence towards a leverage target are analyzed in the second essay "Do firms have tax-influenced capital structure targets? Evidence from taken over companies that became subsidiaries" presented in chapter 6. Again the analysis combines an event study with at least (-3, 3) years around the M&A completion year with a target leverage convergence analysis adapted to international private and public companies from (Harford, Klasa, & Walcott, 2009) and (Kayhan & Titman, 2007). The tax rate difference between the new subsidiary and parent company drives a wedge between observed leverage and its target caused by the tax incentives to shift debt. This debt shifting effect however holds only for underleveraged taken over companies that have spare debt capacity left. Nevertheless, the change in the tax rate difference, the new subsidiary's statutory corporate tax rate and its leverage target have a significantly positive influence on changes in new subsidiary's leverage during the M&A completion year. The acquirer's statutory tax rate positively influences new subsidiary's financial leverage change as well, because a higher tax rate makes debt financing the acquisition more attractive with the financial debt being partly shifted to the new subsidiary. The acquirer's tax effect of approximately 4% on target's leverage is similar to the average jump of 4% in acquirer's leverage caused by debt financing the acquisitions. The analysis of the influence of a cash payment by the acquirer on subsidiary's financial leverage with a (Heckman, 1976; 1979) selection models confirms the effect. The debt used to finance the cash payment for the new subsidiary is spread evenly between the subsidiary and parent company.

After the M&A completion year the subsidiary's convergence towards target leverage is slower than in previous studies, because approximately only 26% of its pre-merger leverage deviation is reversed until the third year after the M&A. This convergence speed towards the benchmark is half as fast as the adjustment speed of acquirers of 54% to 75% found by (Harford, Klasa, & Walcott, 2009). After the M&A the debt-to-assets ratio of the subsidiary decreases, even though it is usually underleveraged before the takeover. The leverage deviation of the new subsidiary becomes more negative. These empirical observations are the opposite of the findings of (Harford, Klasa, & Walcott, 2009) and (Ghosh & Jain, 2000) of increasing leverage of acquirers and the joint company in the post-merger phase.

Besides the adjustment speed effects related to tax rates and tax rate differences the new subsidiary's capital structure convergence towards its leverage target is influenced by financial acquirers' employment of holdings. Holding companies are associated with a 4.52 percentage points increase in subsidiary's leverage during the M&A completion year. In the third post-merger year financial acquirers reduce the debt shifted to the new subsidiary. The leverage increasing effect caused by debt shifting through holdings during the M&A completion year is reversed by a faster post-merger adjustment speed until the third year. The analysis of holdings by financial investors is again difficult, because financial investors' deals account for 13.4% of all M&As in the sample. The effect of holdings is evident for total debt-to-assets, but not for adjusted net debt-to-assets and financial interest-bearing debt-to-assets. The conclusion is that the debt shifting through holdings shows up on the new subsidiary's and financial investor's balance sheets in the accounts payable and accounts receivable included in the definition of total leverage.

Both essays about the tax effects of debt shifting around M&As make use of the same panel of 1,844 international and domestic transactions between private and public companies. The variables are described in the statistical appendix in tables F and G with shared statutory tax rates, capital structure variables, control variables of the transaction's characteristics and inflation as well as the total debt-to-assets, adjusted net debt-to-assets and financial debt-to-assets ratios. The annual regressions of the leverage target adapted from (Kayhan & Titman, 2007) to private and public companies are shown in table H. The next chapters present the 5 essays. Chapter 7 includes the summary, followed by the econometric appendix with derivations and proofs of the Three-step Heckit estimator, the statistical appendix and the bibliography.

2. Tracking M&A advisors' track record - The positive influence of their industry expertise and advisory relationships on serial bidders' acquisition performance

2.1 Introduction

This study sheds light on the positive influence that bidders' advising banks have on the performance in acquisition series. The analysis is complementary to the literature that analyzes acquisition series but has not yet investigated the role of investment banks as advisors of serial bidders (Aktas, Bodt, & Roll, 2009; 2011; Fuller, Netter, & Stegemoller, 2002; Klasa & Stegemoller, 2007). The empirical observation of a positive influence of the advising bank's industry expertise and advisory relationship strength on the returns, completion probability, resolution speed and probability to make a good acquisition decision in terms of completing value creating deals and withdrawing from value destroying deals differs from the at best mixed observations of previous studies. (Bao & Edmans, 2011; Rau, 2000; Ismail, 2010; Hunter & Jagtiani, 2003; Chang, Shekhar, Tam, & Zhu, 2013). If the acquirer selects a bank as advisor with an average target industry expertise of 2.06% the average likelihood of 54.18% to make a good acquisition decision increases by 2.42%. The cumulative abnormal return CAR(-2, 2) is on average 22.52% larger as well, which denotes an equity gain of 2,458,400 dollar compared to an average equity increase of 10,807,200 dollar. A greater expertise of the advising bank that advised one more deal in the target's industry in the past three years is associated with an additional equity gain of 2,195,000 dollar for the bidder. It is economic rational of CEOs and CFOs to hunt performance by selecting banks as advisors with a lot of advisory experience and a good track record in their and the target's industry. This study therefore extends the analyses of (Kale, Kini, & Ryan, 2003), (Sibilkov & McConnell, 2013) and (Golubov, Petmezas, & Travlos, 2012) who also observe a positive influence of advising investment banks on acquirers' returns and (Chang, Shekhar, Tam, & Zhu, 2013) who model banks' industry expertise and bank selection.

in the analysis of bidders' returns the methodological innovation is the extension of the definition what a good advisory performance of a bank advisor is. Maximizing the bidder's cumulative abnormal returns (CAR) is one side of the advisory performance. A good advisor ought to protect the bidder from losses as well, for instance the winner's curse in takeover auctions, which is the other side of the advisory performance (Boone & Mulherin, 2008). Therefore, the advisory performance of supporting the decision whether a value creating deal with a nonnegative CAR is completed is extended by the decision to withdraw from a value destroying deal with a negative CAR. This measure extends the separate measures of (Kale, Kini, & Ryan, 2003) and (Golubov, Petmezas, & Travlos, 2012) into a unified one based on the efficient market hypothesis (Fama E. F., 1970) of the CAR as reaction of rational market participants indicating value creation or destruction.

To analyze the influence of banks' skills on bidders' acquisition performance the advisory skills of investment banks are not assumed to be represented by an indirect measure of reputation, the SDC Top-50 M&A League Table market share MS (Rau, 2000; Sibilkov & McConnell, 2013; Francis, Hasan, & Sun, 2008; Kale, Kini, & Ryan, 2003). The SDC M&A League Table market share is biased against smaller banks. The market share of bulge-bracket banks is ten times larger than the average market share of non-bulge-bracket banks. Banks also ratchet up their SDC League Table market share to look better in the rankings (Derrien & Dessaint, 2012). Depending on the approximation of expertise used the perception of differences between the types of banks ranges widely.

Modeling the expertise directly in each industry makes it possible to compare bulge-bracket banks, the top-10 banks in the SDC Top-50 M&A League Tables, and non-bulge-bracket banks as intermediaries in the market for corporate control (Hunter & Walker, 1990; Andrade & Stafford, 2004). Non-bulge-bracket banks are specialized in certain industries and thus advise fewer transactions than bulge-bracket banks that operate in all industries (Song, Zhou, & Wei, 2013). The average industry specific expertise of bulge-bracket banks is only three times larger than the average industry expertise of non-bulge-bracket banks. The banks' industry expertise modeled as the fraction of M&As advised in the acquirer's and target's industries in the previous three years approximates their relative advisory experience and access to industry information compared to other banks. This direct industry measure of advisory skills is adapted from (Sibilkov & McConnell, 2013) and (Chang, Shekhar, Tam, & Zhu, 2013). For each investment bank its industry expertise in 49 (Fama & French, 1997) industries and advisory relationship strength with the bidders is calculated every year (Benveniste, Busaba, & Wilhelm, 2002; Sibilkov & McConnell, 2013; Chang, Shekhar, Tam, & Zhu, 2013; Allen, Jagtiani, Peristiani, & Saunders, 2004; Forte, Iannotta, & Navone, 2010).

The third contribution of this study is the extension of understanding the factors that drive performance in acquisition sequences (Ahern, 2008; Aktas, Bodt, & Roll, 2009; 2011; Fuller, Netter, & Stegemoller, 2002; Klasa & Stegemoller, 2007). The characteristics of the transactions and acquisition experience of the bidding company change over the course of successive M&As. The changes of the acquirer, target and deal characteristics influence the need for the advisory skills of an investment bank as well as the acquisition performance (Fuller, Netter, & Stegemoller, 2002). This analysis shows that the building of advisory relationships and the matching of experienced banks with the most frequent serial acquirers is efficient in terms of higher returns, better advice, less time to complete or withdraw the deal and higher completion probabilities. These empirical observations support the neoclassical theory of mergers and acquisitions (Andrade, Mitchell, & Stafford, 2001; 2004; Harford, 2005; Mitchell & Mulherin, 1996; Maksimovic & Phillips, 2001). The companies with the largest investment opportunity sets, approximated by Tobin's Q, make acquisitions with higher returns, supported by investment banks as financial intermediaries (Lang, Stulz, & Walkling, 1989; Hunter & Walker, 1990; Klasa & Stegemoller, 2007).

The endogeneity arising from selection along the acquisition series is modeled with instrumental variable (IV) fixed effects GLS panel and IV fixed effects probit models of the announcement returns, likelihood of good advice, deal completion probability and resolution speed (Vella, 1998; Hausman, 1978; Heckman, 1978; Wooldridge, 2002e; 2002d). The econometric methods to correct selection biases in panel data are explained well by (Wooldridge, 2002d; 2002e). (Vella, 1998) provides an excellent overview of the application of selection models to pooled and panel data. For robustness checks and comparability to the studies of (Golubov, Petmezas, & Travlos, 2012) and (Kale, Kini, & Ryan, 2003) pooled Heckman Two-step estimators and bivariate probit models with selection are used (Heckman, 1976; 1979; Greene, 2008a; 2008b). For the analysis a panel of 30,908 bids or acquisitions with 31,954 observations, one to six for advised deals, in acquisition series of 1 to 98 M&As from 1979 to 2006 by 10,280 bidders is used, which is constructed from the SDC M&A database.

In which way the empirical observations are obtained is subject of the next sections. The chapter continues in section 2 with the literature and hypothesis development. Section 3 describes the sample selection and data preparation.

Section 4 defines the variables. Section 5 includes the univariate analysis. Section 6 presents the multivariate analyses. Section 7 finishes with the conclusion.

2.2 Literature review and hypothesis development

The expertise of the advisor is expected to complement the acquisition experience of the acquirer who learns to make shareholder value increasing acquisitions particularly if his investment opportunity set is large (Aktas, Bodt, & Roll, 2009; 2011; Klasa & Stegemoller, 2007). According to (Klasa & Stegemoller, 2007) serial acquirers make consecutive acquisitions to exploit growth opportunities according to the neoclassical theory of mergers and acquisitions (Andrade & Stafford, 2004; Gort, 1969). The targets with the largest synergies and lowest transaction costs are acquired first (Ahern, 2008). Therefore, the announcement returns are expected to be higher at the beginning of the sequence than at the end (Aktas, Bodt, & Roll, 2009; 2011; Ahern, 2008; Croci & Petmezas, 2009; Fuller, Netter, & Stegemoller, 2002).

If the benefits of an acquirer-advisor relationship with a bank that has industry expertise exceed the advisory fees in comparison of doing the acquisitions without advice the advisor choice and maintenance of the relationship are beneficial for the acquirer (Hunter & Walker, 1990; Golubov, Petmezas, & Travlos, 2012). It follows that a greater industry expertise of the financial advisor ought to improve the M&A performance by supporting the acquirer in the bidding process and structuring of the transaction. These arguments lead to the hypothesis that the advising bank's industry expertise and familiarity with the bidder improves his acquisition performance due to bank's greater advisory skills and access to information in the acquirer’s and target’s industries, supporting the exploitation of his set of investment opportunities.

Nevertheless, the mixed evidence of the advisory performance of M&A advisors is puzzling given their task to reduce the transaction costs, contracting costs and information asymmetry between the acquirer and target about the unknown present value of the transaction. (Rau, 2000) observed that the market share of an investment bank does not depend on the past returns of advised deals, but the number of completed deals. Moreover, (Rau, 2000) discovered that acquirers advised by bulge-bracket banks earn lower announcement returns and pay higher acquisition premia. The empirical observations of (Ismail, 2010) are similar for reputable investment banks. In a comparable vain (Hunter & Jagtiani, 2003) show that the returns are smaller and the speed of completion is slower, while the probability of completion similarly to (Rau, 2000) is higher, if a bulge-bracket bank is employed as advisor. On the target’s side (Ma, 2005) shows that the employment of a reputable financial advisor does not hurt the acquirer, which is comparable to the observation of (Kale, Kini, & Ryan, 2003). (Servaes & Zenner, 1996) do not find that the employment of a bank as advisor has an advantage compared to seeking advice in-house. (Bao & Edmans, 2011) discovered that the performance of M&A advisors with respect to the announcement returns is persistent as acquirers do not chase performance. The smaller non-bulge-bracket banks have significantly higher persistent returns than bulge-bracket banks. So far (Kale, Kini, & Ryan, 2003), (Sibilkov & McConnell, 2013) and (Golubov, Petmezas, & Travlos, 2012) are among the few who find a positive effect for the acquirer of employing a financial advisor with a relatively better reputation.

The basic assumption for the employment of an investment bank as advisor is that skilled investment banks provide a better matching between the acquirer and potential targets according to the arguments of (Hunter & Walker, 1990) and

(McLaughlin, 1990; 1992). Investment banks as financial intermediaries reduce the information asymmetry between the acquirer and target in acquisitions. (Servaes & Zenner, 1996) argue that besides the information asymmetry the higher the transaction costs, arising from the deal's complexity, and contracting costs of potential agency conflicts the more likely is the employment of a financial advisor by the acquirer. The task of the advising investment bank is the reduction of these costs for the acquirer. (Aktas, Bodt, & Roll, 2009; 2011) and (Servaes & Zenner, 1996) argue that experienced acquirers are less likely to need the advice of a bank because of their learned ability to reduce these costs themselves.

The contracting costs arise from potential agency problems such as managerial overconfidence, empire building or hubris, and the use of overvalued stock as acquisition currency (Roll, 1986; Morck, Shleifer, & Vishny, 1990; Dong, Hirshleifer, Richardson, & Teoh, 2006; Malmendier & Tate, 2005a; 2005b; 2008). According to (Cornaggia & Rau, 2002) investment banks are hired to certify the value of the acquisition to shareholders that the management is not empire building and the M&A creates value. The bank itself has no interest to get involved in agency conflicts as such a conflict most likely hurts the bank's reputation (McLaughlin, 1990; 1992).

This leads to the first selection equation that the probability to employ a bank as advisor is increasing in the transaction costs, contracting costs and information asymmetry and decreasing in the acquirer's acquisition experience (Servaes & Zenner, 1996). The acquirer's experience is increasing along the acquisition series and reduces the likelihood of successive transaction being advised. Furthermore, the more complex the transaction is the more likely is the choice of a more reputable investment bank, a bulge-bracket bank, than a less reputable investment bank (Song, Zhou, & Wei, 2013; Golubov, Petmezas, & Travlos, 2012). The three-tier decision of the bid being unadvised, advised by a non-bulge-bracket bank or by a bulge-bracket bank assumes an order of the advisory decision. The second selection equation of the order of the advisory decision captures these arguments that the probability of a non-bulge-bracket or bulge-bracket bank being the advisor is increasing in its past advisory performance as well as the complexity of the transaction. The two selection equations incorporate the potential endogeneity in the analysis to solve the puzzle of often opposing empirical results. A dataset of mergers and acquisitions from 1979 to 2006 is used to analyze the hypothesis and selection effects along acquisition sequences.

2.3 Sample preparation and description

To examine the hypothesis the analysis focuses on acquirers that make at least one acquisition or more. The sample of mergers and acquisitions with US targets and disclosed transaction values is taken from the SDC mergers and acquisitions database. The sample selection and data preparation process is summarized in table 1. The same sample is used in chapters 3 and 4 as well. The distribution of transactions in each year, the number of banks in SDC M&A sample A, the SDC Top-50 M&A League Tables and observed bank-deal matches are shown in table 1, too. Sample A includes 61,676 acquisitions or bids before merging with Compustat. It is used to calculate the banks' industry expertise in targets' and acquirers' industries and the acquirer-advisor relationship strength for each bank with each acquirer. After merging with Compustat and CRSP 30,908 acquisitions or bids are left from 01/01/1979 to 12/31/2006.

Table 1: Data preparation and sample statistics

The sample is taken from the SDC Mergers & Acquisitions database. The sample includes US targets only. The deals included are M&As (1, 2), spinoffs & splitoffs (4), tender offers (5), minority stake purchases (10), acquisitions of remaining interest (11), and privatizations (12). The initial sample of 208,654 deals from 01/01/1979 to 12/31/2008 is reduced by missing Compustat data as well as incomplete variables. The final sample includes only M&As of corporate acquirers as well as stake purchases. Most deals without Compustat data involve private acquirers. The final sample includes deals from 01/01/1979 to 12/31/2006. Panel F includes the major statistics of the acquisition sequences. Panel G reports the distribution of the bids and acquisitions over time, the number of advised bids/acquisitions per year, the number of investment banks included in the SDC M&A sample and SDC M&A League Tables and the actuallyobserved bid-bank matches.

Panel A: Observation elemination before merging the data with Compustat

Steps in the Process	deals excluded	M&As
1. The total SDC M&A sample		208,654
2. Excluding self tenders, recapitalisations and repurchases	20,328	188,326
3. Excluding "Creditors", "Investor", "Investors", "Investor Group", "Shareholders", "Undisclosed Acquiror", "Seeking Buyer", and "Employee Stock Ownership Plan"	21,548	166,778
4. Excluding deals with status of "Unknown Status", "Rumor", "Discontinued Rumor", "Intended", "Intent withdrawn", "Pending" and "Seeking Target"	23,640	143,138
5. Excluding acquisitions/bids with undisclosed transaction values	76,073	67,065
6. Excluding individual and financial acquirers	5,352	61,713
7. Excluding bids in which the target is the same company as the acquirer	37	61,676
Sample A before the merging processes, used to compute the industry experience and acquirer-advisor relationship strengh variables		61,676

Panel B: Merging with the Compustat sample

Steps in the Process	deals excluded	M&As
8. Complete Compustat annual files from 1976 to 2006 (Industrial North America)		609,162
9. Keeping the consolidated parent with common stock (cic = 1xx)	8,965	600,197
10. Keeping company-years with positiv total assets	41,934	558,263
Compustat sample before the merging processes, used to compute the industry variables in each Fama & French (1997) industry		558,263
11. Deals with Compustat data available for the acquirer, merged by the CUSIP		39,053

Panel C: Merging with the CRSP sample

Steps in the Process	deals excluded	M&As
12. Deals with available announcement returns after merging with CRSP		33,231

Panel D: Observation elimination after merging with Compustat & CRSP

Steps in the Process	deals excluded	M&As
13. Excluding acquisitions/bids without acquirer's leverage, ROA and Tobin's Q	2,323	30,908
Sample for the analysis of acquisitions/bids with anouncement returns		30,908
Thereof unadvised acquisitions/bids (1)		23,068
Thereof advised acquisitions/bids		7,840
Bank matches with the advised acquisitions/bids (2)		8,886
Final sample B of unadvised and bank matched advised M&As (1+2)		31,954

Panel E: Preparing the SDC Global Debt & Equity Issues to calculate the exclusion restriction

Steps in the Process	issues excluded	Issues
14. Debt and equity issues from 1976 to 2006		852,896
15. Excluding issues with missing transaction values	97,629	755,267
16. Excluding issues without an underwriter	1	755,266
Final sample C to calculate the exclusion restriction SCOPE		755,266

Table 1 (cont.): Data preparation and sample statistics

Panel F: Major acquisition series characteristics in the final sample

Variable	N	Mean	Median	Std.Dev.	Min	Max
Number of acquisitions/bids in the final sample	30,908	---	---	---	---	---
Number of acquirers/bidders in the final sample	10,280	---	---	---	---	---
Acquisitions per acquirer and sequence	---	3.0	2.0	4.0	1	98
Days between acquisitions/bids	---	499.7	224.0	760.1	0	9289
Days between the 1st and 2nd bid in SDC	---	736.6	369.5	1012.6	0	9289
Days between the 2nd and 3rd bid in SDC	---	600.0	305.0	798.6	0	8141
Days between the 3rd and 4th bid in SDC	---	504.5	263.0	705.5	0	6070
Days between the 4th and 5th bid in SDC	---	438.5	198.5	631.4	0	6177
Days between the 5th and 6th and higher bid in SDC	---	303.6	135.0	473.6	0	5517

Panel G: Time series of bids, banks and bid-bank matches

	advised and unadvised bids/acquisitions		bid-bank matches and banks		
Year	Bids / Acquisitions	Advised Deals	bid-bank matches	Banks in SDC sample A	SDC M&A League Table Banks (#)
1979	9	6	7	45	20
1980	45	22	23	83	49
1981	289	62	65	136	50
1982	402	68	73	172	50
1983	540	89	95	170	50
1984	615	110	115	164	51
1985	303	111	124	148	50
1986	479	176	193	210	50
1987	482	121	129	242	50
1988	546	167	180	261	50
1989	687	166	194	295	50
1990	646	118	132	256	50
1991	731	112	129	263	50
1992	965	158	167	271	51
1993	1,229	230	282	281	50
1994	1,600	351	398	345	50
1995	1,651	404	438	342	50
1996	1,989	477	515	351	50
1997	2,627	635	710	392	50
1998	2,669	613	681	351	50
1999	2,079	579	642	355	50
2000	1,919	597	695	318	50
2001	1,396	462	537	312	50
2002	1,330	365	407	292	50
2003	1,293	367	413	292	50
2004	1,387	421	494	336	50
2005	1,508	441	531	366	50
2006	1,492	412	517	351	50
Total	30,908	7,840	8,886		

Sample B with 31,954 observations is larger than the samples of sequences of up to five bids used in previous research (Fuller, Netter, & Stegemoller, 2002; Aktas, Bodt, & Roll, 2009; 2011; Ahern, 2008).

It follows that the definition of an acquisition sequence is everything in excess of one acquisition without any maximum or minimum requirement of the length of the acquisition sequence. The time between successive transactions is on average 500 days and longer than in previous studies (Ahern, 2008; Croci & Petmezas, 2009). Nevertheless, the pattern of decreasing time gaps between successive bids within the acquisition sequence is similar to the pattern observed by (Aktas, Bodt, & Roll, 2009; 2011) and predicted by their theory that with increasing acquisition experience the acquisitions are made in shorter succession. The average time gap of 737 days between the first and second bid decreases to 304 days between sixths and later bids. The final sample of 30,908 acquisitions or bids includes 10,280 different acquirers. M&A announcements of different deals occurring on the same day are ordered by their deal number[1]. The variables used to analyze the influence of bank advisors' expertise on bidders' performance in acquisition sequences is subject of the next section.

2.4 Description of variables

To test the hypothesis the dependent variable shown in table 2 is the cumulative abnormal return CAR(-2, 2) calculated with the Beta-1 model using the CRSP value weighted index as capital market proxy from 2 days before to 2 days after the

[1] One can argue whether to keep deals announced on the same date in the sample. However, there is no theoretically sound procedure which deals to exclude and which to retain. The few deals announced on the same date with different targets share the same cumulative announcement returns. The deals could be considered as one comprehensive deal, but they have different deal characteristics.

announcement of the M&A. The Beta-1 model is used to avoid the problem of overlapping M&As in the pre-merger estimation period (Aktas, Bodt, & Cousin, 2007; Fuller, Netter, & Stegemoller, 2002). Nevertheless, CARs with event windows (-1, 1) and (-3, 3) calculated for each M&A with the CAPM from -270 to -21 trading days before the announcement date, to exclude the pre-merger stock price run-up period, are used in the sensitivity analysis (Mitchell, Pulvino, & Stafford, 2004; Brown & Warner, 1985; 1980). Similar to (Rau, 2000) and (Hunter & Jagtiani, 2003) the dummy COMPLETED is 1 if the transaction has been completed and the variable RESOLSPEED is the time in days from the announcement until the completion or withdrawal of the M&A. A new performance measure is the dummy GOODADVICE that is 1 if a bid with a nonnegative CAR(-2, 2) is completed or withdrawn in the case of a negative CAR(-2, 2) and 0 otherwise. This dummy is a combination of the announcement returns and the probability to complete a transaction, which approximate the upside of a good M&A decision and advisory performance. Bank advisors also ought to protect their clients from losses, which (Kale, Kini, & Ryan, 2003) have analyzed separately. Furthermore, banks' concern for their reputation provides incentives not to "get the deal done" if deal completion harms their clients (McLaughlin, 1990). The downside of a negative CAR(-2, 2) refers to the winner's curse in takeovers as well, because after the deal announcement new bidders might enter the bidding contest, which can lead to overbidding if the bank advisor and bidder cannot adapt the bidding and negotiation strategy accordingly (Boone & Mulherin, 2008). In unadvised transactions the dummy GOODADVICE models the ability of serial acquirers to make good acquisition decisions according the learning hypothesis of (Aktas, Bodt, & Roll, 2009; 2011). The reliance on the announcement returns whether the deal will create or destroy value is based on the efficient capital markets hypothesis of (Fama E. F., 1970). The assumption is that the perfectly rational market participants' reaction to the announcement is indicative of the value created in the proposed transaction.

To test the two selection equations whether the M&A is advised, or by which advisor type, the dependent variables are ADVISED and ADVISORCHOICE. ADVISED is a dummy variable whether the bid or acquisition is advised by at least one investment bank and 0 otherwise (Servaes & Zenner, 1996). The ordered advisory choice of no advisor (1), a non-bulge-bracket bank (2) or a bulge-bracket bank (3) is modeled with the Tobit-type selection indicator ADVISORCHOICE. ADVISORCHOICE combines the selection dummy ADVISED of (Kale, Kini, & Ryan, 2003) and (Servaes, 1991) with the bulge-bracket or non-bulge-bracket bank dummy "Top-tier" of (Golubov, Petmezas, & Travlos, 2012) in one selection indicator. ADVISED and ADVISORCHOICE serve as selection indicators in the multivariate analysis (Heckman, 1976; 1978; 1979; Vella, 1998). The selection models used are explained in detail in econometric appendix E.1.

The independent variables used to approximate the access of investment banks to information in acquirers' and targets' industries and to acquirers' private information are adapted and modified from previous research (Benveniste, Busaba, & Wilhelm, 2002; Forte, Iannotta, & Navone, 2010; Chang, Shekhar, Tam, & Zhu, 2013; Sibilkov & McConnell, 2013). The industry expertise as a direct measure of advisory skills to reduce transaction costs and access to information to overcome information asymmetries is based on the neoclassical theory of M&As. M&As are means to shift the assets of an industry to its most productive users with banks as intermediaries facilitating the process (Andrade & Stafford, 2004; Gort, 1969; Hunter & Walker, 1990). The approximation of the industry expertise is based on the M&As advised in the past three years. A larger number of advised M&As is associated with more information being available about the advised companies and their competitive environment. With more transactions advised the bank learns how to advise M&As better by accumulating advisory skills (Chemmanur & Fulghieri, 1994).

Table 2: Descriptive statistics of variables

This table reports the sample statistics of the dependent, bank, bidder and transaction variables. The variables are described in table C in the statistical appendix. The continous variables are winsorized at the upper and lower 1 percentile to exclude outliers.

Panel A: Descriptive statistics of the dependent variables

Variable	N	Mean	Median	Std.Dev.	Min	Max
CAR_(-2,2)_BETA1_vw	31,954	0.0124	0.0043	0.0788	-0.1994	0.3135
GOODADVICE	31,954	0.5418	1.0000	0.4983	0.0000	1.0000
RESOLSPEED	31,757	77.3367	43.0000	103.8303	0.0000	730.0000
COMPLETED	31,954	0.9416	1.0000	0.2346	0.0000	1.0000
ADVISED	31,954	0.2781	0.0000	0.4481	0.0000	1.0000
ADVISORCHOICE	31,954	1.4025	1.0000	0.6995	1.0000	3.0000
Panel B: Descriptive statistics of the bank/advisor variables						
IEDA	31,954	0.0213	0.0000	0.0546	0.0000	0.6667
IEDT	31,954	0.0206	0.0000	0.0532	0.0000	0.6574
IEVA	31,954	0.0340	0.0000	0.0960	0.0000	0.9418
IEVT	31,954	0.0331	0.0000	0.0939	0.0000	0.8879
ARSD	31,954	0.0154	0.0000	0.0847	0.0000	1.0000
ARSV	31,954	0.0155	0.0000	0.0854	0.0000	1.0000
MS	31,954	2.7883	0.0000	7.5363	0.0000	94.6000
RELREP	31,954	2.2085	0.0000	11.4739	0.0000	376.0000
PASTBBCAR	31,954	0.0067	0.0000	0.0514	-0.1994	0.3135
PASTBIDDERCAR	31,954	0.0079	0.0000	0.0618	-0.1994	0.3135
PASTCOMPLETED	31,954	0.4736	0.0000	0.4993	0.0000	1.0000
PASTGOODADVICE	31,954	0.2752	0.0000	0.4466	0.0000	1.0000
PASTRESOLSPEED	31,954	35.7533	0.0000	82.2297	0.0000	730.0000

Table 2 (cont.): Descriptive statistics of variables

Panel C: Descriptive statistics of the bidder variables						
Variable	N	Mean	Median	Std.Dev.	Min	Max
SCOPE	31,954	0.3036	0.0000	0.4598	0.0000	1.0000
DEALS3YEARS	31,954	1.7123	1.0000	2.9486	0.0000	41.0000
LOGME	31,954	20.3974	20.3154	2.1567	15.0841	25.7360
LNIS	31,954	6.6107	6.7719	0.9283	1.6094	7.9491
TobinsQ	31,954	2.1307	1.4492	2.1052	0.7074	16.1560
ITobinsQ	31,954	2.1184	1.8862	0.9232	0.8867	6.2588
ATobinsQ	31,954	0.0124	-0.2253	1.8525	-5.1792	14.9771
ROA	31,954	0.0557	0.0684	0.1473	-1.0911	0.3314
IROA	31,954	-0.0346	0.0075	0.1098	-0.7143	0.1666
AROA	31,954	0.0903	0.0718	0.1661	-1.1947	0.7949
LEVERAGE	31,954	0.2382	0.2060	0.2023	0.0000	0.9980
ILEVERAGE	31,954	0.2645	0.2708	0.0772	0.0752	0.4962
ALEVERAGE	31,954	-0.0263	-0.0532	0.1829	-0.4599	0.8223
Panel D: Descriptive statistics of the transaction variables						
DIVERS	31,954	0.4288	0.0000	0.4949	0.0000	1.0000
MAJORITY	31,954	0.9487	1.0000	0.2206	0.0000	1.0000
PUBLIC	31,954	0.2065	0.0000	0.4048	0.0000	1.0000
RDS	31,954	0.2467	0.0692	0.5036	0.0002	3.6040
TADVISORTIER	31,954	0.5352	0.0000	0.7529	0.0000	2.0000
MULTIPLE	31,954	1.0271	1.0000	0.2050	1.0000	8.0000
ANTITAKEOVER	31,954	0.0379	0.0000	0.1909	0.0000	1.0000
FAMILY	31,954	0.0031	0.0000	0.0553	0.0000	1.0000
LITIGATION	31,954	0.0181	0.0000	0.1334	0.0000	1.0000
REGULATORY	31,954	0.2898	0.0000	0.4537	0.0000	1.0000
CROSSBORDER	31,954	0.0612	0.0000	0.2397	0.0000	1.0000
DIVERSIFICATION	31,954	0.5002	0.0000	0.5794	0.0000	3.2189
TOEHOLD	31,954	1.8860	0.0000	10.2811	-0.0300	99.8000
HIGHTECH	31,954	0.2874	0.0000	0.4526	0.0000	1.0000
STOCK	31,954	0.1859	0.0000	0.3891	0.0000	1.0000
CASH	31,954	0.2423	0.0000	0.4285	0.0000	1.0000
MIXED	31,954	0.1951	0.0000	0.3963	0.0000	1.0000
OTHER	31,954	0.0868	0.0000	0.2816	0.0000	1.0000
FIRST	31,954	0.3302	0.0000	0.4703	0.0000	1.0000
SIXTH	31,954	0.2518	0.0000	0.4341	0.0000	1.0000

The industry expertise $\mathrm{IE}_{i,k,t}$ of investment bank i is measured either by the number (D) or dollar volume (V) of acquisitions advised with respect to the total number of advised acquisitions $j = 1,...,N$ in each of the $k = 1,...,49$ (Fama & French, 1997) industries in the three years $t-1$, $t-2$, $t-3$ preceding year t of the acquisition or bid. The industry expertise is a relative measure that compares the bank's expertise relative to the expertise of other banks who advised acquisitions or bids in the same industry. The industry expertise of bank i in industry k in year t measured by the number of deals (D) advised is defined as

$$\mathrm{IED}_{i,k,t} = \frac{\left(\frac{\text{advised\_deals}_{i,k,t-1}}{\text{advised\_industry\_deals}_{k,t-1}} + \frac{\text{advised\_deals}_{i,k,t-2}}{\text{advised\_industry\_deals}_{k,t-2}} + \frac{\text{advised\_deals}_{i,k,t-3}}{\text{advised\_industry\_deals}_{k,t-3}} \right)}{3}$$

For instance if the advised acquirer is from the ship building industry and the advised target is from the transportation industry, the acquisition or bid is counted in the year of the announcement once for the ship building industry and once for the transportation industry. If the target and the acquirer are advised and from the same industry the bid is counted only once for the industry to avoid double counting. Double counting is avoided, because an investment bank can advise either the target or the acquirer but not both at the same time. The avoidance of double counting ensures that an investment bank participating in every advised transaction on either the target's or acquirer's side has a maximum industry expertise of 1. Only bids that are advised on the acquirer side, the target side, or on both sides are counted for the number of advised industry deals.

For instance in 1998 Goldman Sachs had an industry expertise in the ship building industry of 0.1111. This is computed by the number of M&As Goldman Sachs advised in the preceding year 1997 divided by the number of all advised M&As in the ship building industry in 1997, which is 1/3. Goldman Sachs did not advice any deal in the ship building industry in 1996 and 1995. The industry expertise by deals (D) of Goldman Sachs in 1998 is $IED_{GS,Ships,1998} = \left(0.\overline{3}+0+0\right)/3 = 0.\overline{1}$. The normalization with 3 ensures that the industry expertise is a ratio between 0 and 1. The maximum industry expertise of 1 corresponds to 100% if Goldman Sachs had participated as advisor on the acquirers' or targets' sides in all advised deals in the ship building industry in the preceding three years. The ratio of 0 to 1 therefore approximated the banks' relative competitiveness by their expertise. The industry expertise based on the number (D) of deals or dollar volume (V) in the acquirer's (A) and the target's (T) industries are IEDA, IEDT, IEVA and IEVT, which are shown in table 2. The same variables are used in chapters 3 and 4, too.

In the final sample IEDT and MS are positively correlated, because bulge-bracket banks operate in almost every industry and thus have high rankings in the SDC M&A League Tables. Non-bulge-bracket banks are highly specialized on certain industries with an on average smaller industry expertise and lower ranking. For instance in the (Fama & French, 1997) industry "Aero" of aircraft manufacturing the correlation between MS and IED ranges from -0.1446 in 1982 to 0.8405 in 1998, with an overall correlation of 0.2962. The annual correlation between IED and MS per year over all industries ranges from 0.2371 in 1982 to 0.5703 in 2000.

The calculation of the proxy for the access to the private information $I_{i,B,t}$ of bidder B of bank i at time t is similar to the calculation of the proxy for industry expertise. The proxy for the access to bidder information is the advisory relationship strength ARS based on the arguments of (Anand & Galetovic, 2006) that building relationships by investment banks with bidding companies enables banks to get access to their private information. The advisory relationship strength is based on the number of M&As bank i advised with respect to the number of all advised M&As the acquirer conducted in the three years preceding the considered bid. In this case the strength of the advisory relationship is a relative measure compared to the strength of the advisory relationships the bidder has with other banks. The variable for the advisory relationship strength by deals (D) is ARSD. For the sensitivity analysis the dollar value (V) based definitions IEVT and ARSV of the industry expertise and advisory relationship strength are used. The industry expertise and the acquirer-advisor relationship strength variables of the Top-25 investment banks in the SDC League Tables and sample A are summarized in table A in the appendix. The variables are described in table C in the statistical appendix. Table A and C are shared with chapters 3 and 4.

For the sensitivity analysis the bidder's advising bank's market share MS as reputation proxy is used. In previous studies a higher reputation is associated with better investment banking skills (Rau, 2000; Carter & Manaster, 1990; Kale, Kini, & Ryan, 2003). The market shares of investment banks is taken from the SDC Top-50 M&A League Tables according to (Rau, 2000), (Francis, Hasan, & Sun, 2008), (Kale, Kini, & Ryan, 2003) and (Sibilkov & McConnell, 2013). The market share MS of investment banks not included in the SDC Top-50 M&A League Tables is set to the minimum of 0.1. On the target's side the bank with the highest SDC Top-50 M&A League Table market share is considered to be the lead advisor (Carter & Manaster, 1990; Kale, Kini, & Ryan, 2003). Related to the market share MS is the relative reputation RELREP, which is the acquirer advisor's market share MS divided by the target advisor's market share (Kale, Kini, & Ryan, 2003). If the target does not employ an advisor the variable RELREP is simply the bidder advisor's market share MS.

Finally the past performance of the M&As advised by banks is modeled comparably to (Rau, 2000) and (Hunter & Jagtiani, 2003). PASTBBCAR is the value weighted CAR(-2, 2) of the bidder's previous M&A if he was advised by the same bank, the bidder-bank matching, or of the previous unadvised deal if no advisor is chosen in the current bid. It is the past CAR(-2, 2) multiplied with the dummy whether the CAR(-2, 2) is available. PASTBIDDERCAR is the value weighted CAR(-2, 2) of the acquirer's previous M&A independent of the past advisory status. PASTGOODADVICE is 1 if the previous deal advised by the same bank that advises the current bid with a nonnegative CAR(-2, 2) was completed, or withdrawn in the case of a negative CAR(-2, 2), and 0 otherwise. In the case of an unadvised bid PASTGOODADVICE is the dummy GOODADVICE of the previously unadvised deal. PASTCOMPLETED and PASTRESOLSPEED are defined for the past dummy COMPLETED and past variable RESOLSPEED analogously to PASTBBCAR and PASTGOODADVICE. All variables are defined in table C in the statistical appendix.

The calculations of the industry expertise IED, advisory relationship strength ARS, market share MS and past performance variables require the tracking and controlling of bank mergers and banks' name changes. The assumption is that successor banks inherit the expertise and advisory relationships of their predecessors. The ultimate parent bank has inherited all relationships and industry expertise of its predecessors. Table B in the statistical appendix includes the mergers and name changes of all 395 banks in the SDC Top-50 M&A League Tables from 1979 to 2006 together with their 201 ultimate parents as of 12/31/2006. Table B is use in chapters 3 and 4 as well.

The methodology to track name changes and bank mergers is similar to (Ljungqvist, Marston, & Wilhelm, 2006) and extend by researching the events in the Factiva and LexisNexis press database and banks' websites and annual reports. The implicit assumption is that key bankers who embody the experience and relationships with clients stay with the bank after mergers, acquisitions or name changes (Ertugrul & Krishnan, 2011). The name changes and mergers of banks not in the SDC Top-50 M&A League Tables are not tracked, because sample A includes 1,854 different banks from 1979 to 2006. The 395 banks in the SDC Top-50 M&A League Tables advise approximately 75% of all M&As. In the years 2007 and 2008 of the financial crisis many banks and two leading investment banks, Lehman Brothers and Bear Sterns, went bankrupt. According to the press Bear Stearns was acquired by JP Morgan while parts of Lehman Brothers were taken over by Nomura, KPMG China and others. According to the Federal Depository Insurance Corporation (FDIC) 470 banks went bankrupt from 2007 until the end of 2012[2]. Tracking their remains is difficult as many key bankers left the industry entirely according to the press. Therefore, the sample is truncated after 2006 to avoid sample attrition of bankrupt banks (Wooldridge, 2002e).

The acquisition experience of the acquirer is approximated by the number of bids or acquisitions he conducted in the previous three years, measured by the variable DEALS3YEARS (Servaes & Zenner, 1996). To be able to conduct M&As the bidding company needs the appropriate resources. The return on assets ROA is used as an approximation of acquirer's profitability (Heron & Lie, 2002). Opposing the effect of high profitability is high leverage that constraints the management in debt financing takeovers. Leverage is modeled with the variable LEVERAGE according to (Masulis, Wang, & Xie, 2007). Besides a larger amount of resources being available to spend on acquisitions a larger investment opportunity set is associated with more profitable acquisition opportunities (Servaes, 1991). The assessment of bidders' investment opportunities by the market is modeled with Tobin's Q adapted from (Andrade & Stafford, 2004). Similarly to all other continuous variables TobinsQ, LEVERAGE and ROA are winsorized at the upper and lower 1% percentile.

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[2] The list of bank insolvencies is available as Excel file on the homepage of the FDIC: http://www.fdic.gov/bank/individual/failed/banklist.html

All mentioned variables measure the individual acquirer's characteristics. According to the neoclassical theory of mergers and acquisitions those companies with the highest profitability and largest set of investment opportunities are going to acquire less profitable companies (Andrade & Stafford, 2004; Mitchell & Mulherin, 1996; Klasa & Stegemoller, 2007). The size of the set of investment opportunities, profitability and leverage are measured relative to the industry average as ATobinsQ, AROA and ALEVERAGE. To compute ALEVERAGE the required average industry leverage ILEVERAGE is the mean leverage of the bidder's primary (Fama & French, 1997) industry, excluding the bidder's leverage from the mean's calculation. The average industry Tobin's Q as ITobinsQ and average industry ROA as IROA are similarly defined as ILEVERGE. ALEVERGE is then defined as LEVERAGE less ILEVERAGE. AROA and ATobinsQ are defined equivalently to ALEVERAGE, with "A" for "abnormal" compared to the industry average[3]. The industry size LNIS is the natural logarithm (LN) of the number of companies (IS) in the acquirer's industry in the year before the bid or acquisition (Maksimovic & Phillips, 2001; 2002). Finally the size of the bidder is controlled with the natural logarithm of the market value of his equity at the end of the fiscal year preceding the year of the announcement LOGME (Moeller, Schlingemann, & Stulz, 2004; 2005). All variable definitions are described in the statistical appendix in table C.

The transaction variables must approximate the transaction's contracting costs and the information asymmetry. The first one is the dummy DIVERS for a diversifying acquisition (Servaes & Zenner, 1996). The target's industry diversification as the number of its industries is measured by the continuous variable

[3] The Compustat sample of 558,263 company-years includes many positive outliers for Tobin's Q and ROA and negative ones for LEVERAGE that winsorizing by 5% at the upper and lower tail is necessary. Manually excluding outlier is somewhat arbitrary. Therefore, a wide winsorizing window is chosen, because at 2.5% still Tobin's Q of 50 and more occurred in the sample. Compustat observations with negative total assets are excluded.

DIVERSIFICATION (Servaes & Zenner, 1996). The purchase of a company is modeled with the variable MAJORITY that is 1 if the acquirer intends to obtain a controlling majority of the target company. If the target or acquirer or both are operating in high-tech industries and have a large share of assets in immaterial intangibles the information asymmetry is high. Whether the M&A is one in high-tech industries is measured by the dummy HIGHTECH (Loughran & Ritter, 2004). The bidder's access to insider target information is measured by the continuous variable TOEHOLD of his ownership stake before the acquisition (Song, Zhou, & Wei, 2013; Kale, Kini, & Ryan, 2003). Relatively larger targets have a higher bargaining power that increases the transaction costs (Servaes & Zenner, 1996; Moeller, Schlingemann, & Stulz, 2004; Moeller & Schlingemann, 2005). The relative deal size is measured with the continuous variable RDS. The existence and consideration of competition from multiple bidders makes the bidding strategy more complex, modeled with the variable MULTIPLE (Boone & Mulherin, 2008).

The last variables modelling the complexity of the transaction are dummy variables adapted and extended from (Kale, Kini, & Ryan, 2003). The dummy ANTITAKEOVER controls for anti-takeover measures (Comment & Schwert, 1995). The second dummy CROSS-BORDER controls for cross-border deals (Moeller & Schlingemann, 2005; Francis, Hasan, & Sun, 2008). The third dummy REGULATORY models the need of regulatory approval, the fourth one FAMILY family ownership, and the fifth LITIGATION a pending litigation against the target. (Kale, Kini, & Ryan, 2003) show that acquirers' advisor choice depends on targets' advisors' tier, which is modelled with the discrete variable TADVISORTIER. A hostile acquisition, modeled with the dummy HOSTILE, is more complex and increases the costs to overcome the resistance of the target's management (Schwert, 2000). If the target is a public company a bidding process for its stock is necessary, modeled with the dummy PUBLIC (Chang S. , 1998). The dummies STOCK, CASH, MIXED and OTHER are set to 1 when stock, cash, both or other means of payment are used (Martin, 1996). The payment dummies are all zero for observations with missing payment information. Dummies for the stages of the acquisition sequences control for factors not directly captured by the transaction, bank and bidder variables. The dummy FIRST is 1 if the acquisition or bid is the first one of the bidding company in the data set. The dummy SIXTH is set to 1 if the transaction is the sixth and later one of the bidding company (Fuller, Netter, & Stegemoller, 2002). The independent variables are shared with the analyses in chapters 3 and 4. The changes of advising banks', bidders' and transactions' characteristics are subject of the univariate analyses in the next section.

2.5 Univariate analysis of advisor choices and acquisition sequences

The univariate analysis of differences between unadvised, non-bulge-bracket bank and bulge-bracket bank advised deals is shown in table 3. The definitions of non-bulge-bracket and bulge-bracket banks are taken from (Hunter & Jagtiani, 2003) and (Rau, 2000). A bank is a bulge-bracket bank if it has an annual rank of 10 or higher according to its weighted ranks of the last three years in the SDC Top-50 M&A League Tables. A non-bulge-bracket bank has a weighted rank of 11 or less. Banks not appearing in the SDC Top-50 M&A League Tables but in the SDC M&A sample A are labeled as non-bulge-bracket banks. The perceived ranking of investment bank i in each year t is the sum of the equally weighted ranks of the current year $t=0$ and the preceding two years $t-1$ and $t-2$. The formula is $\mathrm{NewRank}_{t,\,i}=\left(\mathrm{rank}_{t,\,i}+\mathrm{rank}_{t\text{-}1,\,i}+\mathrm{rank}_{t\text{-}2,\,i}\right)/3$.

Similar to previous research the returns in bulge-bracket bank advised deals are significantly smaller than in unadvised or non-bulge-bracket bank advised M&As (Bao & Edmans, 2011). As expected bulge-bracket banks advise larger and more profitable, but also higher leveraged, bidders. The transactions' characteristics differ between unadvised, non-bulge-bracket and bulge-bracket bank advised deals as well with more complex and relatively larger transactions being more likely advised by bulge-bracket banks. The significant differences in the bank, bidder and transaction characteristics between the advisory types support the necessity to control for selection among these advisory choices.

Similar to the observations of (Aktas, Bodt, & Roll, 2009; 2011) and (Fuller, Netter, & Stegemoller, 2002) the announcement returns are decreasing along the acquisition series, shown in table 4. In later bids more often higher ranking bank advisors and particularly familiar ones are hired or retained, which (Sibilkov & McConnell, 2013) observe as well. With the hiring and retention of higher ranking advisors the average industry expertise, advisory relationship strength, SDC League Table market share, relative reputation and past advisory and acquisition performance are increasing along the acquisition sequence.

Serial bidders' size and acquisition experience increase along their acquisition series. Their investment opportunity sets are on average at first larger than the industry's average but fall below the industry average in the third bid or acquisition. Nevertheless, serial bidders are more profitable and less leveraged than their industry pears, enabling them to make successive acquisitions. The hiring and retention of more experienced and familiar banks is likely to be determined by the increasing complexity of later acquisitions that become relatively smaller as serial acquirers grow in size themselves (Ahern, 2008). Whether these changes in the transaction characteristics along the acquisition series accompanied by more experienced and familiar banks is beneficial for the acquirer is subject of the multivariate analyses.

Table 3: Univariate tests of the dependent, advisor, acquirer and transaction variables by the advisor type

Table 3 shows the distribution of variables over the types of advisory choices. The last two columns show the t-tests with p-values and differences between the unadvised (1), non-bulge-bracket bank advised (2) and bulge-bracket bank (3) advised deals.

Panel A: Dependent and bank/advisor variables

Acquirer advisor tier		unadvised	non-bulge-bracket	bulge-bracket	All Bids	t-test	t-test
N		23,068	4,911	3,975	31,954	p-value	p-value
Variable		1	2	3		1 - 3 = 0	2 - 3 = 0
CAR_(-2, 2)_BETA1_vw	Mean	0.0139	0.0113	0.0050	0.0124	0.0000	0.0004
GOODADVICE	Mean	0.5501	0.5251	0.5145	0.5418	0.0000	0.1582
RESOLSPEED	Mean	62.5488	109.9857	122.4306	77.3367	0.0000	0.0000
COMPLETED	Mean	0.9449	0.9379	0.9265	0.9416	0.0000	0.0168
IEDA	Mean	0.0000	0.0409	0.1203	0.0213	0.0000	0.0000
IEDT	Mean	0.0000	0.0408	0.1156	0.0206	0.0000	0.0000
IEVA	Mean	0.0000	0.0384	0.2257	0.0340	0.0000	0.0000
IEVT	Mean	0.0000	0.0379	0.2191	0.0331	0.0000	0.0000
ARSD	Mean	0.0000	0.0435	0.0699	0.0154	0.0000	0.0000
ARSV	Mean	0.0000	0.0435	0.0709	0.0155	0.0000	0.0000
MS	Mean	0.0000	2.0798	19.8451	2.7883	0.0000	0.0000
RELREP	Mean	0.0000	2.6811	14.4408	2.2085	0.0000	0.0000
PASTBBCAR	Mean	0.0084	0.0027	0.0021	0.0067	0.0000	0.2262
PASTBIDDERCAR	Mean	0.0083	0.0075	0.0059	0.0079	0.0099	0.1173
PASTCOMPLETED	Mean	0.5825	0.1478	0.2443	0.4736	0.0000	0.0000
PASTGOODADVICE	Mean	0.3398	0.0839	0.1366	0.2752	0.0000	0.0000
PASTRESOLSPEED	Mean	40.2591	18.1594	31.3414	35.7533	0.0000	0.0000

Panel B: Bidder variables

SCOPE	Mean	0.2879	0.2997	0.3995	0.3036	0.0000	0.0000
DEALS3YEARS	Mean	1.7968	1.3038	1.7270	1.7123	0.0920	0.0000
LOGME	Mean	20.1435	20.3757	21.8977	20.3974	0.0000	0.0000
LNIS	Mean	6.6044	6.7126	6.5216	6.6107	0.0000	0.0000
TobinsQ	Mean	2.1137	2.1754	2.1744	2.1307	0.0460	0.4912
ITobinsQ	Mean	2.1045	2.1475	2.1626	2.1184	0.0001	0.2388
ATobinsQ	Mean	0.0091	0.0278	0.0118	0.0124	0.4668	0.3430
ROA	Mean	0.0525	0.0509	0.0803	0.0557	0.0000	0.0000
IROA	Mean	-0.0319	-0.0430	-0.0398	-0.0346	0.0000	0.0970
AROA	Mean	0.0844	0.0940	0.1201	0.0903	0.0000	0.0000
LEVERAGE	Mean	0.2420	0.2091	0.2525	0.2382	0.0014	0.0000
ILEVERAGE	Mean	0.2679	0.2489	0.2644	0.2645	0.0036	0.0000
ALEVERAGE	Mean	-0.0259	-0.0399	-0.0119	-0.0263	0.0000	0.0000

Table 3 (cont.): Univariate tests of the dependent, advisor, acquirer and transaction variables by the advisor typ

Table 3 shows the distribution of variables over the types of advisory choices. The last two columns show the t-tests with p-values and differences between the unadvised (1), non-bulge-bracket bank advised (2) and bulge-bracket bank (3) advised deals.

Panel C: Transaction variables

Acquirer advisor tier		unadvised	non-bulge-bracket	bulge-bracket	All Bids	t-test	t-test
N		23,068	4,911	3,975	31,954	p-value	p-value
Variable		1	2	3		1 - 3 = 0	2 - 3 = 0
DIVERS	Mean	0.4498	0.3604	0.3919	0.4288	0.0000	0.0011
MAJORITY	Mean	0.9391	0.9794	0.9665	0.9487	0.0000	0.0001
PUBLIC	Mean	0.1348	0.3653	0.4267	0.2065	0.0000	0.0000
RDS	Mean	0.1713	0.4632	0.4166	0.2467	0.0000	0.0003
TADVISORTIER	Mean	0.3100	0.9597	1.3180	0.5352	0.0000	0.0000
MULTIPLE	Mean	1.0126	1.0495	1.0835	1.0271	0.0000	0.0000
ANTITAKEOVER	Mean	0.0168	0.0804	0.1074	0.0379	0.0000	0.0000
FAMILY	Mean	0.0021	0.0043	0.0070	0.0031	0.0000	0.0399
LITIGATION	Mean	0.0075	0.0350	0.0589	0.0181	0.0000	0.0000
REGULATORY	Mean	0.2032	0.4970	0.5361	0.2898	0.0000	0.0001
CROSSBORDER	Mean	0.0537	0.0872	0.0727	0.0612	0.0000	0.0065
DIVERSIFICATION	Mean	0.4293	0.6380	0.7414	0.5002	0.0000	0.0000
TOEHOLD	Mean	1.6892	1.7831	3.1553	1.8860	0.0000	0.0000
HIGHTECH	Mean	0.2788	0.3221	0.2946	0.2874	0.0203	0.0026
STOCK	Mean	0.1572	0.2916	0.2221	0.1859	0.0000	0.0000
CASH	Mean	0.2366	0.2429	0.2745	0.2423	0.0000	0.0004
MIXED	Mean	0.1625	0.2790	0.2803	0.1951	0.0000	0.4466
OTHER	Mean	0.0965	0.0536	0.0719	0.0868	0.0000	0.0002
FIRST	Mean	0.3379	0.3470	0.2652	0.3302	0.0000	0.0000
SIXTH	Mean	0.2503	0.2004	0.3245	0.2518	0.0000	0.0000

Table 4: Univariate tests of the dependent, advisor, acquirer, and transaction variables between the bids

Table 4 shows the distribution of variables over the bids/acquisitions of the acquisition sequences. The last column shows the t-tests and p-values between the first (1) or second (2) and fifths (5) or sixths and higher bids (6). The variables are summarized in table 2 and described in the statistical appendix in table C.

Panel A: Distribution of the dependent and bank variables										
	bids in the sequence	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH	All Bids	t-test	t-test
Variable	N	10,552	5,511	3,515	2,485	1,844	8,047	31,954	1/2 - 5 = 0	1/2 - 6 = 0
CAR_(-2,2)_BETA1_vw	Mean	0.0179	0.0153	0.0126	0.0125	0.0104	0.0036	0.0124	0.0003	0.0000
GOODADVICE	Mean	0.5574	0.5496	0.5346	0.5493	0.5564	0.5136	0.5418	0.4672	0.0000
RESOLSPEED	Mean	76.3357	75.5910	75.6621	78.2334	79.4042	79.8034	77.3367	0.1253	0.0111
COMPLETED	Mean	0.9321	0.9381	0.9383	0.9485	0.9344	0.9573	0.9416	0.3620	0.0000
ADVISED	Mean	0.2614	0.2854	0.2862	0.2966	0.2918	0.2826	0.2781	0.0032	0.0006
ADVISORCHOICE	Mean	1.3613	1.3934	1.4097	1.4262	1.4436	1.4429	1.4025	0.0000	0.0000
Panel B: Distribution of the bank variables										
IEDA	Mean	0.0182	0.0204	0.0221	0.0234	0.0247	0.0240	0.0213	0.0000	0.0000
IEDT	Mean	0.0181	0.0195	0.0220	0.0220	0.0229	0.0232	0.0206	0.0001	0.0000
IEVA	Mean	0.0262	0.0303	0.0344	0.0352	0.0406	0.0446	0.0340	0.0000	0.0000
IEVT	Mean	0.0262	0.0300	0.0346	0.0327	0.0390	0.0423	0.0331	0.0000	0.0000
ARSD	Mean	0.0000	0.0092	0.0161	0.0212	0.0246	0.0356	0.0154	0.0000	0.0000
ARSV	Mean	0.0000	0.0092	0.0161	0.0213	0.0248	0.0360	0.0155	0.0000	0.0000
MS	Mean	2.1717	2.5352	2.7440	2.8377	3.2966	3.6579	2.7883	0.0000	0.0000
RELREP	Mean	1.9116	2.0385	2.4784	2.3270	2.3756	2.5214	2.2085	0.0480	0.0001
PASTBBCAR	Mean	0.0000	0.0127	0.0124	0.0121	0.0112	0.0063	0.0067	0.2039	0.0000
PASTBIDDERCAR	Mean	0.0000	0.0192	0.0139	0.0137	0.0119	0.0051	0.0079	0.0006	0.0000
PASTCOMPLETED	Mean	0.0000	0.5739	0.6899	0.7183	0.7467	0.7933	0.4736	0.0000	0.0000
PASTGOODADVICE	Mean	0.0000	0.3533	0.4074	0.4306	0.4409	0.4388	0.2752	0.0000	0.0000
PASTRESOLSPEED	Mean	0.0000	42.4585	48.5516	55.6503	55.3113	61.8276	35.7533	0.0000	0.0000
Panel C: Distribution of the bidder variables										
SCOPE	Mean	0.1728	0.2597	0.3141	0.3505	0.3774	0.4694	0.3036	0.0000	0.0000
DEALS3YEARS	Mean	0.0000	0.6966	1.2356	1.7404	2.1855	4.7445	1.7123	0.0000	0.0000
LOGME	Mean	19.7098	19.9317	20.2171	20.5131	20.6855	21.5949	20.3974	0.0000	0.0000
LNIS	Mean	6.5305	6.5548	6.5756	6.5758	6.6113	6.7801	6.6107	0.0003	0.0000
TobinsQ	Mean	2.2066	2.2037	2.1086	2.0753	2.0381	2.0293	2.1307	0.0013	0.0000
ITobinsQ	Mean	2.0652	2.1235	2.1140	2.1333	2.1284	2.1796	2.1184	0.0032	0.0000
ATobinsQ	Mean	0.1414	0.0802	-0.0054	-0.0580	-0.0903	-0.1503	0.0124	0.0000	0.0000
ROA	Mean	0.0339	0.0513	0.0614	0.0723	0.0736	0.0755	0.0557	0.0000	0.0000
IROA	Mean	-0.0284	-0.0324	-0.0348	-0.0349	-0.0341	-0.0443	-0.0346	0.0177	0.0000
AROA	Mean	0.0623	0.0838	0.0961	0.1072	0.1078	0.1198	0.0903	0.0000	0.0000
LEVERAGE	Mean	0.2194	0.2207	0.2303	0.2412	0.2509	0.2747	0.2382	0.0000	0.0000
ILEVERAGE	Mean	0.2627	0.2626	0.2640	0.2655	0.2660	0.2679	0.2645	0.0456	0.0000
ALEVERAGE	Mean	-0.0433	-0.0419	-0.0338	-0.0243	-0.0151	0.0068	-0.0263	0.0000	0.0000

Table 4 (cont.): Univariate tests of the dependent, advisor, acquirer, and transaction variables between the bids

Panel D: Distribution of the transaction variables

	bids in the sequence	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH	All Bids	t-test	t-test
Variable	N	10,552	5,511	3,515	2,485	1,844	8,047	31,954	1 - 5 = 0	1 - 6 = 0
DIVERS	Mean	0.4182	0.4242	0.4202	0.4266	0.4387	0.4481	0.4288	0.0500	0.0000
MAJORITY	Mean	0.9542	0.9497	0.9462	0.9433	0.9501	0.9432	0.9487	0.2190	0.0003
PUBLIC	Mean	0.1724	0.1878	0.2040	0.2040	0.2104	0.2652	0.2065	0.0000	0.0000
RDS	Mean	0.3076	0.2758	0.2512	0.2128	0.2111	0.1635	0.2467	0.0000	0.0000
TADVISORTIER	Mean	0.4418	0.4936	0.5272	0.5590	0.5857	0.6709	0.5352	0.0000	0.0000
MULTIPLE	Mean	1.0223	1.0245	1.0296	1.0217	1.0298	1.0352	1.0271	0.0624	0.0000
ANTITAKEOVER	Mean	0.0235	0.0357	0.0367	0.0382	0.0401	0.0580	0.0379	0.0000	0.0000
FAMILY	Mean	0.0030	0.0034	0.0037	0.0028	0.0049	0.0022	0.0031	0.1011	0.1496
LITIGATION	Mean	0.0158	0.0187	0.0174	0.0177	0.0141	0.0221	0.0181	0.2903	0.0008
REGULATORY	Mean	0.2380	0.2593	0.2799	0.2954	0.3118	0.3760	0.2898	0.0000	0.0000
CROSSBORDER	Mean	0.0831	0.0686	0.0617	0.0604	0.0521	0.0295	0.0612	0.0000	0.0000
DIVERSIFICATION	Mean	0.4601	0.4886	0.5029	0.5386	0.5274	0.5415	0.5002	0.0000	0.0000
TOEHOLD	Mean	1.5406	2.0898	2.0169	2.1151	2.1728	2.0058	1.8860	0.0047	0.0007
HIGHTECH	Mean	0.2819	0.2999	0.2979	0.2869	0.2777	0.2838	0.2874	0.3531	0.3881
STOCK	Mean	0.1757	0.1909	0.1866	0.1710	0.1638	0.2053	0.1859	0.1063	0.0000
CASH	Mean	0.2079	0.2419	0.2444	0.2523	0.2619	0.2790	0.2423	0.0000	0.0000
MIXED	Mean	0.1966	0.2012	0.2171	0.2020	0.2088	0.1739	0.1951	0.1139	0.0000
OTHER	Mean	0.1344	0.0962	0.0765	0.0724	0.0575	0.0337	0.0868	0.0000	0.0000

2.6 Multivariate analyses of advisor selection and acquisition performance

The multivariate analyses are preceded by the analysis of potential outliers. The multivariate outlier analysis is done with the Mahalanobis Distance D^2 measure (Bar-Hen & Daudin, 1995; Hair, Anderson, Tatham, & Black, 1998; Mahalanobis, 1936). The Mahalanobis Distance D^2 measure is used, because an acquisition or bid might not be identified as an outlier with respect to each individual variable. The extreme combination of two or more variables however might move the observation beyond the sphere of the multivariate normal distribution around the centroid. The centroid is the focal point of the average combination of variables, the representative observation. The Mahalanobis Distance D^2 rescales variables such that the distance of the variables' values to the centroid becomes measurable and comparable on a common scale. No deals are excluded at the 1% and 0.1% confidence levels.

First the selection regressions whether the deal is advised and of the advisor type choice are shown in table 5. Comparable to previous observations of (Servaes & Zenner, 1996) and (Kale, Kini, & Ryan, 2003) a good past acquisition decision of the bidder reduces the likelihood that his current bid is advised. More profitable bidders with larger investment opportunity sets are more likely to be advised, because banks expect to be hired in successive transactions (McLaughlin, 1990; 1992; Hunter & Walker, 1990). The exclusion restriction SCOPE is significant because of bidders' familiarity from prior underwriter relationships with advising banks (Li & Prabhala, 2007; Golubov, Petmezas, & Travlos, 2012).

Similar to the univariate analysis in table 3 a higher ranking advisor choice is associated with more complex and larger transactions. If the target hires a higher ranking bank advisor itself, the bidder is more likely to hire a higher ranking bank advisor, too. The relatively larger the transaction is compared to the bidder's market value of equity the more likely is he employing a higher ranking advising bank as well. Regulatory issues and aspects of the deal that make negotiating more complex as well as the method of payment are associated with the selection of a bank advisor, particularly a more reputable one, as well. From the analysis in tables 3 and 5 it follows that one ought to control for the differences in transaction characteristics between the advisor choices, which is shown in the following analysis.

The influence of the decision whether to hire a bank as advisor, particularly a non-bulge-bracket or bulge-bracket bank, given the advising banks' expertise and advisory relationship strength on the announcement returns are estimated in table 6. Without selection control in fixed effects panel regression (1) the industry expertise is insignificant, which is observed by (Chang, Shekhar, Tam, & Zhu, 2013) as well. The selection models are explained in econometric appendix E.1.

Table 5: Regressions of bidders' advisor choice

Table 5 panel A shows the selection regressions whether the deal is advised. The dependent variable is ADVISED. ADVISED is a dummy (0/1) and 1 if the deal is advised by a bank. The variables are summarized in table 2 and described in the statistical appendix in table C. The coefficients are the marginal probability effects at the mean. The standard errors of the Chamberlain random effects panel probit models are based on the observed information matrix (OIM), the inverse Hessian, after maximum likelihood estimation (Efron & Hinkley, 1978). Fixed effects based on the (Mundlak, 1978) version of (Chamberlain, 1980) fixed effects assumption are included but not reported (Wooldridge, 2002a, 2002b). Year fixed effects and a constant are included but not reported. Diagnostic statistics of the models' Chi^2 statistic of significance, the correlation of the fixed effects c_i with explanatory variables x_{it} and the Chi^2-statistic of significance of fixed effects' regressor $\gamma=0$ are shown.

Panel A: Probit analysis	(1)	(2)	(3)	(4)
whether the deal is advised		ADVISED		
VARIABLES	FE panel probit	FE panel probit	FE panel probit	FE panel probit
PASTBIDDERCAR	-0.0326			
	(-0.690)			
PASTGOODADVICE		-0.2117***		
		(-28.161)		
PASTCOMPLETED			-0.2990***	
			(-39.178)	
PASTRESOLSPEED				-0.0007***
				(-16.078)
TADVISORTIER	0.1478***	0.1378***	0.1275***	0.1467***
	(29.485)	(28.257)	(26.571)	(29.403)
SCOPE	0.0246***	0.0317***	0.0346***	0.0274***
	(2.736)	(3.656)	(4.075)	(3.072)
DEALS3YEARS	-0.0070***	-0.0038**	0.0030**	-0.0054***
	(-4.384)	(-2.499)	(2.047)	(-3.392)
ATobinsQ	0.0012	0.0000	-0.0036	0.0005
	(0.458)	(0.007)	(-1.486)	(0.191)
AROA	0.0982**	0.1161***	0.1388***	0.1070***
	(2.390)	(2.924)	(3.574)	(2.630)
ALEVERAGE	0.0293	0.0372	0.0512	0.0338
	(0.886)	(1.164)	(1.644)	(1.031)
SIXTH	-0.0223**	-0.0153	0.0134	-0.0128
	(-2.252)	(-1.598)	(1.408)	(-1.302)
Year fixed effects	Yes	Yes	Yes	Yes
Fixed effects	Yes	Yes	Yes	Yes
N	31,954	31,954	31,954	31,954
Number of Acquirers	10,280	10,280	10,280	10,280
Chi^2-statistic	6,341.87	6,267.59	6,134.58	6,412.59
p-value	0.0000	0.0000	0.0000	0.0000
$corr(c_i, x_{it})$	0.3317	0.3197	0.3130	0.3242
Chi^2-statistic $\gamma=0$	332.65	430.14	481.95	414.71
p-value	0.0000	0.0000	0.0000	0.0000

Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 5 (cont.): Regressions of bidders' advisor choice

Panel A: Probit analysis whether the deal is advised	(1)	(2)	(3)	(4)
	ADVISED			
VARIABLES	FE panel probit	FE panel probit	FE panel probit	FE panel probit
DIVERS	-0.0135*	-0.0113	-0.0086	-0.0144*
	(-1.696)	(-1.465)	(-1.135)	(-1.814)
MAJORITY	0.0805***	0.0740***	0.0709***	0.0722***
	(4.879)	(4.657)	(4.563)	(4.417)
HOSTILE	0.0946***	0.0799**	0.0798***	0.0822**
	(2.915)	(2.551)	(2.601)	(2.548)
ANTITAKEOVER	0.0691***	0.0619***	0.0536***	0.0702***
	(4.256)	(3.981)	(3.581)	(4.305)
FAMILY	0.0022	0.0039	-0.0068	-0.0033
	(0.044)	(0.084)	(-0.149)	(-0.067)
LITIGATION	0.0865***	0.0896***	0.0934***	0.0860***
	(3.482)	(3.783)	(4.050)	(3.456)
REGULATORY	0.1129***	0.1061***	0.0969***	0.1117***
	(13.856)	(13.456)	(12.582)	(13.767)
CROSSBORDER	-0.0998	-0.0581	-0.0271	-0.1055
	(-0.955)	(-0.579)	(-0.284)	(-1.011)
TOEHOLD	0.0010***	0.0011***	0.0011***	0.0010***
	(3.226)	(3.968)	(4.010)	(3.498)
HIGHTECH	0.0077	0.0090	0.0036	0.0075
	(0.451)	(0.543)	(0.221)	(0.439)
DIVERSIFICATION	0.0395***	0.0363***	0.0364***	0.0380***
	(6.508)	(6.208)	(6.346)	(6.307)
MULTIPLE	-0.0391**	-0.0308**	-0.0210	-0.0360**
	(-2.513)	(-2.062)	(-1.443)	(-2.319)
RDS	0.2137***	0.1915***	0.1649***	0.2063***
	(23.470)	(21.861)	(19.500)	(22.799)
LNIS	0.0181	0.0265	0.0545**	0.0453
	(0.604)	(0.927)	(1.993)	(1.508)
PUBLIC	0.0823***	0.0732***	0.0617***	0.0813***
	(9.240)	(8.548)	(7.401)	(9.137)
STOCK	0.1418***	0.1361***	0.1263***	0.1420***
	(12.665)	(12.597)	(11.933)	(12.740)
CASH	0.0658***	0.0668***	0.0636***	0.0667***
	(7.001)	(7.333)	(7.094)	(7.145)
MIXED	0.1756***	0.1696***	0.1574***	0.1766***
	(16.858)	(16.745)	(15.720)	(17.056)
OTHER	0.0868***	0.0721***	0.0566***	0.0809***
	(5.492)	(4.800)	(3.922)	(5.180)
Year fixed effects	Yes	Yes	Yes	Yes
Fixed effects	Yes	Yes	Yes	Yes
N	31,954	31,954	31,954	31,954
Number of Acquirers	10,280	10,280	10,280	10,280
Chi^2-statistic	6,341.87	6,267.59	6,134.58	6,412.59
p-value	0.0000	0.0000	0.0000	0.0000
$corr(c_i, x_{it})$	0.3317	0.3197	0.3130	0.3242
Chi^2-statistic $\gamma=0$	332.65	430.14	481.95	414.71
p-value	0.0000	0.0000	0.0000	0.0000

Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 5 (cont.): Regressions of the advisor choice

Table 5 panel B shows the selection regressions of the advisor choice. The dependent variable is ADVISORCHOICE. ADVISORCHOICE is 1 if the deal is unadvised, 2 if the lead advisor is a non-bulge-bracket bank and 3 if the lead advisor is a bulge-bracket bank. The variables are summarized in table 2 and described in the appendix in table C. The standard errors of the fixed effects tobit panel regressions are based on the observed information matrix (OIM), the inverse Hessian, after maximum likelihood estimation (Efron & Hinkley, 1978). Fixed effects based on the (Mundlak, 1978) version of (Chamberlain, 1980) assumption are included but not reported (Wooldridge, 2002a, 2002b). Year fixed effects and a constant are included but not reported. Diagnostic statistics of the models' Chi²-statistic of significance, the correlation of the fixed effects c_i with explanatory variables x_{it} and the Chi²-statistic of significance of fixed effects' regressor γ=0 are shown.

Panel B: Tobit regressions of	(1)	(2)	(3)	(4)
advisor choice		ADVISORCHOICE		
VARIABLES	FE panel tobit	FE panel tobit	FE panel tobit	FE panel tobit
PASTBIDDERCAR	0.0167			
	(0.048)			
PASTGOODADVICE		-1.6054***		
		(-26.815)		
PASTCOMPLETED			-2.1699***	
			(-39.900)	
PASTRESOLSPEED				-0.0046***
				(-14.250)
TADVISORTIER	1.1756***	1.1254***	1.0365***	1.1679***
	(31.522)	(30.774)	(29.311)	(31.501)
SCOPE	0.2127***	0.2682***	0.2897***	0.2302***
	(3.171)	(4.054)	(4.490)	(3.457)
DEALS3YEARS	-0.0484***	-0.0262**	0.0157	-0.0376***
	(-3.981)	(-2.231)	(1.394)	(-3.144)
ATobinsQ	-0.0136	-0.0223	-0.0473**	-0.0185
	(-0.705)	(-1.184)	(-2.563)	(-0.968)
AROA	0.7044**	0.8602***	0.9826***	0.7762**
	(2.239)	(2.762)	(3.225)	(2.483)
ALEVERAGE	0.1799	0.2303	0.2744	0.1994
	(0.726)	(0.941)	(1.150)	(0.811)
SIXTH	-0.1264*	-0.0838	0.0594	-0.0708
	(-1.712)	(-1.147)	(0.825)	(-0.964)
Year fixed effects	Yes	Yes	Yes	Yes
Fixed effects	Yes	Yes	Yes	Yes
N	31,954	31,954	31,954	31,954
Number of Acquirers	10,280	10,280	10,280	10,280
Chi²-statistic	4,332.18	4,552.17	4,875.92	4,415.88
p-value	0.0000	0.0000	0.0000	0.0000
corr(c_i, x_{it})	0.2359	0.2309	0.2234	0.2349
Chi²-statistic γ=0	343.35	447.27	523.62	396.17
p-value	0.0000	0.0000	0.0000	0.0000

Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 5 (cont.): Regressions of the advisor choice

Panel B: Tobit regressions of advisor choice	(1)	(2)	(3)	(4)
	ADVISORCHOICE			
VARIABLES	FE panel tobit	FE panel tobit	FE panel tobit	FE panel tobit
DIVERS	-0.0884	-0.0733	-0.0472	-0.0921
	(-1.478)	(-1.240)	(-0.816)	(-1.549)
MAJORITY	0.5526***	0.5173***	0.4784***	0.5011***
	(4.376)	(4.139)	(3.907)	(3.995)
HOSTILE	0.5623***	0.4575**	0.4656**	0.5076**
	(2.662)	(2.218)	(2.343)	(2.423)
ANTITAKEOVER	0.4581***	0.4171***	0.3781***	0.4476***
	(4.090)	(3.819)	(3.601)	(4.009)
FAMILY	0.2228	0.2656	0.1728	0.1918
	(0.611)	(0.748)	(0.502)	(0.529)
LITIGATION	0.4823***	0.5259***	0.4861***	0.4397***
	(2.890)	(3.235)	(3.096)	(2.646)
REGULATORY	0.7927***	0.7510***	0.6673***	0.7818***
	(13.143)	(12.653)	(11.569)	(13.020)
CROSSBORDER	-0.9432	-0.6638	-0.3991	-0.9235
	(-1.229)	(-0.878)	(-0.547)	(-1.203)
TOEHOLD	0.0097***	0.0111***	0.0112***	0.0103***
	(4.334)	(5.014)	(5.244)	(4.622)
HIGHTECH	-0.0422	-0.0340	-0.0717	-0.0471
	(-0.324)	(-0.263)	(-0.563)	(-0.363)
DIVERSIFICATION	0.2439***	0.2199***	0.2102***	0.2321***
	(5.451)	(4.990)	(4.889)	(5.222)
MULTIPLE	-0.2405**	-0.1961*	-0.1381	-0.2085**
	(-2.279)	(-1.905)	(-1.393)	(-1.985)
RDS	1.1906***	1.0686***	0.8857***	1.1373***
	(20.074)	(18.414)	(15.800)	(19.301)
LNIS	0.0579	0.1058	0.3106	0.2248
	(0.256)	(0.477)	(1.451)	(0.992)
PUBLIC	0.4989***	0.4480***	0.3726***	0.4928***
	(7.685)	(7.037)	(6.032)	(7.614)
STOCK	1.0765***	1.0530***	0.9837***	1.0773***
	(12.646)	(12.526)	(11.978)	(12.706)
CASH	0.5369***	0.5476***	0.5149***	0.5420***
	(7.447)	(7.653)	(7.330)	(7.562)
MIXED	1.3704***	1.3446***	1.2328***	1.3744***
	(17.386)	(17.233)	(16.140)	(17.527)
OTHER	0.7156***	0.6141***	0.5127***	0.6814***
	(5.959)	(5.217)	(4.490)	(5.714)
Constant	-2.1648**	-1.6032	-1.0999	-2.0939**
	(-2.127)	(-1.643)	(-1.199)	(-2.086)
Year fixed effects	Yes	Yes	Yes	Yes
Fixed effects	Yes	Yes	Yes	Yes
N	31,954	31,954	31,954	31,954
Number of Acquirers	10,280	10,280	10,280	10,280
Chi^2-statistic	4,332.18	4,552.17	4,875.92	4,415.88
p-value	0.0000	0.0000	0.0000	0.0000
corr(c_i, x_{it})	0.2359	0.2309	0.2234	0.2349
Chi^2-statistic γ=0	343.35	447.27	523.62	396.17
p-value	0.0000	0.0000	0.0000	0.0000

Robust z-statistics in parentheses.*** p<0.01, ** p<0.05, * p<0.1.

The regression show that the industry expertise by deals of the bidder's advising bank has a significantly positive influence on the bidder's announcement returns if one controls for selection in panel and pooled models. The selection indicator ADVISORCHOICE in fixed effects panel regression (3) is insignificant itself but positively correlated with industry expertise IEDT and advisory relationships strength ARSD that are nonzero in advised deals only (Nijman & Verbeek, 1992; Verbeek & Nijman, 1992). Therefore, the endogenous selection indicator ADVISORCHOICE is instrumented on the transaction variables shown in table 5 in instrumental variables (IV) fixed effects panel regression (4). IV panel regression (4) shows that the selection of higher ranking bank advisors, which on average have a greater industry expertise, is associated with significantly smaller announcement returns. The smaller announcement returns in bank advised deals are caused by advised deals' greater complexity and transaction costs, which is shown in table 3.

Controlling for selection with a classic (Heckman, 1976; 1979) pooled selection model similar to (Golubov, Petmezas, & Travlos, 2012), (Kale, Kini, & Ryan, 2003) and others regression (5) shows similarly to IV panel regression (4) that bidders' decision to hire a bank advisor and announcement returns are not exogenous but related. The empirical observations between the IV panel regression and the pooled (Heckman, 1976; 1979) regression differ, because the IV fixed effects panel regression takes the time series component of the panel and fixed effects into account. The transaction, bidder and advisory characteristics change along the acquisition sequence, which is shown in table 4.

The economic effect of advisors' average industry expertise in the target's industry of $0.1355 \times 0.0206 = 0.0028$ or 0.28 percentage points indicates a $0.0028/0.0124 = 0.2251$ or 22.52% larger announcement return. $878,000,000$ dollar is the bidders' median market value of equity two days before the announcement date. The increase in equity value for the average bidder who hires an average investment bank is $878,000,000 \times 0.0028 = 2,458,400$ dollar in addition to the average equity increase of $878,000,000 \times 0.0124 = 10,887,200$ dollar. Hiring a bank that has advised on more deal in the target's industry in the last three years, which increases its average industry expertise IEDT by 0.0185, pays for the bidder in terms of a $0.1355 \times 0.0185 = 0.0025$ or 0.25 percentage points higher announcement return. The one deal greater target industry expertise denotes an equity gain of $878,000,000 \times 0.0025 = 2,195,000$ dollar for the bidder. For the bidder it is beneficial to hire an investment bank as advisor with more expertise.

The significant negative correlation of the advisory relationship strength with the bidder's returns arises from the observation in table 4 that along the acquisition sequence the announcement returns decrease whereas the average advisory relationship strength increases, because familiar banks are more likely to be hired in later acquisitions. (Allen, Jagtiani, Peristiani, & Saunders, 2004) have found a negative bidder-bank relationship as well. In the cross section shown in table 3 the advisory relationship strength is stronger for bulge-bracket bank advised deals that have smaller returns due to the deal's greater complexity compared to unadvised deals with larger returns and a missing advisory relationship strength, which results in a negative correlation of the advisory relationship strength with the returns, too. The negative correlation between the advisory relationship and the bidder's returns vanishes if one controls for the advisor choice in IV fixed effects regression (4). In regression (2) on the subsample of advised deals the negative correlation of ARSD with the CARs vanishes as well. Again controlling for selection is necessary.

Table 6: Regressions of serial bidders' announcement returns

Table 6 shows the primary regressions of the announcement returns. The dependent variables are the winsorized CARs from -2 to +2 trading days around the M&A announcement, calculated with the Beta-1 Model and the CRSP value-weighted index. The variables are summarized in table 2 and described in the statistical appendix in table C. The standard errors of fixed effects panel regressions (1) to (3) and pooled (Heckman, 1976, 1979) model (5) are corrected with the Huber & White sandwich estimator clustered by acquirers (Huber, 1967; White, 1980). The standard errors of instrumental variable (IV) fixed effects panel regression (4) are corrected by bootstrapping with 200 repetitions clustered by acquirers (Mooney & Duval, 1993; Efron, 1979; Adkins & Hill, 2004; Hill, Adkins, & Bender, 2003). ADVISED in (Heckman, 1976, 1979) model (5) is instrumented on regression equation (1) in table 5 panel A. ADVISORCHOICE in IV panel regression (4) is instrumented on regression equation (1) in table 5 panel B. Regression (2) is estimated on the subsample of advised transactions. Year fixed effects and transaction variables are included but not reported.

	(1)	(2)	(3)	(4)	(5)
			CAR_(-2,2)_BETA1_vw		
VARIABLES	FE panel reg	FE panel reg	FE panel reg	IV panel reg	Heckman
IEDT	0.0135	0.0263*	0.0216*	0.1355***	0.0301***
	(1.358)	(1.925)	(1.729)	(4.156)	(2.640)
ARSD	-0.0142**	-0.0091	-0.0137**	-0.0080	-0.0144**
	(-2.511)	(-1.244)	(-2.390)	(-1.243)	(-2.379)
ADVISORCHOICE			-0.0011	-0.0167***	
			(-0.915)	(-4.353)	
PASTBBCAR_(-2,2)	-0.0634*	-0.2363***	-0.0634*	-0.0632**	0.3288***
	(-1.958)	(-7.247)	(-1.960)	(-2.005)	(3.913)
ATobinsQ	0.0017**	0.0040**	0.0017**	0.0019**	0.0012
	(2.195)	(2.287)	(2.191)	(2.215)	(1.332)
AROA	-0.0219**	-0.0571**	-0.0218**	-0.0207*	-0.0053
	(-2.081)	(-2.120)	(-2.073)	(-1.919)	(-0.613)
ALEVERAGE	-0.0084	-0.0054	-0.0083	-0.0091	0.0165**
	(-1.186)	(-0.298)	(-1.183)	(-1.261)	(2.387)
LNIS	0.0019	0.0099	0.0019	0.0009	-0.0080***
	(0.397)	(0.723)	(0.385)	(0.180)	(-6.826)
SIXTH	-0.0043**	-0.0080*	-0.0043**	-0.0059***	-0.0047
	(-2.403)	(-1.696)	(-2.420)	(-3.326)	(-1.433)
LOGME	-0.0091***	-0.0129***	-0.0091***	-0.0106***	-0.0058***
	(-7.405)	(-3.808)	(-7.395)	(-9.238)	(-8.989)
Constant	0.1665***	0.2049*	0.1681***	0.2224***	0.1580***
	(3.904)	(1.893)	(3.945)	(5.399)	(7.381)
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Fixed effects	Yes	Yes	Yes	Yes	No
Transaction characteristics	Yes	Yes	Yes	No	No
Instrumented	No	No	No	ADVISORCHOICE	ADVISED
N	31,954	8,886	31,954	31,954	31,954
Number of Acquirers	10,280	4,164	10,280	10,280	10,280
Chi²-/F-statistic	7.53	4.92	7.42	272.61	250.91
p-value	0.0000	0.0000	0.0000	0.0000	0.0000
Chi²-statistic of selection					28.32
p-value of selection test					0.0000

Robust z- & t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

In line with the neoclassical theory of M&As bidders with many investment opportunities compared to their industry make more profitable acquisitions. The influence of the past announcement returns on the current bid's announcement returns is positive if controlling for selection with the pooled (Heckman, 1976; 1979) model. Contrary to (Bao & Edmans, 2011) serial bidders hunt performance, because the retention of a bank advisor with a good past performance is beneficial for the bidder in the current bid in terms of higher returns.

In the fixed effects panel regressions the past performance is negatively correlated with the current bid's announcement returns, because over time the announcement returns decrease as serial bidders' exploit their investment opportunities. The most profitable targets in the bidders' sets of investment opportunities are acquired first, such that the negative correlation of returns over time is in line with the empirical observations of (Klasa & Stegemoller, 2007), (Fuller, Netter, & Stegemoller, 2002) and the learning hypothesis of (Aktas, Bodt, & Roll, 2009; 2011). The difference in the regression coefficients between the fixed effects panel regression and the pooled (Heckman, 1976; 1979) model are the fixed effects. The serial bidder specific and time constant average past bidder-bank CAR(-2,2) of 0.0067 is positive, whereas the deviation from the time constant mean captured by the fixed effects panel regressions' coefficients is negative over time. The pooled estimator's regression coefficient captures the positive time constant mean past performance and its negative deviation over time, with the positive average effect prevailing over its deviation.

The sensitivity analyses of different specifications of serial acquirers' cumulative abnormal returns are shown in panels A and B of table 7. The empirical positive correlation of the bidder's advising bank's expertise in the target's industry with the announcement returns is independent of the returns' computation, and larger for CAPM based CARs. Estimating the effect of advising banks on bidders' returns with pooled (Heckman, 1976; 1979) selection models the empirical observations are similar to regression (5) in table 6, with the tables being available upon request.

The sensitivity analysis of alternative skill and reputation measures shown in table 8 is comparable to (Kale, Kini, & Ryan, 2003). A higher market share MS of the acquirer's advising bank is associated with higher announcement returns if selection effects are considered. The economic effect at the mean of market share MS of $0.0003 \times 2.7883 = 0.0008$ to $0.0013 \times 2.7883 = 0.0036$ or 0.08 to 0.36 percentage points is similar to the effect of expertise in the target's primary industry. The positive effect of the tier of the target advisor in the pooled (Heckman, 1976; 1979) model is contrary to the effect observed by (Golubov, Petmezas, & Travlos, 2012). The economic effect, if significant, of hiring an advising bank with a larger market share than the target's advisor (RELREP) is at the mean $0.0002 \times 2.2085 = 0.0004$ or 0.04 percentage points in regression (6). The effect is driven by large outliers of few bulge-bracket bank advisors with larger market shares MS that are divided by market shares of 0.1 of targets' non-bulge-bracket bank advisors.

The dollar value definitions of expertise IEVT in the target's industry and advisory relationship strength ARSV provide empirical observations similar to the deal based definitions if one controls for selection, which is presented in table 9. The industry expertise and advisory relationship strength by dollar deal value are more skewed towards bulge-bracket banks. The skewness of the variables requires controlling of selection more than for the less skewed deal number defined variables.

The alternative approximation of a good advisory performance by the chosen investment bank on the bidder's side with the dummy GOODADVICE exhibits a positive correlation with the bank's industry expertise in the target's industry as well, shown in table 10. A one deal increase in banks' target industry expertise is associated with a $0.6374 \times 0.0185 = 0.0118$ or 1.18 percentage points higher probability to receive good advice, or a relative improvement of $0.0118/0.5418 = 0.0218$ or 2.18%. A one standard deviation increase in banks' target industry expertise is related to a $0.6374 \times 0.0532 = 0.0339$ or 3.39 percentage points higher probability to receive good advice, or a relative improvement of $0.0339/0.4983 = 0.0681$ or 6.81% compared to a standard deviation of 49.83% of GOODADVICE. Past good advice by the same investment bank, a higher abnormal Tobin's Q, leverage and profitability are significantly positively correlated with the probability to receive good advice, to make a good acquisition decision, as well.

The sensitivity analysis of the correlation of the SDC League Table market share MS and RELREP as skill and reputation proxies used in previous studies on GOODADVICE is shown in table 11. A one standard deviation increase in the acquirer's advisor's market share MS is associated with an increase in the probability to receive good advice of $0.0072 \times 7.5363 = 0.0543$ or a 5.43% percentage points improvement, which is compared to the standard deviation of GOODADVICE a relative improvement of $0.0543/0.4983 = 0.1089$ or 10.89%. The relative reputation has an economic effect of one standard deviation increase of $0.0007 \times 11.4739 = 0.0080$ or 0.80 percentage points higher probability, which is a relative effect of $0.0080/0.4983 = 0.0161$ or 1.61%. Different to the empirical observation of (Kale, Kini, & Ryan, 2003) the target advisor's reputation is mostly insignificant.

The dollar deal value based definition of the industry expertise and advisory relationship strength have a similar effect on the probability to complete a value increasing transaction or to withdraw from a value destroying deal if one controls for selection, which is presented in table 12.

Table 7: Sensitivity analysis of alternative CARs

Table 7 panel A shows the sensitivity analysis for CARs calculated with the Beta-1 Model. The dependent variables are winsorized cumulative abnormal returns (CAR) estimated with the Beta-1 model. The CARs differ in the CRSP index used as market proxy and in the estimation window around the announcement date (t=0). ADVISORCHOICE serves as selection indicator in the IV panel models and is instrumented on the transaction variables shown in table 5 panel B (Vella, 1998; Heckman, 1978; Wooldridge, 2002a). PASTBBCAR is the CAR, similar to the dependent variable, of the previous deal advised by the same bank, the bank-bidder pairing, or of the previous unadvised deal if the current one is unadvised as well. The variables are summarized in table 2 and described in the statistical appendix in table C. The standard errors of the IV panel regressions are corrected by bootstrapping with 200 repetitions clustered by acquirers (Mooney & Duval, 1993; Efron, 1979; Adkins & Hill, 2004; Hill, Adkins, & Bender, 2003). Year fixed effects are included but not reported.

Panel A: Alternative CARs	(1)	(2)	(3)	(4)	(5)
based on the Beta-1 Model	(-1, 1)	(-3, 3)	(-1, 1)	(-2, 2)	(-3, 3)
VARIABLES	value-weighted		equally-weighted		
IEDT	0.1317***	0.1399***	0.1218***	0.1251***	0.1258***
	(4.594)	(3.938)	(4.448)	(4.215)	(4.030)
ARSD	-0.0027	-0.0111	-0.0037	-0.0081	-0.0121*
	(-0.410)	(-1.429)	(-0.660)	(-1.301)	(-1.860)
PASTBBCAR_(*,*)	-0.0789**	-0.0309	-0.0938**	-0.0763**	-0.0385
	(-2.141)	(-0.942)	(-2.222)	(-2.262)	(-1.326)
ADVISORCHOICE	-0.0169***	-0.0168***	-0.0157***	-0.0154***	-0.0151***
	(-5.111)	(-4.098)	(-4.926)	(-4.627)	(-4.107)
ATobinsQ	0.0010	0.0016*	0.0010	0.0019**	0.0016*
	(1.472)	(1.930)	(1.578)	(2.261)	(1.946)
AROA	-0.0136	-0.0167	-0.0154*	-0.0212**	-0.0175
	(-1.297)	(-1.286)	(-1.728)	(-2.021)	(-1.407)
ALEVERAGE	-0.0093	-0.0015	-0.0124**	-0.0126*	-0.0048
	(-1.539)	(-0.198)	(-1.983)	(-1.804)	(-0.652)
LNIS	-0.0017	-0.0008	-0.0017	0.0019	0.0004
	(-0.394)	(-0.157)	(-0.439)	(0.399)	(0.076)
SIXTH	-0.0044***	-0.0059***	-0.0037**	-0.0049***	-0.0043**
	(-2.732)	(-2.953)	(-2.408)	(-2.756)	(-2.436)
LOGME	-0.0080***	-0.0133***	-0.0081***	-0.0107***	-0.0134***
	(-7.910)	(-9.326)	(-7.605)	(-10.043)	(-9.457)
Constant	0.2008***	0.2974***	0.1995***	0.2163***	0.2855***
	(5.920)	(6.283)	(6.129)	(5.651)	(6.549)
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Fixed effects	Yes	Yes	Yes	Yes	Yes
Instrumented			ADVISORCHOICE		
N	31,954	31,954	31,954	31,954	31,954
Number of Acquirers	10,280	10,280	10,280	10,280	10,280
Chi²-statistic	267.31	303.36	201.67	335.29	358.29
p-value	0.0000	0.0000	0.0000	0.0000	0.0000

Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 7 (cont.): Sensitivity analysis of alternative CARs

Table 7 panel B shows the sensitivity analysis for CARs calculated with the CAPM. The dependent variables are winsorized cumulative abnormal returns (CAR) estimated with the CAPM from -270 to -21 trading days before the announcement (t=0). The CARs differ in the CRSP index used as market proxy and in the estimation window around the announcement date (t=0). ADVISORCHOICE serves as selection indicator in the IV panel models and is instrumented on the transaction variables shown in table 5 panel B (Vella, 1998; Heckman, 1978; Wooldridge, 2002a). PASTBBCAR is the CAR, similar to the dependent variable, of the previous deal advised by the same bank, the bank-bidder pairing, or of the previous unadvised deal if the current one is unadvised as well. The variables are summarized in table 2 and described in the statistical appendix in table C. The standard errors of the IV panel regressions are corrected by bootstrapping with 200 repetitions clustered by acquirers (Mooney & Duval, 1993; Efron, 1979; Adkins & Hill, 2004; Hill, Adkins, & Bender, 2003). Year fixed effects are included but not reported.

Panel B: Alternative CARs based on the CAPM	(1)	(2)	(3)	(4)	(5)	(6)
	(-1, 1)	(-2, 2)	(-3, 3)	(-1, 1)	(-2, 2)	(-3, 3)
VARIABLES		value-weighted			equally-weighted	
IEDT	0.1343***	0.1444***	0.1578***	0.1255***	0.1343***	0.1404***
	(4.827)	(5.023)	(4.828)	(4.756)	(4.592)	(4.664)
ARSD	-0.0016	-0.0057	-0.0088	-0.0024	-0.0045	-0.0083
	(-0.246)	(-0.911)	(-1.220)	(-0.374)	(-0.713)	(-1.208)
PASTBBCAR_(*,*)	-0.0640*	-0.0606*	-0.0150	-0.0790**	-0.0779**	-0.0287
	(-1.679)	(-1.762)	(-0.408)	(-2.076)	(-2.069)	(-0.775)
ADVISORCHOICE	-0.0172***	-0.0180***	-0.0193***	-0.0163***	-0.0170***	-0.0175***
	(-5.277)	(-5.379)	(-5.283)	(-5.371)	(-4.935)	(-5.363)
ATobinsQ	-0.0002	-0.0007	-0.0014*	-0.0002	-0.0004	-0.0008
	(-0.367)	(-1.059)	(-1.726)	(-0.324)	(-0.590)	(-1.023)
AROA	-0.0146*	-0.0238**	-0.0214*	-0.0172**	-0.0255**	-0.0271***
	(-1.738)	(-2.281)	(-1.871)	(-2.001)	(-2.521)	(-2.607)
ALEVERAGE	-0.0067	-0.0081	0.0001	-0.0095*	-0.0103	-0.0036
	(-1.125)	(-1.226)	(0.012)	(-1.686)	(-1.559)	(-0.535)
LNIS	-0.0027	-0.0021	-0.0051	-0.0021	0.0003	-0.0017
	(-0.682)	(-0.437)	(-0.971)	(-0.550)	(0.055)	(-0.335)
SIXTH	-0.0034**	-0.0041**	-0.0038*	-0.0027**	-0.0030*	-0.0022
	(-2.422)	(-2.530)	(-1.930)	(-1.963)	(-1.790)	(-1.211)
LOGME	-0.0062***	-0.0077***	-0.0095***	-0.0065***	-0.0079***	-0.0099***
	(-6.031)	(-7.032)	(-7.288)	(-6.577)	(-6.945)	(-7.541)
Constant	0.1720***	0.1891***	0.2545***	0.1719***	0.1785***	0.2370***
	(5.228)	(4.249)	(5.609)	(5.267)	(4.362)	(5.947)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Instrumented			ADVISORCHOICE			
N	31,954	31,954	31,954	31,954	31,954	31,954
Number of Acquirers	10,280	10,280	10,280	10,280	10,280	10,280
Chi²-statistic	227.08	279.03	224.98	276.80	259.59	285.17
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

The simple selection correction whether the deal is advised or not with the biprobit model with selection does not control for the effect of skewness of IEVT and ARSV and random or fixed effects (Greene, 2008b; 2008a). The selection indicator ADVISORCHOICE that distinguishes between non-bulge-bracket bank and bulge-bracket bank advised deals is better suited to control for selection and the skewness of IEVT and ARSV in the IV probit regressions. The (Mundlak, 1978) fixed effects are excluded, because they are highly correlated with the explanatory variables. The regression coefficients of the explanatory variables therefore explain mostly the bidder specific but time constant effects and less the changes over time. A one deal increase in IEVT is expected to increase the probability of a good merger decision by $0.2742 \times 0.0146 = 0.0040$ or 0.40 percentage points. The relative improvement is $0.0040/0.5418 = 0.0074$ or 0.74%. Hiring a bank with a one standard deviation better IEVT is likely to improve the probability of good advice by $0.2742 \times 0.0939 = 0.0257$ or 2.57 percentage points. The relative improvement compared to the standard deviation is $0.0257/0.4983 = 0.0517$ or 5.17%. The economic effects are comparable to the deal number based measures of the advising bank's target industry expertise.

Finally the time until the bid is resolved, withdrawn or completed, and the probability of deal completion similar to (Hunter & Jagtiani, 2003), (Rau, 2000), (Golubov, Petmezas, & Travlos, 2012), and (Chang, Shekhar, Tam, & Zhu, 2013) is tested with respect to the potentially positive influence of the industry expertise of the bidder's advising bank and the strength of the advisory relationship. Table 13 shows that more experienced banks who know the bidder better are executing the transaction faster. The fact that private transactions are usually announced when they are completed is controlled with the dummy PUBLIC (Officer, Poulsen, & Stegemoller, 2009). Limiting the analysis to public deals only the effects are stronger.

Table 8: Sensitivity analysis of skill and reputation variables

Table 8 shows the sensitivity analysis of the approximation of skill and reputation by the advisor's market share MS, target advisor's tier TADVISORTIER and thei relative reputation RELREP. The dependent variables are winsorized cumulative abnormal returns (CAR) estimated with the Beta-1 model over the interval (-2, 2) around the announcement date (t=0). ADVISORCHOICE serves as selection indicator in IV panel models (3) and (6) and is instrumented on the transaction variables shown in table 5 panel B (Vella, 1998; Heckman, 1978; Wooldridge, 2002a). ADVISED is a dummy and 1 if the deal is advised. ADVISED serves as selection dummy in pooled (Heckman, 1976, 1979) regressions (2) and (5) and is instrumented on the transaction variables used in table 5 panel A. PASTBBCAR is the CAR similar to the dependent variable of the previous deal advised by the same bank, the bank-bidder pairing, or of the previous unadvised deal if the current one is unadvised as well. The variables are summarized in table 2 and described in the statistical appendix in table C. The standard errors of panel regressions (1) and (4) and (Heckman,1976, 1979) regressions (2) and (5) are corrected with the Huber & White sandwich estimator clustered by acquirers (Huber, 1967; White, 1980). The standard errors of IV panel regressions (3) and (6) are corrected by bootstrapping with 200 repetitions clustered by acquirers (Mooney & Duval, 1993; Efron, 1979; Adkins & Hill, 2004; Hill, Adkins, & Bender, 2003). Year fixed effects are included but not reported.

	(1)	(2)	(3)	(4)	(5)	(6)
			CAR_(-2,2)_BETA1_vw			
VARIABLES	FE panel reg	Heckman	IV panel reg	FE panel reg	Heckman	IV panel reg
MS	0.0000	0.0003***	0.0013***			
	(0.295)	(3.508)	(2.982)			
TADVISORTIER	-0.0002	0.0183***	0.0018			
	(-0.276)	(3.060)	(1.184)			
RELREP				0.0001*	0.0000	0.0002***
				(1.792)	(0.248)	(3.169)
ARSD	-0.0128**	-0.0156***	-0.0010	-0.0135**	-0.0129**	-0.0040
	(-2.291)	(-2.619)	(-0.130)	(-2.438)	(-2.146)	(-0.628)
PASTBBCAR_(-2,2)	-0.0631*	0.3572***	-0.0552	-0.0631*	0.3295***	-0.0615*
	(-1.948)	(3.917)	(-1.623)	(-1.948)	(3.906)	(-1.691)
ADVISORCHOICE			-0.0224***			-0.0093***
			(-3.114)			(-4.115)
ATobinsQ	0.0017**	0.0014	0.0019**	0.0017**	0.0012	0.0019**
	(2.198)	(1.579)	(2.184)	(2.210)	(1.317)	(2.420)
AROA	-0.0219**	-0.0000	-0.0219*	-0.0219**	-0.0060	-0.0216*
	(-2.088)	(-0.003)	(-1.943)	(-2.089)	(-0.699)	(-1.848)
ALEVERAGE	-0.0084	0.0152**	-0.0088	-0.0083	0.0172**	-0.0092
	(-1.185)	(2.173)	(-1.260)	(-1.181)	(2.500)	(-1.218)
LNIS	0.0020	-0.0075***	0.0021	0.0020	-0.0081***	0.0013
	(0.405)	(-6.293)	(0.436)	(0.413)	(-6.957)	(0.275)
SIXTH	-0.0043**	-0.0065**	-0.0062***	-0.0043**	-0.0048	-0.0059***
	(-2.419)	(-1.975)	(-3.424)	(-2.410)	(-1.457)	(-3.276)
LOGME	-0.0091***	-0.0073***	-0.0108***	-0.0091***	-0.0056***	-0.0106***
	(-7.396)	(-10.064)	(-8.726)	(-7.420)	(-8.795)	(-8.505)
Constant	0.1646***	0.1263***	0.1771***	0.1649***	0.1546***	0.2033***
	(3.867)	(4.876)	(3.777)	(3.870)	(7.262)	(5.093)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Fixed effects	Yes	No	Yes	Yes	No	Yes
Transaction characteristics	Yes	No	No	Yes	No	No
Instrumented	No	ADVISED	ADVISORCHOICE	No	ADVISED	ADVISORCHOICE
N	31,954	31,954	31,954	31,954	31,954	31,954
Number of Acquirers	10,280	10,280	10,280	10,280	10,280	10,280
F-/Chi²-statistic	7.52	252.56	248.20	7.71	245.87	288.37
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Chi²-statistic of selection		16.25			26.94	
p-value of selection test		0.0001			0.0000	

Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 9: Regressions of the announcement returns with expertise measured by deal volume

Table 9 shows the regressions of the announcement returns with the industry expertise and advisory relationship strength calculated with the deal dollar volume. The dependent variables are the winsorized CARs from -2 to +2 trading days around the M&A announcement, calculated with the Beta-1 Model and the CRSP value-weighted index. The variables are summarized in table 2 and described in the statistical appendix in table C. ADVISORCHOICE serves as selection indicator in panel regression (3) (Vella, 1998; Heckman, 1978; Wooldridge, 2002a). The standard errors of fixed effects panel regressions (1) to (3) and pooled (Heckman, 1976, 1979) regression (5) are corrected with the Huber & White sandwich estimator clustered by acquirers (Huber, 1967; White, 1980). The standard errors of instrumental variable (IV) panel regression (4) are corrected by bootstrapping with 200 repetitions clustered by acquirers (Mooney & Duval, 1993; Efron, 1979; Adkins & Hill, 2004; Hill, Adkins, & Bender, 2003). ADVISED in (Heckman, 1976, 1979) regression (5) is instrumented on the variables in regression (1) in table 5 panel A. ADVISORCHOICE in IV panel regression (4) is instrumented on the variables in regression (1) in table 5 panel B. Regression (2) is estimated on advised transactions only. Year fixed effects and transaction variables are included but not reported.

	(1)	(2)	(3)	(4)	(5)
	CAR_(-2,2)_BETA1_vw				
VARIABLES	FE panel reg	FE panel reg	FE panel reg	IV panel reg	Heckman
IEVT	0.0040	0.0154**	0.0062	0.0671***	0.0224***
	(0.707)	(2.195)	(0.861)	(4.524)	(3.506)
ARSV	-0.0135**	-0.0091	-0.0131**	-0.0059	-0.0141**
	(-2.411)	(-1.256)	(-2.320)	(-0.956)	(-2.391)
PASTBBCAR_(-2,2)	-0.0635**	-0.2359***	-0.0634*	-0.0595*	0.3301***
	(-1.961)	(-7.248)	(-1.957)	(-1.804)	(3.918)
ADVISORCHOICE			-0.0006	-0.0158***	
			(-0.449)	(-4.890)	
ATobinsQ	0.0017**	0.0040**	0.0017**	0.0019**	0.0012
	(2.197)	(2.303)	(2.195)	(2.403)	(1.336)
AROA	-0.0220**	-0.0584**	-0.0220**	-0.0217**	-0.0056
	(-2.090)	(-2.169)	(-2.089)	(-2.019)	(-0.648)
ALEVERAGE	-0.0084	-0.0056	-0.0084	-0.0096	0.0162**
	(-1.187)	(-0.304)	(-1.188)	(-1.324)	(2.353)
LNIS	0.0020	0.0100	0.0019	0.0012	-0.0081***
	(0.403)	(0.730)	(0.399)	(0.258)	(-6.905)
SIXTH	-0.0043**	-0.0080*	-0.0043**	-0.0060***	-0.0048
	(-2.414)	(-1.704)	(-2.424)	(-3.066)	(-1.467)
LOGME	-0.0091***	-0.0130***	-0.0091***	-0.0106***	-0.0061***
	(-7.392)	(-3.812)	(-7.386)	(-9.265)	(-9.189)
Constant	0.1658***	0.2055*	0.1665***	0.2186***	0.1639***
	(3.889)	(1.903)	(3.904)	(5.439)	(7.554)
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Fixed effects	Yes	Yes	Yes	Yes	No
Transaction characteristics	Yes	Yes	Yes	No	No
Instrumented	No	No	No	ADVISORCHOICE	ADVISED
N	31,954	8,886	31,954	31,954	31,954
Number of Acquirers	10,280	4,164	10,280	10,280	10,280
Chi²-/F-statistic	7.52	4.98	7.40	302.76	252.18
p-value	0.0000	0.0000	0.0000	0.0000	0.0000
Chi²-statistic of selection					30.14
p-value of selection test					0.0000

Robust z- & t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 10: Regression analysis of GOODADVICE

Table 10 includes the primary analysis of the probability to receive good advice and to make a good acquisition decision. The dependent variable is GOODADVICE. GOODADVICE is 1 if a deal with a nonnegative CAR(-2, 2) is completed or withdrawn in the case of a negative CAR, and 0 otherwise. The coefficients are the marginal probability effects at the mean on P(GOODADVICE=1) or P(GOODADVICE=1|ADVISED=1) in (5). The variables are summarized in table 2 and described in the statistical appendix in table C. (Mundlak, 1978) fixed effects are highly correlated with the regressors, causing multicollinearity, and therefore excluded. The standard errors of random effects probit panel regressions (1) to (3) are based on the observed information matrix (OIM), the inverse Hessian, after maximum likelihood estimation (Efron & Hinkley, 1978). The standard errors of instrumental variables (IV) probit regression (4) and biprobit with selection regression (5) are corrected with the Huber & White sandwich estimator clustered by acquirers (Huber, 1967; White, 1980). ADVISED in biprobit selection model (5) is instrumented on the variables in regression (2) in table 5 panel A (Greene, 2008a, 2008b). ADVISORCHOICE in IV probit regression (4) is instrumented on the variables in regression (2) in table 5 panel B. Regression (2) is estimated on the subsample of advised transactions only. Year fixed effects and transaction variables are included but not reported. Diagnostic statistics of the models' Chi²-statistic of significance and the correlation of random effects c_i with explanatory variables x_{it} are shown.

	(1)	(2)	(3)	(4)	(5)
			GOODADVICE		
VARIABLES	RE probit panel	RE probit panel	RE probit panel	IV probit	biprobit with selection
IEDT	0.1224**	0.1565*	0.1323*	0.6374***	0.1584**
	(1.975)	(1.858)	(1.672)	(3.707)	(2.198)
ARSD	-0.0603	-0.0034	-0.0592	-0.0329	-0.1025**
	(-1.635)	(-0.071)	(-1.589)	(-0.735)	(-2.158)
PASTGOODADVICE	0.0147**	-0.0473**	0.0145**	0.0223**	0.0762***
	(2.056)	(-2.024)	(1.990)	(2.399)	(2.746)
ADVISORCHOICE			-0.0014	-0.0646***	
			(-0.201)	(-3.098)	
ATobinsQ	0.0039**	0.0057	0.0039**	0.0035**	0.0028
	(2.245)	(1.459)	(2.245)	(2.086)	(0.791)
AROA	0.0497**	0.0344	0.0498**	0.0609***	0.0323
	(2.466)	(0.711)	(2.470)	(3.180)	(0.780)
ALEVERAGE	0.0295*	0.1096***	0.0295*	0.0457***	0.1315***
	(1.701)	(2.695)	(1.700)	(2.636)	(3.612)
LNIS	-0.0127***	-0.0358***	-0.0127***	-0.0171***	-0.0448***
	(-3.550)	(-4.337)	(-3.549)	(-5.217)	(-6.664)
SIXTH	-0.0080	-0.0159	-0.0080	-0.0210**	-0.0293*
	(-0.888)	(-0.819)	(-0.889)	(-2.485)	(-1.680)
LOGME	-0.0133***	-0.0195***	-0.0133***	-0.0149***	-0.0179***
	(-6.932)	(-4.098)	(-6.883)	(-8.092)	(-5.002)
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Fixed effects	No	No	No	No	No
Transaction variables	Yes	Yes	Yes	No	No
Instrumented	No	No	No	ADVISORCHOICE	ADVISED
N	31,954	8,886	31,954	31,954	31,954
Number of Acquirers	10,280	4,164	10,280	10,280	10,280
Chi²-statistic	475.29	348.02	475.21	308.48	169.29
p-value	0.0000	0.0000	0.0000	0.0000	0.0000
corr(c_i, x_{it})	0.0463	0.2478	0.0464	0.0714	
Chi²-statistic of selection				9.68	26.33
p-value of selection				0.0019	0.0000

Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 11: Regression analysis of GOODADVICE with alternative skill and reputation measures

Table 11 includes the sensitivity analysis of different skill and reputation proxies on the probability to receive good advice. The dependent variable is GOODADVICE. GOODADVICE is 1 if a deal with a nonnegative CAR(-2, 2) is completed or withdrawn in the case of a negative CAR, and 0 otherwise. The coefficients are the marginal probability effects at the mean on P(GOODADVICE=1) or P(GOODADVICE=1|ADVISED=1) in (2) and (5). The variables are summarized in table 2 and described in the statistical appendix in table C. (Mundlak, 1978) fixed effects are highly correlated with the regressors, causing multicollinearity, and therefore excluded. The standard errors of random effects probit panel regressions (1) and (4) are based on the observed information matrix (OIM), the inverse Hessian, after maximum likelihood estimation (Efron & Hinkley, 1978). The standard errors of instrumental variable (IV) probit regression (3) and (6) and biprobit regression with selection (2) and (5) are corrected with the Huber & White sandwich estimator clustered by acquirers (Huber, 1967; White, 1980). ADVISORCHOICE in IV probit regressions (3) and (6) is instrumented on the variables in regression (2) in table 5 panel B. ADVISED in biprobit regressions with selection (2) and (5) is regressed on the variables in regression (2) in table 5 panel A (Greene, 2008a, 2008b). Year fixed effects and transaction variables are included but not reported. Diagnostic statistics of the models' Chi²-statistic of significance and the correlation of random effects c_i with explanatory variables x_{it} are shown.

	(1)	(2)	(3)	(4)	(5)	(6)
			GOODADVICE			
VARIABLES	RE probit panel	biprobit with selection	IV probit	RE probit panel	biprobit with selection	IV probit
MS	0.0008*	0.0011**	0.0072***			
	(1.788)	(2.098)	(2.587)			
TADVISORTIER	-0.0014	-0.0161*	0.0113			
	(-0.293)	(-1.793)	(1.300)			
RELREP				0.0005*	0.0002	0.0007*
				(1.892)	(0.652)	(1.849)
ARSD	-0.0554	-0.0991**	0.0161	-0.0501	-0.0954**	-0.0360
	(-1.519)	(-2.082)	(0.270)	(-1.396)	(-2.022)	(-0.758)
PASTGOODADVICE	0.0144**	0.0824***	0.0160	0.0139*	0.0769***	0.0276***
	(2.011)	(2.941)	(1.301)	(1.950)	(2.773)	(3.000)
ADVISORCHOICE			-0.1048**			-0.0241*
			(-2.335)			(-1.677)
ATobinsQ	0.0039**	0.0031	0.0033*	0.0039**	0.0027	0.0035**
	(2.222)	(0.869)	(1.895)	(2.242)	(0.770)	(2.074)
AROA	0.0491**	0.0213	0.0583***	0.0491**	0.0288	0.0574***
	(2.436)	(0.511)	(3.033)	(2.435)	(0.700)	(2.998)
ALEVERAGE	0.0296*	0.1310***	0.0458***	0.0300*	0.1353***	0.0486***
	(1.703)	(3.559)	(2.623)	(1.727)	(3.726)	(2.818)
LNIS	-0.0127***	-0.0449***	-0.0168***	-0.0129***	-0.0455***	-0.0181***
	(-3.542)	(-6.622)	(-5.060)	(-3.578)	(-6.801)	(-5.503)
SIXTH	-0.0082	-0.0304*	-0.0235***	-0.0082	-0.0299*	-0.0213**
	(-0.917)	(-1.736)	(-2.658)	(-0.915)	(-1.721)	(-2.510)
LOGME	-0.0134***	-0.0232***	-0.0167***	-0.0130***	-0.0168***	-0.0152***
	(-6.953)	(-5.898)	(-9.485)	(-7.160)	(-4.785)	(-8.105)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Fixed effects	No	No	No	No	No	No
Transaction variables	Yes	No	No	Yes	No	No
Instrumented	No	ADVISED	ADVISORCHOICE	No	ADVISED	ADVISORCHOICE
N	31,954	31,954	31,954	31,954	31,954	31,954
Number of Acquirers	10,280	10,280	10,280	10,280	10,280	10,280
Chi²-statistic	474.16	188.01	308.98	474.35	164.39	300.31
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
corr(c_i, x_{it})	0.0467		0.1045	0.0469		0.0380
Chi²-statistic of selection		34.21	5.74		24.86	4.25
p-value of selection		0.0000	0.0166		0.0000	0.0394

Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 12: Regression analysis of GOODADVICE using the dollar value definitions IEVT and ARS

Table 12 includes the analysis of the probability to receive good advice using the deal dollar value definitions IEVT and ARSV. The dependent variable is GOODADVICE. GOODADVICE is 1 if a deal with a nonnegative CAR(-2, 2) is completed or withdrawn in the case of a negative CAR, and 0 otherwise. The coefficients are the marginal probability effects at the mean on P(GOODADVICE=1) or P(GOODADVICE=1|ADVISED=1) in (5). The variables are summarized in table 2 and described in the statistical appendix in table C. (Mundlak, 1978) fixed effects are highly correlated with the regressors, causing multicollinearity, and therefore excluded. The standard errors of random effects panel probit regressions (1) to (3) are based on the observed information matrix (OIM), the inverse Hessian, after maximum likelihood estimation (Efron & Hinkley, 1978). The standard errors of instrumental variable (IV) probit regression (4) and biprobit regression with selection (5) are corrected with the Huber & White sandwich estimator clustered by acquirers (Huber, 1967; White, 1980). ADVISED in biprobit selection model (5) is instrumented on the variables in regression (2) in table 5 panel A (Greene, 2008a, 2008b). ADVISORCHOICE in IV probit regression (4) is instrumented on the variables in regressions (2) in table 5 panel B. Regression (2) is estimated on the subsample of advised transactions only. Year fixed effects and transaction variables are included but not reported. Diagnostic statistics of the models' Chi²-statistic of significance and the correlation of the random effects c_i with explanatory variables x_{it} are shown.

	(1)	(2)	(3)	(4)	(5)
			GOODADVICE		
VARIABLES	RE probit panel	RE probit panel	RE probit panel	IV probit	biprobit with selection
IEVT	0.0223	0.0427	-0.0006	0.2742***	0.0445
	(0.635)	(0.929)	(-0.013)	(2.697)	(1.129)
ARSV	-0.0444	0.0088	-0.0494	-0.0201	-0.0938**
	(-1.221)	(0.184)	(-1.340)	(-0.435)	(-2.004)
PASTGOODADVICE	0.0135*	-0.0481**	0.0146**	0.0223**	0.0760***
	(1.886)	(-2.062)	(2.007)	(2.296)	(2.751)
ADVISORCHOICE			0.0056	-0.0560**	
			(0.831)	(-2.529)	
ATobinsQ	0.0039**	0.0057	0.0039**	0.0035**	0.0027
	(2.240)	(1.462)	(2.242)	(2.065)	(0.780)
AROA	0.0493**	0.0321	0.0490**	0.0585***	0.0291
	(2.448)	(0.663)	(2.433)	(3.052)	(0.706)
ALEVERAGE	0.0298*	0.1109***	0.0299*	0.0457***	0.1334***
	(1.717)	(2.726)	(1.725)	(2.629)	(3.663)
LNIS	-0.0129***	-0.0362***	-0.0129***	-0.0177***	-0.0454***
	(-3.582)	(-4.393)	(-3.584)	(-5.400)	(-6.779)
SIXTH	-0.0083	-0.0162	-0.0081	-0.0218**	-0.0299*
	(-0.919)	(-0.834)	(-0.905)	(-2.548)	(-1.714)
LOGME	-0.0131***	-0.0192***	-0.0132***	-0.0153***	-0.0176***
	(-6.779)	(-3.971)	(-6.823)	(-8.542)	(-4.865)
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Fixed effects	No	No	No	No	No
Transaction variables	Yes	Yes	Yes	No	No
Instrumented	No	No	No	ADVISORCHOICE	ADVISED
N	31,954	8,886	31,954	31,954	31,954
Number of Acquirers	10,280	4,164	10,280	10,280	10,280
Chi²-statistic	470.99	345.77	472.17	304.82	165.79
p-value	0.0000	0.0000	0.0000	0.0000	0.0000
corr(c_i, x_{it})	0.0469	0.2483	0.0465	0.0702	
Chi²-statistic of selection				8.47	26.10
p-value of selection				0.0036	0.0000

Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Similarly the completion probability is higher. More profitable serial bidders with better investment opportunities make more deals that are resolved faster and more often completed. Measuring the skills of advising banks alternatively with their SDC M&A League Table market share MS and the tier of the target's advisor the empirical observations are similar to the analysis with IEDT and ARSD, shown in table 14. In table 15 it can be seen that the effects of the dollar deal value definitions of the industry expertise and advisory relationship strength are similar to the deal number based definitions.

The economic effect of a standard deviation increase in the advising bank's industry expertise IEDT on the resolution speed is $-876.7493 \times 0.0532 = -46.6431$ days, which is compared to a mean of 77.34 days and a standard deviation of 103.83 days a relatively large effect. Hiring a more familiar bank with a standard deviation greater advisory relationship strength ARSD reduces the time to resolve the transaction by $-66.8383 \times 0.0854 = -5.7080$ days, which is a relatively small effect. The completion probability increases with a one standard deviation increase of IEDT by $2.1473 \times 0.0532 = 0.1142$ or 11.42 percentage points and of ARSD by $0.3671 \times 0.0847 = 0.0311$ or 3.11 percentage points, which are compared to the mean and standard deviation of COMPLETED of 94.16% and 23.46% relatively large effects.

Table 13: Regressions of the resolution speed and the deal completion probability

Table 13 shows the influence of the industry expertise and the advisory relationship strength on the days until the bid es resolved and the completion probability. The dependent variables are RESOLSPEED and COMPLETED. The variables are summarized in table 2 and described in the statistical appendix in table C. The coefficients are the marginal effects at the mean. The standard errors of regressions (1), (2), (5) and (6) are corrected with the Huber & White sandwich estimator clustered by acquirers (Huber, 1967; White, 1980). The standard errors of IV panel regression (3) are corrected by bootstrapping with 200 repetitions clustered by acquirers (Mooney & Duval, 1993; Efron, 1979; Adkins & Hill, 2004; Hill, Adkins, & Bender; 2003). The standard errors of Chamberlain random effects panel probit regression (4) with (Mundlak, 1978) fixed effects are based on the observed information matrix (OIM) after maxium likelihood estimation (Efron & Hikley, 1978; Chamberlain, 1980). ADVISED and ADVISORCHOICE are instrumented on the variables in regressions (3) and (4) in table 5 panels A and B. Year fixed effects, fixed effects and transaction variables are included but not reported. Diagnostic statistics of the models' Chi²-statistic of significance, the correlation of fixed effects c_i with explanatory variables x_{it} and the Chi²-statistic of significance of fixed effects' regressor γ=0 are shown.

	(1)	(2)	(3)	(4)	(5)	(6)
		RESOLSPEED			COMPLETED	
VARIABLES	FE panel reg	Heckman	IV panel reg	FE panel probit	biprobit with selection	IV probit
IEDT	89.8857***	34.6687**	-876.7493***	0.0134	-0.0188	2.1473***
	(6.014)	(2.134)	(-15.272)	(0.707)	(-1.203)	(12.491)
ARSD	8.5259	-46.9199***	-66.8383***	0.0567***	0.0206	0.3671***
	(1.117)	(-5.541)	(-3.786)	(4.656)	(1.228)	(7.841)
PASTRESOLSPEED	-0.0873***	0.3179***	-0.0154			
	(-6.971)	(10.540)	(-0.967)			
PASTCOMPLETED				-0.0157***	0.0145***	-0.1204***
				(-7.023)	(2.757)	(-13.356)
ADVISORCHOICE			134.9538***			-0.2930***
			(23.895)			(-14.239)
ATobinsQ	-0.5275	-3.8502***	0.0525	0.0025***	0.0006	-0.0020
	(-1.056)	(-5.914)	(0.088)	(2.812)	(0.688)	(-0.852)
AROA	-8.2967	-114.5983***	-17.1710	0.0044	0.0067	0.0402
	(-0.815)	(-11.696)	(-1.563)	(0.379)	(0.624)	(1.203)
ALEVERAGE	0.3398	9.8175	-2.4500	0.0007	0.0008	0.0172
	(0.047)	(1.132)	(-0.310)	(0.074)	(0.084)	(0.637)
LNIS	-22.9890*	5.3471***	-14.8684	0.0130**	0.0085***	0.0659***
	(-1.959)	(3.426)	(-1.037)	(2.003)	(4.425)	(2.943)
SIXTH	-6.9625***	-4.9596	-2.1278	0.0152***	-0.0012	0.0350***
	(-3.022)	(-1.437)	(-0.861)	(5.044)	(-0.304)	(4.575)
LOGME	1.4872	2.9274***	-1.1771	-0.0043***	0.0028***	0.0155***
	(1.011)	(3.528)	(-0.746)	(-2.715)	(2.668)	(3.567)
Constant	284.3550**	102.2751***	93.7706			
	(2.520)	(3.042)	(0.677)			
Year fixed effects	Yes	Yes	Yes	Yes	No	No
Fixed effects	Yes	No	Yes	Yes	No	Yes
Transaction variables	Yes	No	No	Yes	No	No
Instrumented	No	ADVISED	ADVISORCHOICE	No	ADVISED	ADVISORCHOICE
N	31,757	31,757	31,757	31,954	31,954	31,954
Number of Acquirers	10,237	10,237	10,237	10,280	10,280	10,280
F-/Chi²-statistic	35.59	481.85	1,409.90	2,024.11	82.68	2,523.43
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Chi²-statistic of selection		412.86			163.26	576.26
p-value of selection		0.0000			0.0000	0.0000
corr(c_i, x_{it})				0.1804		0.7335
Chi²-statistic γ=0				322.82		389.59
p-value				0.0000		0.0000

Robust t- and z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 14: Regressions of the resolution speed and the deal completion probability with alternative skill measures

Table 14 shows the influence of the SDC M&A Top-50 League Table market share MS and the tier of the target's advisor TADVISORTIER. The dependent variables are RESOLSPEED and COMPLETED. The variables are summarized in table 2 and described in the statistical appendix in table C. The coefficients are the marginal effects at the mean. The standard errors of regressions (1), (2), (5) and (6) are corrected with the Huber & White sandwich estimator clustered by acquirers (Huber, 1967; White, 1980). The standard errors of instrumental variable panel regression (3) are corrected by bootstrapping with 200 repetitions clustered by acquirers (Mooney & Duval, 1993; Efron, 1979; Adkins & Hill, 2004; Hill, Adkins, & Bender; 2003). The standard errors of Chamberlain random effects panel probit regression (4) with (Mundlak, 1978) fixed effects are based on the observed information matrix (OIM) after maxium likelihood estimation (Efron & Hikley, 1978). ADVISED and ADVISORCHOICE are instrumented on the variables in regressions (3) and (4) in table 5 panels A and B. Year fixed effects, fixed effects and transaction variables are included but not reported. Diagnostic statistics of the models' Chi²-statistic of significance, the correlation of fixed effects c_i with explanatory variables x_{it} and the Chi²-statistic of significance of fixed effects' regressor γ=0 are shown.

	(1)	(2)	(3)	(4)		(6)
		RESOLSPEED			COMPLETED	
VARIABLES	FE panel reg	Heckman	IV panel reg	FE panel probit	biprobit with selection	IV probit
MS	0.4235***	0.0248	-10.5249***	0.0001	-0.0003	0.0215***
	(4.222)	(0.238)	(-16.395)	(0.647)	(-0.626)	(16.649)
TADVISORTIER	11.9150***	9.7063***	-8.5024***	0.0132***	0.0045	0.0615***
	(10.055)	(4.850)	(-3.982)	(7.833)	(0.358)	(10.655)
ARSD	14.4277*	-108.7556***	-112.6868***	0.0577***	-10.9347***	0.3108***
	(1.880)	(-10.813)	(-7.523)	(4.776)	(-3.971)	(9.144)
PASTRESOLSPEED	-0.0884***	0.2953***	0.0096			
	(-7.046)	(9.915)	(0.757)			
PASTCOMPLETED				-0.0158***	-0.0106	
				(-7.053)	(-0.290)	
ADVISORCHOICE			187.8459***			-0.3584***
			(18.698)			(-18.461)
ATobinsQ	-0.5254	-3.6307***	0.2694	0.0025***	0.0043	0.0036
	(-1.052)	(-5.676)	(0.417)	(2.828)	(1.022)	(1.585)
AROA	-8.9149	-111.4996***	-9.3498	0.0044	0.1036**	0.0166
	(-0.875)	(-11.396)	(-0.793)	(0.378)	(2.097)	(0.493)
ALEVERAGE	0.4322	11.8160	-6.1859	0.0006	-0.0121	-0.0044
	(0.060)	(1.386)	(-0.662)	(0.063)	(-0.289)	(-0.164)
LNIS	-22.5423*	5.3042***	-23.1413	0.0132**	0.0435***	0.0718***
	(-1.917)	(3.371)	(-1.590)	(2.036)	(5.518)	(3.284)
SIXTH	-7.0782***	-3.5998	-0.6037	0.0152***	0.0085	
	(-3.065)	(-1.051)	(-0.225)	(5.032)	(0.453)	
LOGME	1.5286	2.5626***	-0.1799	-0.0044***	0.0060	-0.0071*
	(1.037)	(2.874)	(-0.104)	(-2.741)	(1.304)	(-1.864)
Constant	263.1335**	83.7533**	435.3793**			
	(2.265)	(2.459)	(2.544)			
Year fixed effects	Yes	Yes	Yes	No	No	No
Fixed effects	Yes	No	Yes	Yes	No	Yes
Transaction variables	Yes	No	No	Yes	No	No
Instrumented	No	ADVISED	ADVISORCHOICE	No	ADVISED	ADVISORCHOICE
N	31,757	31,757	31,757	31,954	31,954	31,954
Number of Acquirers	10,237	10,237	10,237	10,280	10,280	10,280
F-/Chi²-statistic	35.08	518.00	1,247.23	2,018.42	104.22	2,155.23
p-value	0.0000	0.0000			0.0000	0.0000
Chi²-statistic of selection		119.136			60.6056	812.8226
p-value of selection		0.0000			0.0000	0.0000
corr(c_i, x_{it})				0.1810		0.7514
Chi²-statistic γ=0				317.2998		150.5668
p-value				0.0000		0.0000

Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 15: Regressions of RESOLSPEED and COMPLETED with the dollar deal value definitions

Table 15 shows the influence of the industry expertise and the advisory relationship strength based on the dollar value of transactions on the days until the bid es resolved and the completion probability. The dependent variables are RESOLSPEED and COMPLETED. The variables are summarized in table 2 and described in the statistical appendix in table C. The coefficients are the marginal effects at the mean. The standard errors of regressions (1), (2), (5) and (6) are corrected with the Huber & White sandwich estimator clustered by acquirers (Huber, 1967; White, 1980). The standard errors of instrumental variable panel regression (3) are corrected by bootstrapping with 200 repetitions clustered by acquirers (Mooney & Duval, 1993; Efron, 1979; Adkins & Hill, 2004; Hill, Adkins, & Bender; 2003). The standard errors of Chamberlain random effects panel probit regression (4) with (Mundlak, 1978) fixed effects are based on the observed information matrix (OIM) after maxium likelihood estimation (Efron & Hikley, 1978). ADVISED and ADVISORCHOICE are instrumented on the variables in regressions (3) and (4) in table 5 panels A and B. Year fixed effects, fixed effects and transaction variables are included but not reported. Diagnostic statistics of the models' Chi²-statistic of significance, the correlation of fixed effects c_i with explanatory variables x_{it} and the Chi²-statistic of significance of fixed effects' regressor γ=0 are shown.

	(1)	(2)	(3)	(4)	(5)	(6)
		RESOLSPEED			COMPLETED	
VARIABLES	FE panel reg	Heckman	IV panel reg	FE panel probit	biprobit with selection	IV probit
IEVT	34.2858***	15.9973**	-487.0018***	0.0020	-0.0062	1.1927***
	(4.573)	(1.960)	(-18.355)	(0.192)	(-0.686)	(12.790)
ARSV	14.0532*	-44.7413***	-76.5451***	0.0556***	0.0176	0.4059***
	(1.841)	(-5.367)	(-5.620)	(4.701)	(1.079)	(9.284)
PASTRESOLSPEED	-0.0886***	0.3171***	-0.0136			
	(-7.074)	(10.508)	(-0.909)			
PASTCOMPLETED				-0.0158***	0.0150***	-0.1255***
				(-7.101)	(2.871)	(-13.149)
ADVISORCHOICE			133.5570***			-0.2971***
			(26.712)			(-13.888)
ATobinsQ	-0.5068	-3.8590***	-0.1305	0.0025***	0.0006	-0.0009
	(-1.014)	(-5.934)	(-0.217)	(2.825)	(0.694)	(-0.372)
AROA	-8.8506	-115.1748***	-10.7349	0.0044	0.0073	0.0211
	(-0.870)	(-11.738)	(-0.953)	(0.384)	(0.667)	(0.623)
ALEVERAGE	0.0625	10.0155	1.0538	0.0006	0.0006	0.0087
	(0.009)	(1.158)	(0.122)	(0.066)	(0.061)	(0.320)
LNIS	-22.8334*	5.2142***	-16.6017	0.0129**	0.0087***	0.0574**
	(-1.946)	(3.372)	(-1.184)	(2.006)	(4.557)	(2.564)
SIXTH	-7.0707***	-5.1153	-1.9973	0.0151***	-0.0011	0.0320***
	(-3.069)	(-1.488)	(-0.788)	(5.039)	(-0.264)	(4.136)
LOGME	1.5385	2.8268***	-1.1546	-0.0043***	0.0028***	0.0139***
	(1.045)	(3.320)	(-0.693)	(-2.700)	(2.674)	(3.206)
Constant	280.8070**	105.1606***	106.4522			
	(2.480)	(3.097)	(0.800)			
Year fixed effects	Yes	Yes	Yes	No	No	No
Fixed effects	Yes	No	Yes	Yes	No	Yes
Transaction variables	Yes	No	No	Yes	No	No
Instrumented	No	ADVISED	ADVISORCHOICE	No	ADVISED	ADVISORCHOICE
N	31,757	31,757	31,757	31,954	31,954	31,954
Number of Acquirers	10,237	10,237	10,237	10,280	10,280	10,280
F-/Chi²-statistic	35.13	483.61	1,583.19	2,015.40	81.49	2,470.22
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Chi²-statistic of selection		411.61			163.15	563.95
p-value of selection		0.0000			0.0000	0.0000
corr(c_i, x_{it})				0.1829		0.7411
Chi²-statistic γ=0				318.30		409.69
p-value				0.0000		0.0000

Robust t- and z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

2.7 Discussion and conclusion

The univariate and multivariate analyses show that along the acquisition sequence hiring bank advisors with a higher industry expertise and more intensive advisory relationship is beneficial for the serial bidder. The serial bidder receives better advisory services to make good acquisition decisions, namely the completion of value creating acquisitions and withdrawing from value destroying ones, in less time. The focus on the cumulative abnormal returns to assess a bank's influence on the value creation in M&As by completing value increasing acquisitions is extend by the other side, the ability of banks as advisors to protect their clients from losses like the winner's curse. To sum it up this study extends the research of (Aktas, Bodt, & Roll, 2009; 2011), (Klasa & Stegemoller, 2007), (Kale, Kini, & Ryan, 2003), (Golubov, Petmezas, & Travlos, 2012), (Bao & Edmans, 2011), (Chang, Shekhar, Tam, & Zhu, 2013), and (Hunter & Jagtiani, 2003) that along the acquisition sequence bank advisors support the serial bidder in making value increasing and smart acquisition decisions in shorter time with a higher deal completion probability. The advice for bidders is to look for banks with a large industry expertise and a good track record, to hunt performance.

3. The bidder's selection and retention of his bank advisor - Its positive effect on the extension of acquisition sequences and formation of a hierarchical investment banking market

3.1 Introduction

The study combines the research that analyses investment banks as intermediaries in the market for corporate control with the recent research in acquisition series and theoretical research of investment banking markets in a unified empirical framework. The question whether investment banks as M&A advisors support bidding companies in the exploitation of their investment opportunities by finding targets for successor M&As is supported by the empirical observations. More experienced banks with stronger client relationships are more likely to be hired again, increasing their chances to be retained as advisors in successor transactions. The hiring of banks as M&A advisors, the retention of familiar advisors and the continuation of acquisition sequences leads to banks' accumulation of expertise. The loop of M&A advisor choice, retention, acquisition continuation and banks' accumulation of expertise and client relationships is repeated until a hierarchy with the most experienced banks that maintain the strongest client relationships at the top emerges.

This study empirically examines the theories of (Chemmanur & Fulghieri, 1994) and (Anand & Galetovic, 2006), considering advising banks as partners of serial acquirers along their acquisition sequences. Analyzing the role of serial bidders' bank advisors complements the research of learning along acquisition sequences (Aktas, Bodt, & Roll, 2009; 2011; Croci & Petmezas, 2009) and M&A sequences as means to exploit investment opportunities according to the neoclassical theory (Alexandridis, Mavrovitis, & Travlos, 2012; Andrade & Stafford, 2004; Andrade, Mitchell, & Stafford, 2001; Klasa & Stegemoller, 2007). The analyses provide further empirical support for the literature that investigates the structure of bank-bidder advisory relationships and the role of investment banks as financial intermediaries in the market for corporate control (Hunter & Walker, 1990; McLaughlin, 1990; 1992).

(Anand & Galetovic, 2006) argue that banks form relationships with bidders to generate M&A advisory business. The bulge-bracket banks form relationships with the largest and most frequent bidders, such as Cisco Systems that bid for and acquired 98 companies in the sample to grow externally. (Chemmanur & Fulghieri, 1994) and (Anand & Galetovic, 2006) model theoretically the hierarchical separation of the investment banking industry for underwriters and M&As advisors as a process of repeated rounds in which banks moving to the top accumulate more skills and experience and match with the bidders that benefit most from their experience. This study shows empirically that this process occurs with a concentration of the strongest client relationships among bulge-bracket banks that are active in almost every (Fama & French, 1997) industry. Non-bulge-bracket banks are usually specialized boutiques that are active in a few industries (Song, Zhou, & Wei, 2013).

In the first step of the circular process the choice of a particular bank as advisor increases by 9.15% if the bank has advised one more deal in the last three years in the target's industry. Having advised the bidder in one more transaction in the past three years increases the bank's selection probability by 33.32%. A one standard deviation higher ranking in the SDC M&A Top-50 League Tables increases the bank's visibility in the advisory market and chance to be chosen by 28.26%. The unconditional initial selection probability in the SDC M&A universe with 45 to 392 banks per year is 0.36 percentage points. Being chosen initially increases the advising bank's unconditional likelihood of 4.53% to be retained as advisor. A stronger client relationship, one more advised deal in the past three years, increases the bank's retention probability relatively by 60.47%. Banks familiar with the bidder also pitch deals and are selected as advisors if the bidder accepts the deal proposal. The interrelatedness results in a simultaneous decision of advisor retention and acquisition sequence continuation. Being familiar with the bidder from previously advised deals in terms of a standard deviation greater advisory relationship increases the likelihood to be retained as advisor in the current bid by 11.89% and the successor bid probability of 66.59% relatively by 5.25%. The industry expertise in the target industry, being a standard deviation greater, increases the probability to be retained as old advisor by 27.29% and the continuation probability of the acquisition sequence by 12.04%. The advising bank's advisory relationship strength and target industry expertise work indirectly on the bidder's M&A series continuation as well through the retention probability, which itself increases the successor bid probability by 15.65%. Finally being retained as old advisor improves the bank's target industry expertise by 34.47%, which going back to the first step enhances its chances to be initially chosen as M&A advisor from the set of all possible bank advisors. Besides the influence of the advising investment bank bidders with above industry average profitability and investment opportunities operating in large industries are more likely to continue making bids and acquisitions (Jovanovic & Rousseau, 2002; Servaes, 1991; Lang, Stulz, & Walkling, 1989; Klasa & Stegemoller, 2007).

The process starts all over, being a loop of simultaneous and interrelated decisions that are self-enforcing. Through this process empirically modeled along the theoretical arguments of (Anand & Galetovic, 2006) and (Chemmanur & Fulghieri, 1994) a few banks with strong client relationships and industry expertise emerge at the top, while the majority of non-bulge-bracket banks or boutiques focus on few industries and arms-length relationships. Goldman Sachs alone advised 4,472 deals in the SDC M&A sample and 654 deals in the final sample of 8,886 bid-bank matches, followed by Merrill Lynch with 514 advisory mandates. The Top-10 M&A advisors account for 3,335 bid-bank matches, or 37.53%, of the 8,886 ones. The analysis uses a panel of 31,954 observations, one to six for advised deals, in sequences of 1 to 98 M&As from 1979 to 2006 by 10,280 bidders, which is constructed from the SDC M&A and Compustat databases.

A problem in the analyses is the selection bias and simultaneity caused by banks self-selecting themselves into advising more complex and larger transactions of the largest acquirers that make many acquisitions (Anand & Galetovic, 2006; Chemmanur & Fulghieri, 1994; Bao & Edmans, 2011; Golubov, Petmezas, & Travlos, 2012). The selection bias along the acquisition sequence is modeled with selection indicator dummies in the context of Chamberlain probit panel models including (Mundlak, 1978) fixed effects of the likelihood to retain an old advisor and a successor transaction (Nijman & Verbeek, 1992; Verbeek & Nijman, 1992; Wooldridge, 2002e; 2002d). Finally the interrelated decisions are estimated within biprobit simultaneous equation systems (Heckman, 1978; Maddala, 1983a). Within the simultaneous equation systems the interrelated decisions of hiring a familiar bank advisor with greater expertise and the M&A sequence continuation are estimated (Sibilkov & McConnell, 2013). For robustness checks biprobit models with selection and instrumental variables (IV) probit models are used (Vella, 1993; Greene, 2008a; 2008b; Vella, 1998). The econometric methods to estimate binary response models for panel date with fixed effects and the correction of a selection bias in panel data are explained well by (Wooldridge, 2002d; 2002e). (Vella, 1998) provides an excellent overview of pooled and panel selection models.

In which way these results are obtained is elaborated in the following sections. Section 2 summarizes the literature and the hypothesis development. Section 3 follows with the panel description. Section 4 contains the description of the variables, section 5 the univariate analysis, section 6 the multivariate analysis with robustness checks, section 7 the conclusion.

3.2 Literature review and hypotheses development

The basic assumption of the choice of an investment bank as advisor is that skilled investment banks provide a better matching between the bidder and target according to the arguments of (Hunter & Walker, 1990) and (McLaughlin, 1990; 1992). Investment banks as financial intermediaries reduce the information asymmetry between bidders and targets (Servaes & Zenner, 1996). Investment banks facilitate the matching process by reducing the search costs of the bidder by scanning the market for potentially valuable acquisition targets constantly. Investment banks help their clients to find targets or bidders with the highest expected synergies (Hunter & Walker, 1990; McLaughlin, 1990; 1992). (Servaes & Zenner, 1996) argue that besides the information asymmetry the higher the transaction costs, arising from the deal's complexity, and contracting costs arising from agency problems the more likely is the employment of a financial advisor in the M&A on the side of the bidder.

The contracting costs are caused by agency problems of managerial overconfidence or hubris, empire building, or payment with overvalued stock as acquisition currency (Roll, 1986; Morck, Shleifer, & Vishny, 1990; Dong, Hirshleifer, Richardson, & Teoh, 2006; Malmendier & Tate, 2005a; 2005b; 2008). The bank itself avoids to get involved in any agency conflict, because it might hurt its reputation (McLaughlin, 1990; 1992).

Given the transaction costs (Aktas, Bodt, & Roll, 2009; 2011) and (Servaes & Zenner, 1996) argue that experienced bidders are less in need of the advice of a bank. This leads to the selection analysis that the probability of employing a bank as advisor is increasing in the transaction costs, contracting costs and information asymmetry and decreasing in the bidder's acquisition experience. The bidder's acquisition experience increases with the number of previous transactions and his prior acquisition performance. More profitable bidders with larger investment opportunity sets are more likely to be advised, because banks want to retain these bidders as clients for future advisory mandates.

The bank can probably advise more deals in an ongoing advisory relationship. The relationship with the bidder enables the investment bank to obtain private information about the bidder that is not available to external investment banks. In the relationship the bank and the bidder engage in a win-win situation. For the relationship bank it is easier to get the advisory mandate compared to unknown banks, because it is more familiar with the bidder. The bidder gets better informed advisory services at lower transaction costs (Chemmanur & Fulghieri, 1994; Anand & Galetovic, 2006; Kale, Kini, & Ryan, 2003). Bidders are expected to be more likely to hire banks with which they have a strong advisory relationship (Chang, Shekhar, Tam, & Zhu, 2013; Forte, Iannotta, & Navone, 2010). The first equation captures these arguments that the probability to hire a bank as advisor is increasing in its advisory skills, its access to information in the industries of the bidder and target and its access to bidder's private information. The access to information enables the bank to identify targets for successor deals to exploit the bidder's investment opportunity set (Chemmanur & Fulghieri, 1994). Finally the investment bank's skill and access to information are expected to increase in the number of M&As advised, which again improves its chances to be selected as advisor (Chemmanur & Fulghieri, 1994; Chang, Shekhar, Tam, & Zhu, 2013; Anand & Galetovic, 2006).

From the bidder's perspective his set of investment opportunities changes due to economic shocks that facilitate the redeployment of assets to their most productive use according to the neoclassical theory (Mitchell & Mulherin, 1996). Companies with larger investment opportunities, measured by Tobin's Q, acquire companies with smaller investment opportunities (Jovanovic & Rousseau, 2002; Lang, Stulz, & Walkling, 1989). More profitable companies are more likely to acquire less profitable companies as well (Harford, 2005). The bidder's investment opportunity set is the set of possible targets. The time-varying changes in the companies' investment opportunities lead to acquisition sequences as responses to these changes (Klasa & Stegemoller, 2007). The larger the bidder's investment opportunity set is the more likely is the continuation of the acquisition sequence. From the bidder's perspective the choice of his advisor is expected to positively influence the probability of successor deals. These arguments lead to the hypothesis that the hiring or retention of a bank advisor has a positive influence on the probability to find a successor target if the bidder's investment opportunity set is sufficiently large, which again increase the bank's chances to be hired and retained as advisor through the accumulation of expertise and a stronger advisory relationship.

3.3 Sample preparation and description

To examine the hypothesis the sample of M&As is taken from the SDC mergers and acquisitions database. The sample of 30,908 bids includes M&As with US targets with a disclosed transaction value. The sample is also used in chapters 2 and 4. The definition of an acquisition sequence is everything beyond one acquisition (Fuller, Netter, & Stegemoller, 2002; Aktas, Bodt, & Roll, 2009; 2011; Ahern, 2008). The avoidance of restrictions on the time between successive transactions results in an average time gap of 500 days that is longer than in other studies (Ahern, 2008; Croci & Petmezas, 2009). Similar to (Aktas, Bodt, & Roll, 2009) the time gap of 737 days between the first and second bid decreases to 304 days between the sixth or later bid.

The number of banks in the SDC M&A universe, defined as sample A, per year ranges from 45 in 1979 to 392 in 1997. The 7,840 advised deals are advised by 8,886 banks. The primary panel used to test the hypothesis has 23,068 unadvised transactions and 8,886 bank-deal matches with a total of 31,954 observations including 10,280 different bidders. The sample to test the initial particular M&A advisor selection in the 7,840 advised deals consists of 2,489,259 possible bank-deal matches. The final estimation of advising banks' accumulation of industry expertise and advisory relationships uses the panel of 8,886 bank-deal matches with 718 banks in sample B. The samples' construction and statistics are summarized in table 1, which is similar to table 1 in chapters 2 and 4.

The years after 2006 are not included in the analysis because of sample attrition caused by the insolvency of 470 smaller and two leading investment banks, Lehman Brothers and Bear Stearns, from 2007 until the end of 2012[4]. According to the press these two banks were partly taken over by Barclays Capital, KPMG China, Nomura, PWC and Neuberger Bergman in the case of Lehman Brothers and JP Morgan in the case of Bear Stearns. If one tracks the surviving remains of the banks it is difficult to adjust for the bankruptcy caused break in banks' industry expertise and advisory relationships, because newspapers mentioned that many bankers left the industry completely. The bank adjustments are summarized in table B in the statistical appendix. The adjustments are identical to the ones in chapters 2 and 4.

[4] The list of bank failures can be downloaded as an Excel sheet from the Federal Depository Insurance Corporation's (FDIC) website: http://www.fdic.gov/bank/individual/failed/banklist.html

Table 1: Data preparation and sample statistics

The sample is taken from the SDC Mergers & Acquisitions database. The sample includes US targets only. The deals included are M&As (1, 2), spinoffs & splitoffs (4), tender offers (5), minority stake purchases (10), acquisitions of remaining interest (11), and privatizations (12). The initial sample of 208,654 deals from 01/01/1979 to 12/31/2008 is reduced by missing Compustat data as well as incomplete variables. The sample includes only M&As of corporate acquirers as well as stake purchases. Most deals without Compustat data involve private acquirers. The final sample includes deals from 01/01/1979 to 12/31/2006. Panel F includes the major statistics of the acquisition sequences. Panel G reports the distribution of the bids and acquisitions over time, the number of advised bids/acquisitions per year, the number of investment banks included in the SDC M&A sample and SDC M&A League Tables and the actually chosen bid-bank matches.

Panel A: Observation elemination before merging the data with Compustat

Steps in the Process	deals excluded	M&As
1. The total SDC M&A sample		208,654
2. Excluding self tenders, recapitalisations and repurchases	20,328	188,326
3. Excluding "Creditors", "Investor", "Investors", "Investor Group", "Shareholders", "Undisclosed Acquiror", "Seeking Buyer", and "Employee Stock Ownership Plan"	21,548	166,778
4. Excluding deals with status of "Unknown Status", "Rumor", "Discontinued Rumor", "Intended", "Intent withdrawn", "Pending" and "Seeking Target"	23,640	143,138
5. Excluding acquisitions/bids with undisclosed transaction values	76,073	67,065
6. Excluding individual and financial acquirers	5,352	61,713
7. Excluding bids in which the target is the same company as the acquirer	37	61,676
Sample A before the merging processes, used to compute the industry experience and acquirer-advisor relationship strengh variables		61,676

Panel B: Merging with the Compustat sample

Steps in the Process	deals excluded	M&As
8. Complete Compustat annual files from 1976 to 2006 (Industrial North America)		609,162
9. Keeping the consolidated parent with common stock (cic = 1xx)	8,965	600,197
10. Keeping company-years with positiv total assets	41,934	558,263
Compustat sample before the merging processes, used to compute the industry variables in each Fama & French (1997) industry		558,263
11. Deals with Compustat data available for the acquirer, merged by the CUSIP		39,053

Panel C: Merging with the CRSP sample

Steps in the Process	deals excluded	M&As
12. Deals with available announcement returns after merging with CRSP		33,231

Panel D: Observation elimination after merging with Compustat & CRSP

Steps in the Process	deals excluded	M&As
13. Excluding acquisitions/bids without acquirer's leverage, ROA and Tobin's Q	2,323	30,908
Sample for the analysis of acquisitions/bids with anouncement returns		30,908
Thereof unadvised acquisitions/bids (1)		23,068
Thereof advised acquisitions/bids		7,840
Bank matches with the advised acquisitions/bids (2)		8,886
Final sample B for estimation of unadvised and bank matched advised M&As (1+2)		31,954

Panel E: Preparing the SDC Global Debt & Equity Issues to calculate the exclusion restriction

Steps in the Process	issues excluded	Issues
14. Debt and equity issues from 1976 to 2006		852,896
15. Excluding issues with missing transaction values	97,629	755,267
16. Excluding issues without an underwriter	1	755,266
Final sample C to calculate the exclusion restriction SCOPE		755,266

Table 1 (cont.): Data preparation and sample statistics

Panel F: Major acquisitions series characteristics in the final sample

Variable	N	Mean	Median	Std.Dev.	Min	Max
Number of acquisitions/bids in the final sample	30,908	---	---	---	---	---
Number of acquirers/bidders in the final sample	10,280	---	---	---	---	---
Acquisitions per acquirer and sequence	---	3.0	2.0	4.0	1	98
Days between acquisitions/bids	---	499.7	224.0	760.1	0	9289
Days between the 1st and 2nd bid in SDC	---	736.6	369.5	1012.6	0	9289
Days between the 2nd and 3rd bid in SDC	---	600.0	305.0	798.6	0	8141
Days between the 3rd and 4th bid in SDC	---	504.5	263.0	705.5	0	6070
Days between the 4th and 5th bid in SDC	---	438.5	198.5	631.4	0	6177
Days between the 5th and 6th and higher bid in SDC	---	303.6	135.0	473.6	0	5517

Panel G: Time series of acquisitions/bids and possible bid-bank matches

	advised and unadvised bids/acquisitions		banks		bid-bank matches			
Year	Bids / Acquisitions	Advised Deals	Banks in the SDC Universe	SDC M&A League Table Banks (#)	Possible advised bid-bank Matches	Winning Matches	Losing Matches	Missing Matches
1979	9	6	45	20	270	7	263	0
1980	45	22	83	49	1,826	23	1,803	0
1981	289	62	136	50	8,432	65	8,367	0
1982	402	68	172	50	11,696	73	11,623	0
1983	540	89	170	50	15,130	95	15,035	0
1984	615	110	164	51	18,040	115	17,925	0
1985	303	111	148	50	16,428	124	16,304	0
1986	479	176	210	50	36,960	193	36,767	0
1987	482	121	242	50	29,282	129	29,153	0
1988	546	167	261	50	43,587	180	43,407	0
1989	687	166	295	50	48,970	194	48,776	0
1990	646	118	256	50	30,208	132	30,076	0
1991	731	112	263	50	29,456	129	29,327	0
1992	965	158	271	51	42,818	167	42,651	0
1993	1,229	230	281	50	64,630	282	64,348	0
1994	1,600	351	345	50	121,095	398	120,697	0
1995	1,651	404	342	50	138,168	438	137,730	0
1996	1,989	477	351	50	167,427	515	166,912	0
1997	2,627	635	392	50	248,920	710	248,210	0
1998	2,669	613	351	50	215,163	681	214,482	0
1999	2,079	579	355	50	205,545	642	204,903	0
2000	1,919	597	318	50	189,846	695	189,151	0
2001	1,396	462	312	50	144,144	537	143,607	0
2002	1,330	365	292	50	106,580	407	106,173	0
2003	1,293	367	292	50	107,164	413	106,751	0
2004	1,387	421	336	50	141,456	494	140,962	0
2005	1,508	441	366	50	161,406	531	160,875	0
2006	1,492	412	351	50	144,612	517	144,095	0
Total	30,908	7,840			2,489,259	8,886	2,480,373	0

3.4 Description of variables

The selection equation that the probability of the M&A being advised depends on the transaction's complexity has to be estimated by probit and tobit panel regressions. The dependent variable ADVISED is a dummy that is 1 if the bid or acquisition is advised by at least one investment bank and 0 otherwise (Servaes & Zenner, 1996). The alternative dependent variable ADVISORCHOICE is 1 if no advisor is chosen, 2 if the bidder's chosen lead bank with the highest market share MS is a non-bulge-bracket bank and 3 if the leading bank is a bulge-bracket bank. In the hypothesis tests the dependent variable SUCCESSORBID is 1 if the current M&A is succeeded by another M&A of the same bidder. OLDADVISOR is a dummy and indicates whether the current bank advisor who advised the bidder within the last 3 years is retained (Sibilkov & McConnell, 2013). The variables are summarized in table 2 and described in the statistical appendix in table C, which is shared with chapters 2 and 4.

The independent bank variables used to approximate investment banks' access to information in the bidder's and target's industries and to bidder's private information directly are adapted and modified from previous research (Chang, Shekhar, Tam, & Zhu, 2013; Allen, Jagtiani, Peristiani, & Saunders, 2004; Benveniste, Busaba, & Wilhelm, 2002; Forte, Iannotta, & Navone, 2010). The industry expertise $\mathrm{IE}_{i,k,t}$ is the sum of the investment bank's i investment banking skills and its access to information in (Fama & French, 1997) industry k at time t. The industry expertise is measured either by the acquisition dollar volume (V) or the number of acquisitions (D) advised relative to the total volume or number of advised acquisitions in each of the $k = 1,\ldots,49$ (Fama & French, 1997) industries in the three years $t-1$, $t-2$, $t-3$ preceding year t of the acquisition or bid. If the target and acquirer within the same industry are both advised the deal is counted once for the industry to avoid double counting. Avoidance of double counting guarantees that a bank which participated in every M&A as advisor on either the target's or bidder's side has an expertise of 1. Only acquisitions or bids that are advised on the bidders', targets' or both sides are counted for the number (D) or dollar volume (V) of advised deals. The industry expertise variables are IEDA, IEVA, IEDT and IEVT. The missing values in unadvised transactions are set to zero.

The proxy for the access to bidder information is the advisory relationship strength ARS based on the arguments of (Anand & Galetovic, 2006) that building of relationships by investment banks with the bidding companies enables banks to get access to bidders' private information. The measure is adapted from (Forte, Iannotta, & Navone, 2010) and (Allen, Jagtiani, Peristiani, & Saunders, 2004).

The advisory relationship strength is based on the number (ARSD) or dollar volume (ARSV) of M&As bank i advised with respect to the number or dollar volume of all advised M&As bidder j conducted in the three years preceding the acquisition or bid considered in year t. The strength of the advisory relationship is a relative measure. The industry expertise and advisory relationship strength variables of the Top-25 banks in the SDC Top-50 M&A League Tables and sample A are summarized in table A in the statistical appendix, which is shared with chapters 2 and 4.

Additionally the advisor's market share MS over all industries and advised deals as reputation proxy is used. A higher reputation has been associated with better investment banking skills in previous studies (Kale, Kini, & Ryan, 2003; Rau, 2000).

Table 2: Descriptive statistics of variables

This table reports the sample statistics of the dependent, bank, bidder and transaction variables. The variables are described in table C in the statistical appendix. The continuous variables are winsorized at the upper and lower 1 percentile to exclude outliers.

Variable	N	Mean	Median	Std.Dev.	Min	Max
Panel A: Descriptive statistics of the dependent variables						
SUCCESSORBID	31,954	0.6659	1.0000	0.4717	0.0000	1.0000
OLDADVISOR	31,954	0.0453	0.0000	0.2081	0.0000	1.0000
ADVISED	31,954	0.2781	0.0000	0.4481	0.0000	1.0000
ADVISORCHOICE	31,954	1.4025	1.0000	0.6995	1.0000	3.0000
Panel B: Descriptive statistics of the bank/advisor variables						
IEDA	31,954	0.0213	0.0000	0.0546	0.0000	0.6667
IEDT	31,954	0.0206	0.0000	0.0532	0.0000	0.6574
IEVA	31,954	0.0340	0.0000	0.0960	0.0000	0.9418
IEVT	31,954	0.0331	0.0000	0.0939	0.0000	0.8879
ARSD	31,954	0.0154	0.0000	0.0847	0.0000	1.0000
ARSV	31,954	0.0155	0.0000	0.0854	0.0000	1.0000
MS	31,954	2.7883	0.0000	7.5363	0.0000	94.6000
PASTBBCAR	31,954	0.0067	0.0000	0.0514	-0.1994	0.3135
PASTBIDDERCAR	31,954	0.0079	0.0000	0.0618	-0.1994	0.3135
Panel C: Descriptive statistics of the transaction variables						
DIVERS	31,954	0.4288	0.0000	0.4949	0.0000	1.0000
MAJORITY	31,954	0.9487	1.0000	0.2206	0.0000	1.0000
PUBLIC	31,954	0.2065	0.0000	0.4048	0.0000	1.0000
RDS	31,954	0.2467	0.0692	0.5036	0.0002	3.6040
TADVISORTIER	31,954	0.5352	0.0000	0.7529	0.0000	2.0000
MULTIPLE	31,954	1.0271	1.0000	0.2050	1.0000	8.0000
ANTITAKEOVER	31,954	0.0379	0.0000	0.1909	0.0000	1.0000
FAMILY	31,954	0.0031	0.0000	0.0553	0.0000	1.0000
LITIGATION	31,954	0.0181	0.0000	0.1334	0.0000	1.0000
REGULATORY	31,954	0.2898	0.0000	0.4537	0.0000	1.0000
CROSSBORDER	31,954	0.0612	0.0000	0.2397	0.0000	1.0000
DIVERSIFICATION	31,954	0.5002	0.0000	0.5794	0.0000	3.2189
TOEHOLD	31,954	1.8860	0.0000	10.2811	-0.0300	99.8000
HIGHTECH	31,954	0.2874	0.0000	0.4526	0.0000	1.0000
STOCK	31,954	0.1859	0.0000	0.3891	0.0000	1.0000
CASH	31,954	0.2423	0.0000	0.4285	0.0000	1.0000
MIXED	31,954	0.1951	0.0000	0.3963	0.0000	1.0000
OTHER	31,954	0.0868	0.0000	0.2816	0.0000	1.0000
FIRST	31,954	0.3302	0.0000	0.4703	0.0000	1.0000
SIXTH	31,954	0.2518	0.0000	0.4341	0.0000	1.0000

Table 2 (cont.): Descriptive statistics of variables

Variable	N	Mean	Median	Std.Dev.	Min	Max
Panel D: Descriptive statistics of the bidder variables						
SCOPE	31,954	0.3036	0.0000	0.4598	0.0000	1.0000
DEALS3YEARS	31,954	1.7123	1.0000	2.9486	0.0000	41.0000
LOGME	31,954	20.3974	20.3154	2.1567	15.0841	25.7360
LNIS	31,954	6.6107	6.7719	0.9283	1.6094	7.9491
TobinsQ	31,954	2.1307	1.4492	2.1052	0.7074	16.1560
ITobinsQ	31,954	2.1184	1.8862	0.9232	0.8867	6.2588
ATobinsQ	31,954	0.0124	-0.2253	1.8525	-5.1792	14.9771
ROA	31,954	0.0557	0.0684	0.1473	-1.0911	0.3314
IROA	31,954	-0.0346	0.0075	0.1098	-0.7143	0.1666
AROA	31,954	0.0903	0.0718	0.1661	-1.1947	0.7949
LEVERAGE	31,954	0.2382	0.2060	0.2023	0.0000	0.9980
ILEVERAGE	31,954	0.2645	0.2708	0.0772	0.0752	0.4962
ALEVERAGE	31,954	-0.0263	-0.0532	0.1829	-0.4599	0.8223
Panel E: Descriptive statistics of the subsample of possible bank-deal matches						
AADVISOR	2,489,259	0.0036	0.0000	0.0596	0.0000	1.0000
IEDT	2,489,259	0.0116	0.0000	0.0347	0.0000	0.8333
IEDA	2,489,259	0.0117	0.0000	0.0351	0.0000	0.8333
ARSD	2,489,259	0.0005	0.0000	0.0150	0.0000	1.0000
IEVT	2,489,259	0.0156	0.0000	0.0582	0.0000	0.9418
IEVA	2,489,259	0.0157	0.0000	0.0589	0.0000	0.9704
ARSV	2,489,259	0.0005	0.0000	0.0151	0.0000	1.0000
PASTBBCAR	2,489,259	0.0000	0.0000	0.0023	-0.1994	0.3135
RDS	2,489,259	0.4106	0.1815	0.6109	0.0002	3.6040
MS	2,489,259	0.7878	0.1000	3.3914	0.0000	94.6000
LOGME	2,489,259	20.9858	20.8738	2.0309	15.0841	25.7360
Panel F: Descriptive statistics of the subsample of banks and their advised deals						
ARSD	8,886	0.0553	0.0000	0.1536	0.0000	1.0000
ARSV	8,886	0.0557	0.0000	0.1550	0.0000	1.0000
IEDT	8,886	0.0743	0.0521	0.0787	0.0000	0.6574
IEDA	8,886	0.0764	0.0536	0.0807	0.0000	0.6667
IEVT	8,886	0.1190	0.0513	0.1466	0.0000	0.8879
IEVA	8,886	0.1222	0.0539	0.1497	0.0000	0.9418
MS	8,886	10.0268	5.9000	11.4746	0.1000	94.6000
PASTBANKCAR	8,886	0.0074	0.0000	0.0840	-0.1994	0.3135
DEALS3YEARS	8,886	1.4931	1.0000	2.3953	0.0000	28.0000
ATobinsQ	8,886	0.0207	-0.1802	1.8604	-5.1723	14.5082
AROA	8,886	0.1057	0.0806	0.1556	-1.1152	0.7949
ALEVERAGE	8,886	-0.0274	-0.0537	0.1756	-0.4545	0.8071
LOGME	8,886	21.0566	20.9537	2.0205	15.0841	25.7360

The market share of the investment bank is taken from the SDC Top-50 M&A League Tables according to (Rau, 2000), (Servaes & Zenner, 1996), (Francis, Hasan, & Sun, 2008) and (Kale, Kini, & Ryan, 2003). The market share MS of investment banks included in sample A but not appearing in the SDC Top-50 M&A League Table is set to 0.1 and for unadvised deals to 0. According to (Derrien & Dessaint, 2012) however the league table rankings and market share MS are measures of investment banks' skills or reputation that have to be used with caution due to their manipulation by banks.

Finally the past acquisition and advisory performance of banks is modeled similarly to (Rau, 2000) and (Hunter & Jagtiani, 2003). PASTBBCAR is the cumulative abnormal return $\mathrm{CAR}(-2,2)$, computed with the Beta-1 model using the CRSP value-weighted index as market proxy, if the bank advised the bidder in a previous M&A. If the deal is unadvised PASTBBCAR is the return of the acquirer's previous unadvised bid or acquisition. PASTBIDDERCAR is the bidder's previous deal's return independent of its advisory status. PASTBANKCAR is the $\mathrm{CAR}(-2,2)_{i-1}$ of the previous deal advised by the same bank, independent of the bidder. The CAR computation with the Beta-1 model avoids the problem of overlapping M&As in the pre-merger period (Fuller, Netter, & Stegemoller, 2002; Brown & Warner, 1985; 1980; Aktas, Bodt, & Cousin, 2007).

The calculation of the industry expertise, advisory relationship strength, market share and past performance variables requires adjustments for bank mergers and banks' name changes. The assumption is that the successor bank inherits the expertise and advisory relationships of its predecessors. The ultimate parent bank has inherited all relationships and industry expertise of its former banks. Table B in the statistical appendix shared with chapters 2 and 4 includes the mergers and name changes of the 395 banks in the SDC Top-50 M&A League Tables from

1979 to 2006 together with 201 ultimate parents as of 12/31/2006. The methodology to track name changes and mergers is adapted from (Ljungqvist, Marston, & Wilhelm, 2006) complemented by a research in the Factiva and LexisNexis press database, websites and annual reports of banks. Implied by the adjustments is that predecessor bank's major bankers, who embody the expertise and client relationships, stay with the successor bank (Ertugrul & Krishnan, 2011). The name changes and mergers of banks not in the SDC Top-50 M&A League Table are not tracked, because sample A includes 1,854 and sample B 718 different banks. The 395 banks in the SDC M&A League Tables advise approximately 75% of all bids in SDC M&A sample A.

The acquisition experience of the bidder is approximated by the number of bids or acquisitions he conducted in the previous three years, measured by the variable DEALS3YEARS (Servaes & Zenner, 1996). Larger companies are known to make larger and more acquisitions in general, which makes them attractive for investment banks as clients (Moeller, Schlingemann, & Stulz, 2004; Hunter & Walker, 1990). The bidder's size is approximated by the logarithm of the bidder's market value of equity at the end of the fiscal year before the announcement of the acquisition using the variable LOGME.

To be able to conduct M&As the bidding company needs sufficient resources. The ability to bid for target companies increase in the ability to finance the acquisition. The profitability is measured with the variable ROA calculated according to (Heron & Lie, 2002). Higher leverage constrains bidder's management in its attempts to acquire other companies. Leverage is modeled with the variable LEVERAGE according to (Masulis, Wang, & Xie, 2007). Besides a sufficient amount of resources a larger investment opportunity set, measured by Tobin's Q, is expected to indicate more profitable acquisition opportunities (Lang, Stulz, & Walkling, 1989; Servaes, 1991). However, the measurement of Tobin's Q is difficult as marginal Q is usually not observable while average Tobin's Q might be a flawed approximation (Hennessy, 2004). The simplified approximation by (Andrade & Stafford, 2004) of the bidder's market value of equity divided his book value of his assets is used as it is easy to compute and to interpret. Similar to all other continuous variables TobinsQ is winsorized at the upper and lower 1% percentile.

All mentioned variables measure the individual acquirer's characteristics. According to the neoclassical theory of mergers and acquisitions those companies with the highest profitability and largest set of investment opportunities in an industry are going to acquire other companies (Andrade & Stafford, 2004; Maksimovic & Phillips, 2002; 2001; Harford, 2005; Mitchell & Mulherin, 1996). The size of the set of investment opportunities and profitability are measured relative to the industry average. The average industry leverage is controlled with the variable ILEVERAGE, which is the annual mean of the (Fama & French, 1997) industry. The average industry Tobin's Q as ITobinsQ and average industry ROA as IROA are similarly defined as ILEVERGE, excluding the bidder's values from the calculation. The size of the industry is measured with the variable LNIS, the natural logarithm of the number of companies in the bidder's primary industry in the year before the deal (Maksimovic & Phillips, 2001; 2002). The difference between the bidder's values and industry's averages are measured with the variables ATobinsQ, AROA and ALEVERAGE, with A for "abnormal"[5].

The variables of the deal characteristics that approximate the transaction's contracting costs, potential agency conflicts and information asymmetry are taken from the previous literature and are shown in table 2 and described in table C in the statistical appendix. Different to previous studies the method of payment is

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[5] The Compustat sample of 558,263 company-years includes for Tobin's Q and ROA so many positive outliers, and for LEVERAGE negative ones, that winsorizing by 5% at the upper and lower tail was necessary. Company-years with negative total assets are excluded.

modeled with the dummies STOCK, CASH, MIXED and OTHER (Martin, 1996), whereas these dummies together are all zero for the 28.57% of deals with missing payment method information. Variables for the mode of the acquisition whether it is a merger or tender offer are not used. The mode of the acquisition is usually determined with the advisor after he has been chosen (Bao & Edmans, 2011).

The dummy SIXTH is used for long acquisition sequences to control for hidden factors not included explicitly. Controlling for the different lengths of acquisition sequence in the panel is necessary as the characteristics of the transactions, bidding companies and chosen advising investment banks change over the course of successive transactions (Fuller, Netter, & Stegemoller, 2002; Aktas, Bodt, & Roll, 2009; 2011; Ahern, 2008). The change in the characteristics of the advising banks, bidders and transactions is subject of the univariate analyses. The independent variables are mostly shared with chapters 2 and 4.

3.5 Univariate analysis of advisor choices and acquisition sequences

The univariate analyses of the primary panel of 31,954 observations examine the differences in the advisor, bidder, and transaction characteristics along the acquisition sequence as well as between the advisor types. The distribution of the variables is of interest to check whether the advisory relationships and transaction characteristics change along the acquisition sequence and differ between the M&As that are unadvised or advised by non-bulge-bracket banks and bulge-bracket banks.

The definition of a non-bulge-bracket bank and a bulge-bracket bank is adapted from (Hunter & Jagtiani, 2003) and (Rau, 2000). A bank is defined as a bulge-bracket bank if it has an annual rank of 10 or higher based on its weighted ranks of the last three years in the SDC Top-50 M&A League Tables. A non-bulge-bracket bank has a weighted rank of 11 or less. Banks that do not appear in the SDC Top-50 M&A League Tables but in the SDC M&A sample A are labeled as non-bulge-bracket banks. To avoid a look-ahead bias and to adjust for changes in the perception of the ranking of investment bank i in year t the rank is the sum of the equally weighted ranks of the current year $t = 0$ and the preceding two years $t-1$ and $t-2$. The formula is $\text{NewRank}_{\text{t, i}} = \left(\text{rank}_{\text{t, i}} + \text{rank}_{\text{t-1, i}} + \text{rank}_{\text{t-2, i}}\right)/3$. The analysis in table 3 reveals that bulge-bracket banks have a significantly greater industry expertise and advisory relationship strength than non-bulge-bracket banks and are chosen or retained more often as old advisors in advised bids or acquisition in later stages of the acquisition sequence. The significant difference between transactions advised by different advisor types requires controlling for selection. The multivariate analysis of selection between advisor types in table 5 shows similar observations.

The distribution of the advisor characteristics along the acquisition sequence shows in table 4 a significant increase of the industry expertise in the bidders' and targets' industries of banks chosen as advisor. Hence more experienced banks are chosen in later acquisitions. Later acquisitions are more often advised by more familiar bank advisors, even though serial bidders' experience in terms of deals in the last three years is increasing. The repeated interaction of advising banks with serial bidders results in a greater familiarity and industry expertise after several acquisitions, which is preliminary evidence for the hypothesis and theoretical models of (Anand & Galetovic, 2006) and (Chemmanur & Fulghieri, 1994). Tables 3 and 4 are comparable to the univariate analysis in chapters 2 and 4. However, the past performance of advised deals in terms of returns is decreasing after the fifths bid, which coincides with the learning hypothesis of (Aktas, Bodt, & Roll, 2009; 2011) and is observed in previous studies as well (Ahern, 2008; Fuller, Netter, & Stegemoller, 2002; Klasa & Stegemoller, 2007).

The bidder becomes larger measured by his market capitalization LOGME, because he integrates acquired companies, which is observed by (Ahern, 2008) as well. The growth in size is caused by the exploitation of investment opportunities in the investment opportunity set (Klasa & Stegemoller, 2007). The at first larger bidders' Tobin's Q decreases along the acquisition sequences, which hints at the observation of (Klasa & Stegemoller, 2007) that serial bidders with the largest investment opportunities make more acquisitions to exploit these opportunities. The abnormal Tobin's Q is at first positive and becomes negative in the fourth bid or acquisition. Hence another question is whether the optimal exploitation of investment opportunities occurs until the fourth M&A. The industry Tobin's Q is larger along the acquisition sequence, because more acquisitions are possible in industries with better investment opportunities (Jovanovic & Rousseau, 2002). Together with a greater likelihood of a successor deal in later transactions ROA and AROA are larger in later transactions, too. Bidders' in larger industries make more acquisitions, indicated by a larger industry size in later bids. These observations provide preliminary evidence for the neoclassical theory that more profitable companies in larger industries with better investment opportunities make more acquisitions (Klasa & Stegemoller, 2007).

Regarding the deal characteristics later acquisitions or bids are more complex. It follows that the increasing proportion of bidder-advisor matches with familiar banks with a greater expertise in later M&As coincides with the increasing transaction costs and information asymmetries of those deals (Servaes & Zenner, 1996; Ahern, 2008). However, the fraction of cross-border transactions is diminishing and the bidder has a greater toehold in the targets of later stages, which reduces the information asymmetry.

Table 3: Univariate tests of the dependent, advisor, acquirer and transaction variables by the advisor type

Table 3 shows the distribution of variables between the types of advisory choices. The last two columns show the t-tests with p-values and differences between the unadvised (1), non-bulge-bracket bank advised (2) and bulge-bracket bank (3) advised deals.

Panel A: Dependent and bank/advisor variables

Acquirer advisor tier		unadvised	non-bulge-bracket	bulge-bracket	All Bids	t-test	t-test
N		23,068	4,911	3,975	31,954	p-value	p-value
Variable		1	2	3		1 - 3 = 0	2 - 3 = 0
SUCCESSORBID	Mean	0.6722	0.6186	0.6875	0.6659	0.0281	0.0000
OLDADVISOR	Mean	0.0000	0.1317	0.2018	0.0453	0.0000	0.0000
IEDA	Mean	0.0000	0.0409	0.1203	0.0213	0.0000	0.0000
IEDT	Mean	0.0000	0.0408	0.1156	0.0206	0.0000	0.0000
IEVA	Mean	0.0000	0.0384	0.2257	0.0340	0.0000	0.0000
IEVT	Mean	0.0000	0.0379	0.2191	0.0331	0.0000	0.0000
ARSD	Mean	0.0000	0.0435	0.0699	0.0154	0.0000	0.0000
ARSV	Mean	0.0000	0.0435	0.0709	0.0155	0.0000	0.0000
MS	Mean	0.0000	2.0798	19.8451	2.7883	0.0000	0.0000
PASTBBCAR	Mean	0.0084	0.0027	0.0021	0.0067	0.0000	0.2262
PASTBIDDERCAR	Mean	0.0083	0.0079	0.0054	0.0079	0.0027	0.0371

Panel B: Bidder variables

SCOPE	Mean	0.2879	0.2997	0.3036	0.3036	0.0000	0.0000
DEALS3YEARS	Mean	1.7968	1.3038	1.7123	1.7123	0.0920	0.0000
LOGME	Mean	20.1435	20.3757	20.3974	20.3974	0.0000	0.0000
LNIS	Mean	6.6044	6.7126	6.6107	6.6107	0.0000	0.0000
TobinsQ	Mean	2.1137	2.1754	2.1307	2.1307	0.0460	0.4912
ITobinsQ	Mean	2.1045	2.1475	2.1184	2.1184	0.0001	0.2388
ATobinsQ	Mean	0.0091	0.0278	0.0124	0.0124	0.4668	0.3430
ROA	Mean	0.0525	0.0509	0.0557	0.0557	0.0000	0.0000
IROA	Mean	-0.0319	-0.0430	-0.0346	-0.0346	0.0000	0.0970
AROA	Mean	0.0844	0.0940	0.0903	0.0903	0.0000	0.0000
LEVERAGE	Mean	0.2420	0.2091	0.2382	0.2382	0.0014	0.0000
ILEVERAGE	Mean	0.2679	0.2489	0.2645	0.2645	0.0036	0.0000
ALEVERAGE	Mean	-0.0259	-0.0399	-0.0263	-0.0263	0.0000	0.0000

Table 3 (cont.): Univariate tests of the dependent, advisor, acquirer and transaction variables

Table 3 shows the distribution of variables over the types of advisory choices. The last two columns show the t-tests with p-values and differences between the unadvised (1), non-bulge-bracket bank advised (2) and bulge-bracket bank (3) advised deals.

Panel C: Transaction variables

Acquirer advisor tier		unadvised	non-bulge-bracket	bulge-bracket	All Bids	t-test	t-test
N		23,068	4,911	3,975	31,954	p-value	p-value
Variable		1	2	3		1 - 3 = 0	2 - 3 = 0
DIVERS	Mean	0.4498	0.3604	0.3919	0.4288	0.0000	0.0011
MAJORITY	Mean	0.9391	0.9794	0.9665	0.9487	0.0000	0.0001
PUBLIC	Mean	0.1348	0.3653	0.4267	0.2065	0.0000	0.0000
RDS	Mean	0.1713	0.4632	0.4166	0.2467	0.0000	0.0003
TADVISORTIER	Mean	0.3100	0.9597	1.3180	0.5352	0.0000	0.0000
MULTIPLE	Mean	1.0126	1.0495	1.0835	1.0271	0.0000	0.0000
ANTITAKEOVER	Mean	0.0168	0.0804	0.1074	0.0379	0.0000	0.0000
FAMILY	Mean	0.0021	0.0043	0.0070	0.0031	0.0000	0.0399
LITIGATION	Mean	0.0075	0.0350	0.0589	0.0181	0.0000	0.0000
REGULATORY	Mean	0.2032	0.4970	0.5361	0.2898	0.0000	0.0001
CROSSBORDER	Mean	0.0537	0.0872	0.0727	0.0612	0.0000	0.0065
DIVERSIFICATION	Mean	0.4293	0.6380	0.7414	0.5002	0.0000	0.0000
TOEHOLD	Mean	1.6892	1.7831	3.1553	1.8860	0.0000	0.0000
HIGHTECH	Mean	0.2788	0.3221	0.2946	0.2874	0.0203	0.0026
STOCK	Mean	0.1572	0.2916	0.2221	0.1859	0.0000	0.0000
CASH	Mean	0.2366	0.2429	0.2745	0.2423	0.0000	0.0004
MIXED	Mean	0.1625	0.2790	0.2803	0.1951	0.0000	0.4466
OTHER	Mean	0.0965	0.0536	0.0719	0.0868	0.0000	0.0002
FIRST	Mean	0.3379	0.3470	0.2652	0.3302	0.0000	0.0000
SIXTH	Mean	0.2503	0.2004	0.3245	0.2518	0.0000	0.0000

Table 4: Univariate tests of the dependent, advisor, acquirer, and transaction variables between the bids

Table 4 shows the distribution of variables along the bids/acquisitions of acquisition sequences. The last column shows the t-tests with p-values between the first (1) or second (2) and fifths (5) or sixths and higher bids (6). The variables are summarized in table 2 and described in the statistical appendix in table C.

Panel A: Distribution of the dependent variables										
	bids in the sequence	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH	All Bids	t-test	t-test
Variable	N	10,552	5,511	3,515	2,485	1,844	8,047	31,954	1/2 - 5 = 0	1/2 - 6 = 0
SUCCESSORBID	Mean	0.5195	0.6362	0.6962	0.7433	0.7505	0.8215	0.6659	0.0000	0.0000
OLDADVISOR	Mean	0.0000	0.0377	0.0586	0.0652	0.0781	0.0906	0.0453	0.0000	0.0000
ADVISED	Mean	0.2614	0.2854	0.2862	0.2966	0.2918	0.2826	0.2781	0.0032	0.0006
ADVISORCHOICE	Mean	1.3613	1.3934	1.4097	1.4262	1.4436	1.4429	1.4025	0.0000	0.0000
Panel B: Distribution of the bank variables										
IEDA	Mean	0.0182	0.0204	0.0221	0.0234	0.0247	0.0240	0.0213	0.0000	0.0000
IEDT	Mean	0.0181	0.0195	0.0220	0.0220	0.0229	0.0232	0.0206	0.0001	0.0000
IEVA	Mean	0.0262	0.0303	0.0344	0.0352	0.0406	0.0446	0.0340	0.0000	0.0000
IEVT	Mean	0.0262	0.0300	0.0346	0.0327	0.0390	0.0423	0.0331	0.0000	0.0000
ARSD	Mean	0.0000	0.0092	0.0161	0.0212	0.0246	0.0356	0.0154	0.0000	0.0000
ARSV	Mean	0.0000	0.0092	0.0161	0.0213	0.0248	0.0360	0.0155	0.0000	0.0000
MS	Mean	2.1717	2.5352	2.7440	2.8377	3.2966	3.6579	2.7883	0.0000	0.0000
PASTBBCAR	Mean	0.0000	0.0127	0.0124	0.0121	0.0112	0.0063	0.0067	0.2039	0.0000
PASTBIDDERCAR	Mean	0.0000	0.0192	0.0139	0.0137	0.0119	0.0051	0.0079	0.0006	0.0000
Panel C: Distribution of the bidder variables										
SCOPE	Mean	0.1728	0.2597	0.3141	0.3505	0.3774	0.4694	0.3036	0.0000	0.0000
DEALS3YEARS	Mean	0.0000	0.6966	1.2356	1.7404	2.1855	4.7445	1.7123	0.0000	0.0000
LOGME	Mean	19.7098	19.9317	20.2171	20.5131	20.6855	21.5949	20.3974	0.0000	0.0000
LNIS	Mean	6.5305	6.5548	6.5756	6.5758	6.6113	6.7801	6.6107	0.0003	0.0000
TobinsQ	Mean	2.2066	2.2037	2.1086	2.0753	2.0381	2.0293	2.1307	0.0013	0.0000
ITobinsQ	Mean	2.0652	2.1235	2.1140	2.1333	2.1284	2.1796	2.1184	0.0032	0.0000
ATobinsQ	Mean	0.1414	0.0802	-0.0054	-0.0580	-0.0903	-0.1503	0.0124	0.0000	0.0000
ROA	Mean	0.0339	0.0513	0.0614	0.0723	0.0736	0.0755	0.0557	0.0000	0.0000
IROA	Mean	-0.0284	-0.0324	-0.0348	-0.0349	-0.0341	-0.0443	-0.0346	0.0177	0.0000
AROA	Mean	0.0623	0.0838	0.0961	0.1072	0.1078	0.1198	0.0903	0.0000	0.0000
LEVERAGE	Mean	0.2194	0.2207	0.2303	0.2412	0.2509	0.2747	0.2382	0.0000	0.0000
ILEVERAGE	Mean	0.2627	0.2626	0.2640	0.2655	0.2660	0.2679	0.2645	0.0456	0.0000
ALEVERAGE	Mean	-0.0433	-0.0419	-0.0338	-0.0243	-0.0151	0.0068	-0.0263	0.0000	0.0000

Table 4 (cont.): Univariate tests of the dependent, advisor, acquirer, and transaction variables between the bids

Panel D: Distribution of the transaction variables

	bids in the sequence	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH	All Bids	t-test	t-test
Variable	N	10,552	5,511	3,515	2,485	1,844	8,047	31,954	1 - 5 = 0	1 - 6 = 0
DIVERS	Mean	0.4182	0.4242	0.4202	0.4266	0.4387	0.4481	0.4288	0.0500	0.0000
MAJORITY	Mean	0.9542	0.9497	0.9462	0.9433	0.9501	0.9432	0.9487	0.2190	0.0003
PUBLIC	Mean	0.1724	0.1878	0.2040	0.2040	0.2104	0.2652	0.2065	0.0000	0.0000
RDS	Mean	0.3076	0.2758	0.2512	0.2128	0.2111	0.1635	0.2467	0.0000	0.0000
TADVISORTIER	Mean	0.4418	0.4936	0.5272	0.5590	0.5857	0.6709	0.5352	0.0000	0.0000
MULTIPLE	Mean	1.0223	1.0245	1.0296	1.0217	1.0298	1.0352	1.0271	0.0624	0.0000
ANTITAKEOVER	Mean	0.0235	0.0357	0.0367	0.0382	0.0401	0.0580	0.0379	0.0000	0.0000
FAMILY	Mean	0.0030	0.0034	0.0037	0.0028	0.0049	0.0022	0.0031	0.1011	0.1496
LITIGATION	Mean	0.0158	0.0187	0.0174	0.0177	0.0141	0.0221	0.0181	0.2903	0.0008
REGULATORY	Mean	0.2380	0.2593	0.2799	0.2954	0.3118	0.3760	0.2898	0.0000	0.0000
CROSSBORDER	Mean	0.0831	0.0686	0.0617	0.0604	0.0521	0.0295	0.0612	0.0000	0.0000
DIVERSIFICATION	Mean	0.4601	0.4886	0.5029	0.5386	0.5274	0.5415	0.5002	0.0000	0.0000
TOEHOLD	Mean	1.5406	2.0898	2.0169	2.1151	2.1728	2.0058	1.8860	0.0047	0.0007
HIGHTECH	Mean	0.2819	0.2999	0.2979	0.2869	0.2777	0.2838	0.2874	0.3531	0.3881
STOCK	Mean	0.1757	0.1909	0.1866	0.1710	0.1638	0.2053	0.1859	0.1063	0.0000
CASH	Mean	0.2079	0.2419	0.2444	0.2523	0.2619	0.2790	0.2423	0.0000	0.0000
MIXED	Mean	0.1966	0.2012	0.2171	0.2020	0.2088	0.1739	0.1951	0.1139	0.0000
OTHER	Mean	0.1344	0.0962	0.0765	0.0724	0.0575	0.0337	0.0868	0.0000	0.0000

That more complex transactions are more likely to be advised by bulge-bracket banks is not so obvious from the univariate analyses. This is similar to (Song, Zhou, & Wei, 2013) observation that non-bulge-bracket banks are employed in complex transactions as well.

Finally the univariate analyses provide first empirical support for the first part of the hypothesis that investment banks with a greater industry expertise and advisory relationship strength are more often chosen and retained as advisors, which is comparable to the observations made by (Song, Zhou, & Wei, 2013) and (Forte, Iannotta, & Navone, 2010). Similarly to (Fuller, Netter, & Stegemoller, 2002) the transaction, bidder and advisor characteristics change in successor transactions. Whether these preliminary empirical observations for the selection equation and hypothesis are supported by the regression analyses and whether the choice of investment banks as advisors affects the likelihood of successor bids, which also affect banks' accumulation of expertise and client relationships, is subject of the multivariate analyses.

3.7 Multivariate analyses

3.7.1 Analysis of advisor selection

After the univariate analysis of outliers the multivariate outlier analysis is based on a Mahalanobis Distance D^2 analysis (Bar-Hen & Daudin, 1995; Hair, Anderson, Tatham, & Black, 1998; Mahalanobis, 1936). The Mahalanobis Distance D^2 measure is used, because a transaction might not be identified as an outlier with respect to each individual variable. The extreme combination of several variables might move the observation beyond the sphere of the multivariate normal distribution focused around the centroid. The centroid is the representative observation, the average combination of variables. The Mahalanobis Distance D^2 measure rescales all variables onto a common scale. The distance of the variables' values to the centroid becomes measurable. At the 1% and 0.1% confidence levels no deal is excluded from sample B. The potential heteroscedasticity arising from 1 to 6 bid-bank matches for advised M&A is addressed with the Huber & White sandwich estimator and the observed information matrix (OIM) in the probit panel models (Huber, 1967; Efron & Hinkley, 1978; White, 1980).

The probit and tobit panel regressions of the selection equations are shown in table 5. The coefficients of bidder's M&A experience as well as his profitability compared to the industry's mean have the expected signs.

Table 5: Regressions of the advisory choice in M&As

Table 5 shows the regressions of the advisory choices in M&As. The dependent variables are ADVISED and ADVISORCHOICE. ADVISED is a dummy (0/1) if the deal is advised by a bank. ADVISORCHOICE is 1 for unadvised deals, 2 if the lead advisor with the largest SDC Top-50 League Table market share MS is a non-bulge-bracket bank and 3 if the lead advisor is a bulge-bracket bank. The variables are summarized in table 2 and described in the statistical appendix in table C. The coefficients are the marginal probability effects at the mean. The fixed effects in Chamberlain random effects probit panel model (1) and tobit panel (3) based on (Mundlak, 1978) are reported if they are meaningful (Chamberlain, 1980; Wooldridge, 2002b). The standard errors of fixed and random effects panel regressions (1) to (4) are based on the observed information matrix (OIM), the inverse Hessian, after maximum likelihood estimation (Efron & Hinkley, 1978). Year fixed effects are included but not reported. The diagnostic statistics of the models' fit, the correlation of fixed or random effects c_i with explanatory variables x_{it} and the test of significance of fixed effects' regressor γ=0 are shown.

	(1)	(2)	(3)	(4)
	ADVISED		ADVISORCHOICE	
VARIABLES	FE panel probit	RE panel probit	FE panel tobit	RE panel tobit
PASTBIDDERCAR	-0.0294	-0.0619	-0.1176	-0.3409
	(-0.674)	(-1.370)	(-0.368)	(-1.060)
TADVISORTIER	0.1478***	0.1876***	1.1747***	1.4790***
	(29.487)	(39.092)	(31.516)	(44.723)
DEALS3YEARS	0.0248***	0.0496***	0.2182***	0.4127***
	(2.763)	(6.561)	(3.250)	(8.202)
SCOPE	-0.0070***	-0.0103***	-0.0485***	-0.0775***
	(-4.382)	(-5.584)	(-3.990)	(-6.929)
ATobinsQ	0.0012	0.0042**	-0.0135	0.0281**
	(0.451)	(2.285)	(-0.702)	(2.212)
AROA	0.0987**	0.1339***	0.7091**	1.0670***
	(2.403)	(6.238)	(2.255)	(6.908)
ALEVERAGE	0.0295	-0.0210	0.1806	0.0093
	(0.891)	(-1.058)	(0.730)	(0.069)
SIXTH	-0.0216**	-0.0252**	-0.1196	-0.0732
	(-2.175)	(-2.489)	(-1.614)	(-1.128)
Year fixed effects	Yes	Yes	Yes	Yes
Fixed effects	Yes	No	Yes	No
N	31,954	31,954	31,954	31,954
No. of Acquirers	10,280	10,280	10,280	10,280
Chi²-statistic	6,345.46	5,817.17	5,104.96	4,220.16
p-value	0.0000	0.0000	0.0000	0.0000
corr(c_i, x_{it})	0.3316	0.3237	0.2355	0.2404
Chi²-statistic γ=0	333.18		343.06	
p-value	0.0000		0.0000	

Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 5 (cont.): Regressions of the advisory choice in M&As

	(1)	(2)	(3)	(4)
	ADVISED		ADVISORCHOICE	
VARIABLES	FE panel probit	RE panel probit	FE panel tobit	RE panel tobit
DIVERS	-0.0135*	-0.0203***	-0.0888	-0.1256***
	(-1.699)	(-3.062)	(-1.485)	(-2.791)
MAJORITY	0.0803***	0.0691***	0.5478***	0.4468***
	(4.864)	(4.016)	(4.343)	(4.048)
HOSTILE	0.0945***	0.0774**	0.5656***	0.4118**
	(2.912)	(2.241)	(2.679)	(2.210)
ANTITAKEOVER	0.0693***	0.0837***	0.4623***	0.5257***
	(4.269)	(4.883)	(4.128)	(5.314)
FAMILY	0.0024	-0.0064	0.2274	0.1099
	(0.048)	(-0.119)	(0.624)	(0.340)
LITIGATION	0.0861***	0.0850***	0.4776***	0.5235***
	(3.466)	(3.376)	(2.863)	(3.568)
REGULATORY	0.1131***	0.1322***	0.7955***	0.9040***
	(13.870)	(18.471)	(13.184)	(18.117)
CROSSBORDER	-0.0995	0.0624***	-0.9292	0.2918***
	(-0.952)	(4.566)	(-1.211)	(2.971)
TOEHOLD	0.0010***	0.0015***	0.0097***	0.0140***
	(3.228)	(4.958)	(4.336)	(7.502)
HIGHTECH	0.0078	0.0222***	-0.0419	0.1484***
	(0.452)	(2.779)	(-0.321)	(2.599)
DIVERSIFICATION	0.0395***	0.0408***	0.2437***	0.2690***
	(6.510)	(7.393)	(5.449)	(7.176)
MULTIPLE	-0.0390**	-0.0126	-0.2378**	-0.0696
	(-2.502)	(-0.880)	(-2.253)	(-0.765)
RDS	0.2136***	0.1422***	1.1877***	0.7793***
	(23.454)	(20.123)	(20.035)	(19.168)
LNIS	0.0243	0.0070*	0.1544	0.0186
	(0.775)	(1.719)	(0.653)	(0.635)
PUBLIC	0.0822***	0.0933***	0.4974***	0.5624***
	(9.217)	(11.575)	(7.663)	(10.254)
STOCK	0.1430***	0.1398***	1.0914***	0.9765***
	(12.619)	(13.464)	(12.662)	(13.824)
CASH	0.0670***	0.0662***	0.5503***	0.5162***
	(7.011)	(7.446)	(7.509)	(8.356)
MIXED	0.1768***	0.1574***	1.3846***	1.1467***
	(16.738)	(17.170)	(17.306)	(17.527)
OTHER	0.0922***	0.0839***	0.7845***	0.6854***
	(5.231)	(4.924)	(5.835)	(5.675)
mean_TADVISORTIER	0.0982***		0.7390***	
	(11.169)		(11.547)	
mean_DEALS3YEARS	0.0613***		0.4464***	
	(4.436)		(4.404)	
mean_SCOPE	-0.0178***		-0.1746***	
	(-4.212)		(-5.693)	
Year fixed effects	Yes	Yes	Yes	Yes
Fixed effects	Yes	No	Yes	No
N	31,954	31,954	31,954	31,954
No. of Acquirers	10,280	10,280	10,280	10,280
Chi²-statistic	6,345.46	5,817.17	5,104.96	4,220.16
p-value	0.0000	0.0000	0.0000	0.0000
corr(c_i, x_{it})	0.3316	0.3237	0.2355	0.2404
Chi²-statistic γ=0	333.18		343.06	
p-value	0.0000		0.0000	

Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

These empirical observations are similar to (Servaes & Zenner, 1996) and (Kale, Kini, & Ryan, 2003). The more experienced and successful the serial bidder is the less likely is the transaction advised, particularly by more reputable and experienced bulge-bracket banks. More profitable bidders facing advised targets in later deals however are likely to be advised, because investment banks are interested in these clients for successive advisory mandates. The likelihood to be advised by a bulge-bracket bank increases with the deal's complexity compared to a non-bulge-bracket bank, shown in regressions (3) and (4) of table 5.

The observation in table 5 of the transaction characteristics' effects on the selection of the advisor type in regressions (3) and (4) coincides with the univariate observations in table 3 of significant transaction differences between the advisor types. The multivariate analysis of the hypothesis controls for selection primarily with instrumental variables (IV) estimation of the lagged Tobit-type selection indicator L1.ADVISORHOICE, which is explained in detail in econometric appendix E.2. The binary selection dummy ADVISED is used to control for selection in biprobit models with selection conceptually similar to (Heckman, 1976; 1979) selection regressions used by (Golubov, Petmezas, & Travlos, 2012) and (Kale, Kini, & Ryan, 2003) to ensure comparability of the analysis to previous studies (Greene, 2008a; 2008b).

3.7.2 Analyses of hiring and retaining a skilled and familiar bank advisor

The first analysis in table 6 shows that banks with a greater industry expertise and greater advisory relationship strength, a better familiarity with the serial bidder, and a better past performance are more likely to be chosen as advisors. Conditioning on advised deals the pooled probit analysis of all possible bank-deal matches reveals that the likelihood of a particular bank to be the acquirer's advisor increases by $0.0178 \times 0.0185 = 0.0003$ or 0.03%[6] given a one deal improvement in its industry expertise IEDT. Relative to a probability of 0.36% to be selected the one deal increase in IEDT results in a $0.03/0.36 = 0.0915$ or 9.15% higher probability to be chosen, which is a sizeable economic effect. For ARSD the effect is $0.0287 \times 0.0418 = 0.0012$ or $0.12/0.36 = 0.3332$ or 33.32%. A standard deviation higher past performance has a positive effect on the bank to be chosen of $0.0326 \times 0.0023 = 0.000075$ or $0.0075/0.36 = 0.0208$ or 2.08%. Still reputation and visibility matter as a one standard deviation larger market share MS is associated with a $0.0003 \times 3.3914 = 0.0010$ or relative $0.10/0.36 = 0.2826$ or 28.26% higher selection probability. The banks' reported market shares, industry expertise and advisory relationships are related to each other in the accumulation of expertise and advisory relationships shown later in table 10.

The relevance of the industry expertise, past performance and advisory relationship strength for the hiring and retention of a familiar advisor along the acquisition sequence is shown in table 7. The past performance of a previous deal advised by the same bank has no effect on the retention of a familiar bank, compared to the positive effect on the selection among all possible bank advisors. The industry expertise and past advisory choice of a bank with greater advisory relationship strength are the major determinants of hiring or retaining a familiar bank in the present deal. Controlling for selection in regressions (2) to (4) in table 7 the positive effect of the bank's industry expertise to be retained is observed. The effect of the expertise in the target's industry is larger if one controls for the past

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[6] The one deal increase of IEDT and IEVT is calculated as $\text{IEDT+1=IEDT+}\left(\text{1/advised\_industry\_deal\_number\_3years}\right)$ and for a deal increase of average value $\text{IEVT+1=IEVT+}\left(\text{average\_deal\_value/advised\_industry\_deal\_volume\_3years}\right)$. The computations of ARSD+1 and ARSV+1 are similar. The means are 0.0185 for IEDT+1, 0.0527 for IEVT+1, 0.0418 for ARSD+1 and 0.0424 for ARSV+1.

advisory choice in instrumental variables (IV) probit regression (4) that also solves the initial conditions problem of the stochastic process of advisor retention (Heckman, 1981). The models are explained in econometric appendix E.2. The bank has access to the serial bidder and improves its advisory relationship if it advised him in a past transaction, which increases its chances to be retained as familiar bank advisor in the current transaction. The advisory choice of the serial bidder's previous transaction is considered, because according to the univariate analysis bulge-bracket banks have stronger client relationships than non-bulge-bracket banks and are more often retained as familiar bank advisors.

The analysis in panel B is similar to the analysis in panel A, except for the addition of the advisory relationship strength of the bank advisor chosen in the previous bid. The lagged advisory relationship strength is used to model the influence client relationships have on retaining familiar banks. The problem of lagged selection indicators is the truncation of the first bids in the sample, or one third of all observations (10,552). By construction the selection indicators are positively correlated with the bank variables, which are positive only in advised deals. The lagged selection indicators are still positively correlated, albeit smaller, with the current bid's bank variables due to the positive correlation of retaining familiar bank advisors along the acquisition sequence (Nijman & Verbeek, 1992; Verbeek & Nijman, 1992). The correlation problem is solved with instrumental variables (IV) probit models for the lagged selection indicator ADVISORCHOICE. The IV approach to the inclusion of a lagged selection indicator also solves the initial conditions problem (Heckman, 1981), which is explained in econometric appendix E.2 in more detail.

Table 6: Regressions of the selection of a particular bank in advised deals

Table 6 shows the probit analysis of selecting an advisor from all 1,854 banks in SDC M&A sample A, given that the bid is advised. The dependent variable is AADVISOR, a dummy that indicates whether the particular bank is an advisor of the advised bid. The independent variables are the bank characteristics and in regressions (3) and (6) the acquirer and transaction characteristics as well. The variables are summarized in table 2 and described in the statistical appendix in table C. The coefficients are the marginal probability effects at the mean on P(AADVISOR=1). The standard errors are corrected with the Huber & White sandwich estimator clustered by banks or deals (Huber, 1967; White, 1980). All probit regressions include year fixed effects and (Fama & French, 1997) industry fixed effects that are not reported.

	(1)	(2)	(3)	(4)	(5)	(6)
	AADVISOR					
VARIABLES	pooled probit	pooled probit	pooled probit	pooled probit	pooled probit	pooled probit
IEDT	0.0097***	0.0179***	0.0178***			
	(6.067)	(6.956)	(42.467)			
IEDA	0.0104***					
	(6.946)					
ARSD	0.0277***	0.0284***	0.0287***			
	(9.072)	(8.994)	(34.393)			
IEVT				0.0025***	0.0050***	0.0049***
				(3.166)	(4.187)	(15.165)
IEVA				0.0032***		
				(3.822)		
ARSV				0.0313***	0.0316***	0.0319***
				(9.166)	(9.132)	(37.041)
PASTBBCAR	0.0323***	0.0329***	0.0326***	0.0360***	0.0364***	0.0361***
	(2.969)	(2.994)	(6.665)	(3.087)	(3.098)	(6.926)
RDS	0.0002*	0.0002*	0.0001***	0.0002*	0.0002*	0.0002***
	(1.865)	(1.792)	(5.910)	(1.754)	(1.741)	(6.049)
MS	0.0003***	0.0003***	0.0003***	0.0003***	0.0003***	0.0003***
	(7.090)	(7.459)	(89.540)	(7.517)	(7.850)	(81.739)
LOGME	-0.0001	-0.0001	-0.0001***	-0.0001	-0.0001	-0.0001***
	(-1.094)	(-1.119)	(-9.094)	(-1.103)	(-1.102)	(-8.870)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Transaction variables	No	No	Yes	No	No	Yes
Acquirer variables	No	No	Yes	No	No	Yes
N	2,489,259	2,489,259	2,489,259	2,489,259	2,489,259	2,489,259
N of banks/deals	1,854	1,854	7,840	1,854	1,854	7,840
Chi²-statistic	2,474.71	2,419.53	33,181.27	2,385.65	2,201.11	30,031.62
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Pseudo R²	0.21	0.21	0.21	0.20	0.20	0.20

Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 7: Regressions of the hiring/retention of an old advisor

Table 7 panel A shows the primary regression of hiring or retaining an old advisor. The dependent variable is OLDADVISOR and 1 if the chosen bank advised the bidder within the last three years and 0 for unfamiliar banks and unadvised deals. The variables are summarized in table 2 and described in the statistical appendix in table C. ADVISORCHOICE serves as lagged Tobit-type selection indicator in panel probit and instrumental variable (IV) probit regressions (2) and (3) (Nijman & Verbeek, 1992; Wooldridge, 2002a; Heckman, 1978; Hausmann, 1978; Vella, 1998). The instruments for ADVISED and ADVISORCHOICE in IV panel regression (3) and biprobit regression with selection (4) (Greene, 2008a, 2008b) are identical to regressions (2) and (4) in table 5. The coefficients are the marginal effects at the mean on P(OLDADVISOR=1). The standard errors of regressions (1) and (2) are based on the observed information matrix (OIM), the inverse Hessian, after maximum likelihood estimation (Efron & Hinkley, 1978). In IV probit regression (3) and biprobit regression (4) the Huber & White sandwich estimator clustered by acquirers is used to correct the standard errors (Huber, 1967; White, 1980). Year fixed effects are included but not reported. The fixed effects in regressions (1) to (3) based on (Mundlak, 1978) are reported if they are meaningful. The diagnostic statistics of the models' fit, the correlation of fixed effects c_i with explanatory variables x_{it} and the test of significance of fixed effects' regressor γ=0 are shown.

Panel A: Primary analysis of	(1)	(2)	(3)	(4)
hiring an old advisor			OLDADVISOR	
VARIABLES	FE panel probit	FE panel probit	IV probit	biprobit with selection
IEDT	0.1460***	0.2855***	0.4594***	0.3003***
	(10.128)	(12.588)	(16.750)	(6.506)
PASTBBCAR	0.0075	0.0052	0.0148	0.1667
	(1.096)	(0.401)	(0.546)	(0.947)
L1.ADVISORCHOICE		0.0111***	0.0286***	
		(9.227)	(7.274)	
DEALS3YEARS	0.0007***	0.0009***	0.0018***	0.0177***
	(3.935)	(2.732)	(2.997)	(6.067)
RDS	0.0048***	0.0084***	0.0120***	-0.0205*
	(4.885)	(4.845)	(3.958)	(-1.819)
LNIS	0.0069*	-0.0013	-0.0035	0.0162***
	(1.689)	(-0.168)	(-0.229)	(3.729)
ATobinsQ	-0.0004	0.0004	0.0011	0.0039**
	(-1.168)	(0.690)	(1.131)	(2.195)
AROA	-0.0039	-0.0079	-0.0235	-0.0221
	(-0.639)	(-0.663)	(-1.146)	(-0.854)
ALEVERAGE	0.0096**	0.0047	0.0010	-0.0100
	(2.263)	(0.578)	(0.071)	(-0.390)
SIXTH	0.0005	0.0039*	0.0058	0.0748***
	(0.419)	(1.800)	(1.499)	(4.834)
LOGME	0.0038***	0.0036***	0.0045*	0.0112***
	(4.897)	(2.606)	(1.667)	(4.593)
mean_IEDT	0.0208*	-0.2397***	0.1880***	
	(1.795)	(-6.584)	(3.028)	
mean_PASTBBCAR	-0.0122	-0.0069	-0.1284	
	(-0.577)	(-0.173)	(-1.308)	
mean_L1.ADVISORCHOICE		0.0462***		
		(12.298)		
Year fixed effects	Yes	Yes	Yes	Yes
Fixed effects	Yes	Yes	Yes	No
Instrumented	No	No	L1.ADVISORCHOICE	ADVISED
N	31,954	21,402	21,402	31,954
No. of Acquirers	10,280	5,344	5,344	10,280
Chi² statistic	3,405.00	3,284.95	1,498.06	417.23
p-value	0.0000	0.0000	0.0000	0.0000
corr(c_i, x_{it})	0.3424	0.1826	0.0697	
Chi²-statistic γ=0	95.15	369.07	815.41	
p-value	0.0000	0.0000	0.0000	
Chi² of exogeneity			4.72	1.31
p-value of exogeneity			0.0298	0.2522

Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 7 (cont.): Regressions of the hiring/retention of an old advisor

Table 7 panel B shows the influence of ARSD of the previous bid's advisor on retaining an old advisor in the current bid. The dependent variable is OLDADVISOR and 1 if the bank advised the bidder within the last three years and 0 for unfamiliar banks and unadvised deals. The variables are summarized in table 2 and described in table C. The analysis is otherwise similar to the one in panel A. Year fixed effects are included but not reported. The fixed effects in regressions (1) to (3) based on (Mundlak, 1978) are reported if they are meaningful. The diagnostic statistics of the models' fit, the correlation of fixed effects c_i with explanatory variables x_{it} and the test of significance of fixed effects' regressor $\gamma=0$ are shown.

Panel B: previous advisor's	(1)	(2)	(3)	(4)
ARSD			OLDADVISOR	
VARIABLES	FE panel probit	FE panel probit	IV probit	biprobit with selection
IEDT	0.3863***	0.3535***	0.4360***	0.4250***
	(15.583)	(15.331)	(17.700)	(6.697)
L1.ARSD	-0.0035	-0.0297***	-0.0344***	0.4423***
	(-0.466)	(-4.380)	(-2.818)	(9.545)
PASTBBCAR	0.0047	0.0042	0.0044	0.1356
	(0.256)	(0.258)	(0.175)	(0.673)
L1.ADVISORCHOICE		0.0161***	0.0217***	
		(11.058)	(5.913)	
DEALS3YEARS	0.0010**	0.0012***	0.0017***	0.0119***
	(2.134)	(2.949)	(2.594)	(4.761)
RDS	0.0111***	0.0100***	0.0116***	-0.0187
	(4.528)	(4.773)	(4.179)	(-1.336)
LNIS	0.0019	-0.0002	-0.0012	0.0242***
	(0.176)	(-0.017)	(-0.095)	(4.515)
ATobinsQ	0.0007	0.0007	0.0012	0.0091***
	(0.808)	(1.025)	(1.353)	(3.574)
AROA	-0.0212	-0.0104	-0.0178	-0.0660*
	(-1.251)	(-0.713)	(-0.977)	(-1.857)
ALEVERAGE	0.0175	0.0071	0.0085	-0.0185
	(1.496)	(0.703)	(0.634)	(-0.563)
SIXTH	0.0052*	0.0068**	0.0086**	0.0346**
	(1.665)	(2.482)	(2.221)	(2.318)
LOGME	0.0054***	0.0038**	0.0039	0.0113***
	(2.750)	(2.257)	(1.559)	(3.290)
mean_IEDT	0.0172	-0.3690***	-0.1564**	
	(0.431)	(-8.535)	(-2.241)	
mean_L1.ARSD	0.4802***	0.3234***	0.4798***	
	(16.388)	(13.896)	(10.671)	
mean_PASTBBCAR	-0.0538	-0.0435	-0.0719	
	(-1.022)	(-0.979)	(-1.147)	
mean_L1.ADVISORCHOICE		0.0368***		
		(11.359)		
Year fixed effects	Yes	Yes	Yes	Yes
Fixed effects	Yes	Yes	Yes	No
Instrumented	No	No	L1.ADVISORCHOICE	ADVISED
N	21,402	21,402	21,402	21,402
No. of Acquirers	5,344	5,344	5,344	5,344
Chi² statistic	3,925.57	4,286.09	1,666.59	467.51
p-value	0.0000	0.0000	0.0000	0.0000
corr(c_i, x_{it})	0.1217	0.0632	0.0797	
Chi²-statistic $\gamma=0$	596.64	715.31	869.80	
p-value	0.0000	0.0000	0.0000	
Chi² of exogeneity			5.34	5.66
p-value of exogeneity			0.0209	0.0173

Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 7 (cont.): Regressions of the hiring/retention of an old advisor

Table 7 Panel C shows the SUR biprobit simultaneous equation systems (Heckman, 1978) of hiring or retaining an old advisor and whether the bid is advised. The dependent variables are OLDADVISOR and ADVISED. OLDADVISOR is a dummy (0/1) if the chosen bank advised the bidder within the last three years and 0 for unfamiliar banks and unadvised deals. ADVISED is a dummy if the bid is advised by a bank. The variables are summarized in table 2 and described in table C in the statistical appendix. The regressions for OLDADVISOR and ADVISED are identical to regressions (1) in table 7 panels A and B and (2) in table 5. The coefficients in (3) and (6) are the marginal effects at the mean of the simultaneously estimated variables in regressions (1), (2) and (4), (5) on the joint probability P(OLDADVISOR=1 & ADVISED=1). In the biprobit simultaneous equation systems the Huber & White sandwich estimator clustered by acquirers is used to correct the standard errors (Huber, 1967; White, 1980). Year fixed effects and transaction variables are included but not reported.

Panel C: Biprobit simultaneous equation system	(1)	(2)	(3)	(4)	(5)	(6)
	OLDADVISOR & ADVISED					
	System 1			System 2		
VARIABLES	OLDADVISOR	ADVISED	joint probability	OLDADVISOR	ADVISED	joint probability
IEDT	2.5228***		0.8482***	2.3491***		0.5605***
	(10.073)		(12.354)	(10.301)		(12.722)
L1.ARSD	1.3341***		0.4486***			
	(13.101)		(12.005)			
PASTBBCAR	0.4467		0.1502	0.6573		0.1568
	(1.190)		(1.183)	(1.447)		(1.436)
PASTBIDDERCAR		-0.2190	0.0418		-0.1881	0.0240
		(-1.284)	(1.275)		(-1.119)	(1.113)
DEALS3YEARS	-0.0069	-0.0461***	0.0065***	0.0123	-0.0478***	0.0090***
	(-1.038)	(-7.504)	(3.269)	(1.340)	(-7.889)	(4.491)
RDS	0.3397***	0.5938***	0.0010	0.2989***	0.4274***	0.0169**
	(11.678)	(16.261)	(0.091)	(11.078)	(20.001)	(2.572)
LNIS	0.1149***	-0.0041	0.0394***	0.1059***	0.0118	0.0238***
	(5.533)	(-0.251)	(6.506)	(4.993)	(0.901)	(5.194)
ATobinsQ	0.0186**	0.0124	0.0039*	0.0111	0.0176***	0.0004
	(2.073)	(1.552)	(1.675)	(1.289)	(2.898)	(0.242)
AROA	0.1118	0.6512***	-0.0865**	0.1281	0.4406***	-0.0256
	(0.870)	(6.617)	(-2.313)	(1.064)	(6.351)	(-0.989)
ALEVERAGE	-0.1760	0.0280	-0.0645**	-0.1681	-0.0157	-0.0381
	(-1.557)	(0.350)	(-1.990)	(-1.500)	(-0.250)	(-1.609)
SIXTH	0.1448***	-0.0312	0.0546***	0.3827***	-0.0393	0.0963***
	(3.443)	(-0.890)	(4.245)	(7.471)	(-1.099)	(8.117)
LOGME	0.0934***		0.0314***	0.1047***		0.0250***
	(9.159)		(9.734)	(10.188)		(11.433)
Constant	-4.7378***	-1.7998***		-5.0400***	-1.0597**	
	(-17.680)	(-11.556)		(-19.186)	(-2.265)	
Year fixed effects	Yes	No	Yes	Yes	No	Yes
Fixed effects	No	No	No	No	No	No
Transaction characteristics	No	Yes	Yes	No	Yes	Yes
N	21,402	21,402	21,402	31,954	31,954	31,954
No. of Acquirers	5,344	5,344	5,344	10,280	10,280	10,280
Chi² statistic	3,418.78	3,418.78		5,360.04	5,360.04	
p-value	0.0000	0.0000		0.0000	0.0000	
Chi² of exogeneity	542.86	542.86		513.81	513.81	
p-value of exogeneity	0.0000	0.0000		0.0000	0.0000	

Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

A one standard deviation greater advisory relationship strength of the chosen bank advisor in the previous bid increases the bank's chances to be retained as advisor in the current bid by at least $0.0847 \times 0.3234 = 0.0274$ or relatively by $0.0274/0.0453 = 0.6047$ or 60.47%. The economic effect of the strength of the advisory relationship on hiring and retaining a familiar bank as advisor is large. The 4.53% of hired and retained old bank advisors compared to 27.81% of deals that are advised receive $0.0452/0.2781 = 0.1622$ or 16.22% of all advisory mandates. Banks are aware of the importance of close advisory relationships to receive advisory mandates. Therefore, banks pitch deals to known bidders to receive the advisory mandate of the proposed deal. The decisions whether the bid is advised and whether to hire and retain a familiar bank as advisor are not exclusive but occur simultaneously. The interrelatedness of the advisor selection and retention decisions are modeled with biprobit simultaneous equation systems of (Heckman, 1978) shown in panel C of table 7. The empirically observed positive effects of banks' industry expertise and advisory relationship strength are similar to the effects observed in panels A and B. The independence of the advisory decision and whether to retain a familiar bank advisor are clearly reject, which is evident by the p-value of the exogeneity test of the two equations.

3.7.3 Analysis of acquisition sequence continuation

The regressions in table 8 show that the advising bank's industry expertise and advisory relationship strength have a significantly positive effect on the probability of the current M&A being succeeded by another one. The more profitable the bidder is with above average investment opportunities and a good past acquisition performance the more likely is he extending his acquisition series. The advising investment bank supports the bidder in the exploitation of his investment opportunities. The effects are driven by the fixed effects that are negatively correlated with the changes in the advising banks' industry expertise, advisory relationship strength and the probability to retain an old advisor. The correlation and significance of the fixed effects emerges from the relatively few acquirers that make many acquisitions in short succession, like Cisco Systems with 98 acquisitions.

On the other hand the interrelatedness of hiring or retaining a familiar advisor and the probability of a successor deal is significant, shown in table 9 in biprobit simultaneous equation system 1. Banks pitch deals to known clients to earn the advisory fees from further advisory mandates (McLaughlin, 1990; 1992). With the acceptance of the proposed successor transaction the bidder also accepts the pitching bank as advisor. The empirical observations of the positive influence of the target industry expertise and advisory relationship strength on the retention of an old advisor and on the probability of a successor deal are similar to the empirical observations shown before.

The economic effect of hiring a familiar advisor measured by ARSD in the previous deal is greater on the retention of an old advisor than on the probability of a successor transaction. The economic effect of the previous deal's advising bank's standard deviation greater advisory relationship strength is $0.2921 \times 0.0847 = 0.0247$ or relatively $0.0247/0.4717 = 0.0525$ or 5.25% on the successor bid probability and $0.0247/0.2081 = 0.1189$ or 11.89% on the retention of an old advisor. Similarly a one standard deviation increase in IEDT is associated with a $1.0676 \times 0.0532 = 0.0568$ or $0.0568/0.4717 = 0.1204$ or 12.04% higher successor bid probability and $0.0568/0.2081 = 0.2729$ or 27.29% higher probability of retaining an old advisor. A standard deviation greater probability of retaining an old advisor itself increases the successor bid probability by

$0.3548 \times 0.2081 = 0.0738$ and thus $0.0738/0.4717 = 0.1565$ or 15.65%. Compared to an unconditional successor bid probability of 66.59% and a standard deviation of 47.17% the relative economic effect in the range of 23.51% to 33.18% is fairly large. The mechanism of establishing stronger client relationships and accumulating industry expertise positively affecting the likelihood of extending serial bidders' acquisition sequences is an indirect one through the greater likelihood of hiring or retaining old advisors.

Controlling for simultaneity a one standard deviation increase in Tobin's Q above the industry average increases the successor bid probability by $0.0278 \times 1.8525 = 0.0515$, 5.15 percentage points, or relatively by $0.0515/0.4717 = 0.1092$ or 10.92%. The profitability above average has an economic effect of $0.0606 \times 0.1661 = 0.0101$, 1.01 percentage points, or relatively of $0.0101/0.4717 = 0.0213$ or 2.13%. A one standard deviation larger industry size LNIS makes a successor bid also more likely, namely by $0.0359 \times 0.9283 = 0.0333$, 3.33 percentage points, or relatively by $0.0333/0.4717 = 0.0707$ or 7.07%. Interesting is the observations that above average leverage of the bidder makes retaining an old advisor and a successor bid more likely, probably because highly leveraged bidders offer banks business opportunities of providing financing different from debt for the acquisition besides obtaining the M&A advisory mandate itself.

Table 8: Regressions of the probability of a successor bid

Table 8 shows the primary analysis of the liklihood of a successor bid. The dependent variable is SUCCESSORBID. SUCCESSORBID is a dummy (0/1) if the current bid is succeeded by another bid of the same bidder. The variables are summarized in table 2 and described in table C. ADVISED is a dummy (0/1) if the deal is advised by a bank. ADVISED serves as selection dummy in biprobit regressions with selection (5) and (6) (Greene, 2008a, 2008b). The instruments for ADVISED are identical to regression (2) in table 5. The standard errors of probit panel regressions (1) to (4) are based on the observed information matrix, the inverse Hessian, after maximum likelihood estimation (Efron & Hinkley, 1978). In biprobit regressions with selection (5) and (6) the Huber & White sandwich estimator clustered by acquirers is used to correct the standard errors (Huber, 1967; White, 1980). Year fixed effects are included but not reported. The fixed effects in regressions (3) and (4) based on (Mundlak, 1978) are reported if they are meaningful. The diagnostic statistics of the models' fit, the correlation of fixed effects c_i with explanatory variables x_{it} and the test of significance of fixed effects' regressor γ=0 are shown.

	(1)	(2)	(3)	(4)	(5)	(6)
			SUCCESSORBID			
VARIABLES	RE panel probit	RE panel probit	FE panel probit	FE panel probit	biprobit with selection	
IEDT	0.1800**	0.1691**	-0.0353	-0.0339	0.1222*	0.1247*
	(2.217)	(2.087)	(-0.541)	(-0.521)	(1.773)	(1.820)
ARSD	0.0063		-0.2962***		0.2146***	
	(0.118)		(-6.913)		(5.392)	
OLDADVISOR		0.0155		-0.1167***		0.1144***
		(0.747)		(-7.378)		(7.151)
PASTBIDDERCAR	0.0559	0.0559	-0.1187***	-0.1145***	0.1578*	0.1564*
	(0.899)	(0.898)	(-2.752)	(-2.648)	(1.885)	(1.843)
RDS	-0.0779***	-0.0780***	-0.0420***	-0.0417***	-0.0894***	-0.0889***
	(-9.456)	(-9.470)	(-5.725)	(-5.684)	(-9.730)	(-9.597)
LNIS	0.0458***	0.0457***	-0.4497***	-0.4514***	0.0099	0.0093
	(7.180)	(7.168)	(-12.165)	(-12.204)	(1.561)	(1.460)
ATobinsQ	0.0294***	0.0294***	0.0524***	0.0528***	0.0153***	0.0149***
	(10.489)	(10.478)	(18.028)	(18.170)	(4.484)	(4.368)
AROA	0.3550***	0.3547***	-0.3505***	-0.3539***	0.2997***	0.3006***
	(11.525)	(11.525)	(-8.833)	(-8.926)	(7.440)	(7.459)
ALEVERAGE	-0.0636**	-0.0634**	-0.2755***	-0.2772***	0.0879**	0.0891**
	(-2.295)	(-2.289)	(-8.439)	(-8.489)	(2.509)	(2.527)
SIXTH	-0.0488***	-0.0486***	-0.5007***	-0.5030***	0.1939***	0.1919***
	(-3.437)	(-3.426)	(-42.898)	(-43.154)	(12.243)	(12.217)
mean_IEDT			0.1691*	0.0535		
			(1.827)	(0.572)		
mean_ARSD			1.0449***			
			(11.284)			
mean_OLDADVISOR				0.5029***		
				(14.896)		
mean_PASTBBCAR			1.3331***	1.3253***		
			(13.186)	(13.087)		
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Fixed effects	No	No	Yes	Yes	No	No
Instrumented	No	No	No	No	ADVISED	ADVISED
N	31,954	31,954	31,954	31,954	31,954	31954
No. of Acquirers	10,280	10,280	10,280	10,280	10,280	10280
Chi² statistic	1,814.82	1,819.43	6,324.40	6,399.58	975.26	998.9345
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
corr(c_i, x_{it})			0.5168	0.5157		
Chi²-statistic γ=0			4,122.91	4,195.56		
p-value			0.0000	0.0000		
Chi² of exogeneity					11.02	11.11
p-value of exogeneity					0.0009	0.0009

Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 9: Biprobit Simultaneous Equation Systems of SUCCESSORBID and OLDADVISOR

Table 9 shows the recursive and SUR biprobit simultaneous equation systems (Heckman, 1978) of the current bid being succeeded by another bid and hiring or retaining an old advisor. The dependent variables are SUCCESSORBID and OLDADVISOR. SUCCESSORBID is a dummy (0/1) if the current bid of the serial bidder is succeeded by another bid. OLDADVISOR is a dummy (0/1) if the chosen bank advised the bidder within the last three years and 0 for unfamiliar banks and unadvised deals. The variables are summarized in table 2 and described in table C. The regression equations of SUCCESSORBID and OLDADVISOR are identical to the regressions in table 7 panel A and table 8. The coefficients in (3) and (6) are the marginal effects at the mean on the joint probability P(SUCCESSORBID=1 & OLDADVISOR=1). In the biprobit simultaneous equation systems the Huber & White sandwich estimator clustered by acquirers is used to correct the standard errors (Huber, 1967; White, 1980). Year fixed effects are included but not reported.

	(1)	(2)	(3)	(4)	(5)	(6)
	SUCCESSORBID & OLDADVISOR					
	System 1			System 2		
VARIABLES	SUCCESSORBID	OLDADVISOR	joint probability	SUCCESSORBID	OLDADVISOR	joint probability
IEDT		6.5717***	1.0676***	0.2199	6.9761***	-0.0250
		(16.191)	(3.764)	(1.146)	(26.890)	(-0.362)
OLDADVISOR	0.8532***		0.3548***			
	(3.317)		(4.042)			
L1.ARSD		1.7980***	0.2921***		1.9001***	-0.0246**
		(10.835)	(3.818)		(13.748)	(-2.314)
PASTBIDDERCAR	0.2108		0.0877	0.1608		0.0477
	(1.482)		(1.489)	(1.124)		(1.123)
PASTBBCAR		0.0848	0.0138		-0.0124	0.0002
		(0.246)	(0.243)		(-0.035)	(0.035)
DEALS3YEARS		0.0083	0.0013		-0.0027	0.0000
		(0.987)	(0.813)		(-0.393)	(0.385)
RDS	-0.2779***	0.2248***	-0.0791***	-0.2468***	0.2122***	-0.0760***
	(-10.623)	(7.124)	(-4.307)	(-9.813)	(6.830)	(-9.973)
LNIS	0.0268**	0.1526***	0.0359***	0.0363***	0.1481***	0.0089**
	(2.246)	(6.841)	(4.640)	(3.189)	(6.708)	(2.465)
ATobinsQ	0.0666***	0.0005	0.0278***	0.0735***	0.0132	0.0216***
	(7.481)	(0.053)	(5.490)	(9.017)	(1.527)	(8.493)
AROA	0.0830	0.1604	0.0606*	0.1269*	0.0207	0.0374*
	(1.132)	(1.139)	(1.808)	(1.781)	(0.160)	(1.761)
ALEVERAGE	0.2086***	-0.1752	0.0583*	0.2081***	-0.2039*	0.0644***
	(3.232)	(-1.516)	(1.834)	(3.255)	(-1.766)	(3.378)
SIXTH	0.3693***	0.0600	0.1634***	0.4125***	0.0962**	0.1212***
	(11.536)	(1.320)	(8.091)	(16.742)	(2.218)	(13.813)
Constant	0.3323***	-3.1185***		0.3065***	-3.0633***	
	(4.391)	(-5.747)		(4.057)	(-5.329)	
Year fixed effects	No	Yes	Yes	No	Yes	Yes
Fixed effects	No	No	No	No	No	No
N	21,402	21,402	21,402	21,402	21,402	21,402
No. of Acquirers	5,344	5,344	5,344	5,344	5,344	5,344
Chi² statistic	2,892.25	2,892.25		2,373.24	2,373.24	
p-value	0.0000	0.0000		0.0000	0.0000	
Chi² of exogeneity	5.88	5.88		4.71	4.71	
p-value of exogeneity	0.0153	0.0153		0.0300	0.0300	

Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

3.7.4 Analysis of banks' accumulation of expertise and advisory relationships

Finally banks' accumulation of expertise in acquirers' and targets' industries as well as the strengthening of their advisory relationships is modeled along the sequences of advised deals for each bank in sample B, shown in table 10. The regressions on the panel of 8,886 bid-bank matches with 718 banks show that industry expertise and advisory relationships are positively correlated as expected. Banks with stronger advisory relationships (ARSD) get advisory mandates easier, which improves their industry expertise in the targets' and acquirers' industries. Being retained as familiar advisor makes the accumulation of industry expertise easier, shown in regressions (1) and (2). Being retained increases the industry expertise IEDT by 0.0071, which compared to the average of 0.0206 is a sizeable effect of 34.47%. The effect of an increase of 0.0119 of IEVT compared to its average of 0.0331, or 35.95%, is similar. The greater industry expertise on the other hand increases the likelihood to be hired and retained as advisor, shown in tables 6 and 7. The process over several rounds of hiring and retaining bank advisors who accumulate expertise and advisory relationships is self-enforcing.

The self-enforcing mechanism of expertise and relationship accumulation is evident in dynamic regressions (3) to (6). The lagged industry expertise and advisory relationship strength limit the dynamic analysis to those banks that advise more than one deal in sample B. The 274 banks who advise more than one deal account for 38% of all 718 banks in sample B and for 15% of all banks in SDC M&A sample A. The market of M&A advisors is dominated by few banks that advise many deals. Goldman Sachs alone advised 654 deals, followed by Merrill Lynch with 514 deals. The Top-10 banks advised 3,335 deals, or 37.53%.

Table 10: Regressions of banks' accumulation of industry expertise and advisory relationships

Table 10 shows the dynamic panel regressions of banks' accumulation of industry expertise and advisory relationships. The dependent and primary independent variables are the banks' industry expertise variables IEDT, IEDA, IEVT, IEVA and their advisory relationship strength variables ARSD and ARSV as well as OLDADVISOR. The variables are summarized in table 2 and described in table C. The Huber & White sandwich estimator clustered by banks is used to correct the standard errors in fixed effects panel regressions (1) and (2) (Huber, 1967; White, 1980). The standard errors of (Arellano & Bond, 1991) GMM one-step dynamic panel regressions (3) to (6) are based on their robust variance estimator as well. Year fixed effects are included but not reported.

	(1)	(2)	(3)	(4)	(5)	(6)
	IEDT	IEVT	ARSD	ARSV	IEDT	IEVT
VARIABLES	FE panel reg	FE panel reg	Arellano-Bond	Arellano-Bond	Arellano-Bond	Arellano-Bond
OLDADVISOR	0.0071***	0.0119***				
	(2.814)	(3.145)				
IEDT			0.1684*			
			(1.650)			
L1.ARSD			0.0380			
			(1.249)			
IEVT				0.1167***		
				(3.054)		
L1.ARSV				0.0379		
				(1.275)		
ARSD					0.0304**	
					(2.025)	
L1.IEDT					0.0756**	
					(2.498)	
ARSV						0.0436***
						(3.825)
L1.IEVT						0.0855***
						(3.096)
MS	0.0006**	0.0032***	0.0001	0.0003	0.0006	0.0004
	(2.245)	(5.114)	(0.106)	(0.265)	(0.821)	(0.465)
PASTBANKCAR	0.0137*	-0.0049	-0.0003	0.0011	0.0021	-0.0045
	(1.730)	(-0.380)	(-0.013)	(0.054)	(0.193)	(-0.331)
DEALS3YEARS	-0.0009**	-0.0011*	0.0201***	0.0203***	-0.0009**	-0.0013**
	(-2.516)	(-1.776)	(6.882)	(6.815)	(-2.132)	(-2.389)
ATobinsQ	-0.0011**	-0.0016	-0.0022	-0.0022	-0.0003	0.0002
	(-2.092)	(-1.448)	(-1.574)	(-1.554)	(-0.543)	(0.263)
AROA	-0.0099	-0.0036	-0.0196	-0.0183	0.0127*	0.0084
	(-1.108)	(-0.405)	(-0.977)	(-0.896)	(1.699)	(0.873)
ALEVERAGE	0.0190***	0.0285***	0.0064	0.0067	0.0210***	0.0402***
	(4.095)	(3.511)	(0.320)	(0.334)	(2.928)	(3.347)
LOGME	-0.0004	0.0006	0.0091***	0.0086***	-0.0005	0.0007
	(-0.873)	(0.850)	(2.950)	(2.791)	(-0.768)	(0.599)
Constant	-0.0701	-0.3123**	-0.0876	-0.0862	-0.0608	-0.1579*
	(-1.538)	(-2.536)	(-1.142)	(-1.225)	(-0.881)	(-1.930)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Fixed effects	Yes	Yes	No	No	No	No
N	8,886	8,886	5,203	5,203	5,203	5,203
Number of banks	718	718	274	274	274	274
F-/Chi²-statistic	8.28	53.79	286.64	273.05	288.81	574.63
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
R^2 adjusted	0.03	0.07				

Robust t- and z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

3.8 Sensitivity analysis

The empirical analysis of hiring and retaining a familiar advisor, the probability of a successor transaction and the simultaneity of retaining an old advisor and the influence of advisor retention on the successor bid probability are replicated with dollar volume based definitions of the industry expertise and advisory relationship strength in table 11. The economic effects of the dollar value based definitions on the retention of a familiar bank as advisor shown in table 11 panel A are similar to the ones of the deal number based definitions used in table 7 panels A and B. The likelihood of a successor bid is similarly positively influenced by the dollar value based measures as it is by the deal number based measures in table 8. Finally the interrelatedness, or simultaneity, of the occurrence of a successor bid and retaining a familiar bank advisor is unaffected whether the industry expertise and advisory relationship strength are measured by the number or dollar value of deals, shown in table 11 panel C. The economic effects are similar to the ones observed for the deal number based definitions of the industry expertise and advisory relationship strength.

Table 11: Sensitivity analysis

Table 11 panel A shows the sensitivity analysis of hiring or retaining an old advisor. The dependent variable is OLDADVISOR that is 1 if the chosen bank advised the bidder within the last three years and 0 for unfamiliar banks and unadvised deals. The variables are summarized in table 2 and described in table C. The analysis is otherwise similar to the one shown in table 7 panel B, except for the use of IEVT and ARSV. Year fixed effects are included but not reported. The fixed effects in regressions (1) to (3) based on (Mundlak, 1978) are reported if they are meaningful. The diagnostic statistics of the models' fit, the correlation of fixed effects c_i with explanatory variables x_{it} and the test of significance of fixed effects' regressor γ=0 are shown.

Panel A: OLDADVISOR	(1)	(2)	(3)	(4)
			OLDADVISOR	
VARIABLES	FE panel probit	FE panel probit	IV probit	biprobit with selection
IEDT	0.1966***	0.1829***	0.2205***	0.1734***
	(15.517)	(15.760)	(18.160)	(5.403)
L1.ARSV	-0.0030	-0.0318***	-0.0367***	0.4402***
	(-0.363)	(-4.314)	(-2.805)	(10.173)
L1.ADVISORCHOICE		0.0177***	0.0237***	
		(11.473)	(6.076)	
PASTBBCAR	0.0066	0.0058	0.0055	0.1530
	(0.329)	(0.324)	(0.206)	(0.745)
DEALS3YEARS	0.0012**	0.0014***	0.0019***	0.0122***
	(2.243)	(3.176)	(2.639)	(4.774)
RDS	0.0145***	0.0134***	0.0150***	-0.0193
	(5.452)	(5.856)	(5.231)	(-1.359)
LNIS	0.0052	-0.0003	0.0006	0.0209***
	(0.444)	(-0.034)	(0.048)	(3.891)
ATobinsQ	0.0012	0.0012	0.0018*	0.0096***
	(1.303)	(1.447)	(1.821)	(3.692)
AROA	-0.0364**	-0.0247	-0.0348*	-0.0816**
	(-1.985)	(-1.553)	(-1.710)	(-2.225)
ALEVERAGE	0.0139	0.0033	0.0040	-0.0173
	(1.093)	(0.302)	(0.278)	(-0.515)
SIXTH	0.0052	0.0064**	0.0082*	0.0344**
	(1.519)	(2.156)	(1.922)	(2.277)
LOGME	0.0056***	0.0039**	0.0040	0.0106***
	(2.626)	(2.090)	(1.489)	(3.044)
mean_IEVT	0.0131	-0.2668***	-0.0965***	
	(0.523)	(-9.928)	(-2.628)	
mean_L1_ARSV	0.5485***	0.3587***	0.5296***	
	(18.098)	(15.102)	(9.935)	
mean_L1.ADVISORCHOICE		0.0451***		
		(12.851)		
mean_PASTBBCAR	-0.0594	-0.0483	-0.0675	
	(-1.046)	(-1.003)	(-1.103)	
Year fixed effects	Yes	Yes	Yes	Yes
Fixed effects	Yes	Yes	Yes	No
Instrumented	No	No	L1.ADVISORCHOICE	ADVISED
N	21,402	21,402	21,402	21,402
No. of Acquirers	5,344	5,344	5,344	5,344
Chi² statistic	4,240.89	4,864.00	1,700.55	442.03
p-value	0.0000	0.0000	0.0000	0.0000
corr(c_i, x_{it})	0.1144	0.0489	0.0879	
Chi²-statistic γ=0	623.30	783.74	1,244.06	
p-value	0.0000	0.0000	0.0000	
Chi² of exogeneity			6.17	7.22
p-value of exogeneity			0.0130	0.0072

Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 11 (cont.): Sensitivity analysis

Table 11 Panel B shows the sensitivity analysis of the probability of a successor bid. The dependent variable is SUCCESSORBID. SUCCESSORBID is a dummy (0/1) and 1 if the current bid is succeded by another bid of the same bidder. ADVISED serves as selection dummy in biprobit regressions with selection (3) and (4) (Greene, 2008a, 2008b). The instruments for ADVISED are identical to regression (2) in table 5. The variables are summarized in table 2 and described in table C. The coefficients are the marginal effects at the mean on P(SUCCESSORBID=1). The standard errors of probit panel regressions (1) and (2) are based on the observed information matrix, the inverse Hessian, after maximum likelihood estimation (Efron & Hinkley, 1978). In biprobit regressions (3) and (4) the Huber & White sandwich estimator clustered by acquirers is used to correct the standard errors (Huber, 1967; White, 1980). Year fixed effects are included but not reported. The fixed effects in regressions (3) and (4) based on (Mundlak, 1978) are reported if they are meaningful. The diagnostic statistics of the models' fit, the correlation of fixed effects c_i with explanatory variables x_{it} and the test of significance of fixed effects' regressor γ=0 are shown.

Panel B: SUCCESSORBID	(1)	(2)	(3)	(4)
		SUCCESSORBID		
VARIABLES	FE panel probit	FE panel probit	biprobit with selection	
IEVT	-0.0945***	-0.0932***	0.0807**	0.0816**
	(-2.672)	(-2.631)	(2.182)	(2.217)
ARSV	-0.2811***		0.2183***	
	(-6.673)		(5.467)	
OLDADVISOR		-0.1111***		0.1172***
		(-7.068)		(7.234)
PASTBIDDERCAR	-0.1169***	-0.1134***	0.1617*	0.1592*
	(-2.713)	(-2.626)	(1.888)	(1.832)
RDS	-0.0394***	-0.0392***	-0.0872***	-0.0867***
	(-5.401)	(-5.368)	(-9.262)	(-9.130)
LNIS	-0.4497***	-0.4517***	0.0097	0.0091
	(-12.166)	(-12.213)	(1.501)	(1.402)
ATobinsQ	0.0523***	0.0527***	0.0156***	0.0152***
	(18.009)	(18.160)	(4.480)	(4.356)
AROA	-0.3468***	-0.3500***	0.3055***	0.3061***
	(-8.747)	(-8.833)	(7.492)	(7.513)
ALEVERAGE	-0.2743***	-0.2760***	0.0877**	0.0893**
	(-8.408)	(-8.457)	(2.454)	(2.486)
SIXTH	-0.5002***	-0.5026***	0.1961***	0.1941***
	(-42.885)	(-43.136)	(12.207)	(12.179)
mean_IEVT	0.2238***	0.1594***		
	(4.216)	(2.966)		
mean_ARSV	0.9945***			
	(10.879)			
mean_OLDADVISOR		0.4858***		
		(14.507)		
mean_PASTBBCAR	1.3373***	1.3306***		
	(13.243)	(13.155)		
Year fixed effects	Yes	Yes	Yes	Yes
Fixed effects	Yes	Yes	No	No
Instrumented	No	No	ADVISED	ADVISED
N	31,954	31,954	31,954	31954
No. of Acquirers	10,280	10,280	10,280	10280
Chi² statistic	6,320.89	6,320.89	971.99	994.6615
p-value	0.0000	0.0000	0.0000	0.0000
corr(c_i, x_{it})	0.0000	0.0000		
Chi²-statistic γ=0	4,125.98	4,125.98		
p-value	0.0000	0.0000		
Chi² of exogeneity			5.76	5.82
p-value of exogeneity			0.0164	0.0158

Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 11 (cont.): Sensitivity analysis

Table 11 panel C shows the sensitivity analysis of biprobit simultaneous equation systems (Heckman, 1978) of the current bid being succeded by another bid and hiring or retaining an old advisor. The dependent variables are SUCCESSORBID and OLDADVISOR. SUCCESSORBID is a dummy and 1 if the current bid of the serial bidder is succeded by another bid. OLDADVISOR is a dummy (0/1) and 1 if the chosen bank advised the bidder within the last three years and 0 for unfamiliar banks and unadvised deals. The variables are summarized in table 2 and described in table C in the statistical appendix. The regression equations for SUCCESSORBID and OLDADVISOR are identical to the regression equations in table 11 panels A and B. The coefficients in (3) and (6) are the marginal effects at the mean of the joint probability P(SUCCESSORBID=1 & OLDADVISOR=1). In the biprobit simultaneous equation systems the Huber & White sandwich estimator clustered by acquirers is used to correct the standard errors (Huber, 1967; White, 1980). Year fixed effects are included but not reported.

Panel C: Biprobit simultaneous equation system	(1)	(2)	(3)	(4)	(5)	(6)
	SUCCESSORBID & OLDADVISOR					
	System 1			System 2		
VARIABLES	SUCCESSORBID	OLDADVISOR	joint probability	SUCCESSORBID	OLDADVISOR	joint probability
IEVT		2.9186***	0.5691***	-0.0328	3.2804***	-0.0533
		(13.250)	(23.858)	(-0.322)	(26.056)	(-1.591)
OLDADVISOR	1.0927***		0.4137***			
	(5.431)		(23.241)			
L1.ARSV		1.7401***	0.3393***		1.9273***	-0.0256**
		(10.834)	(14.655)		(15.048)	(-2.485)
PASTBIDDERCAR	0.2388*		0.0904*	0.1562		0.0463
	(1.704)		(1.688)	(1.086)		(1.085)
PASTBBCAR		0.1393	0.0272		0.0079	-0.0001
		(0.436)	(0.434)		(0.023)	(-0.023)
DEALS3YEARS		0.0117	0.0023		-0.0027	0.0000
		(1.536)	(1.445)		(-0.408)	(0.401)
RDS	-0.2864***	0.2431***	-0.0610***	-0.2410***	0.2267***	-0.0745***
	(-11.495)	(8.181)	(-2.886)	(-9.661)	(7.652)	(-9.940)
LNIS	0.0243**	0.1195***	0.0325***	0.0356***	0.1122***	0.0091***
	(2.085)	(5.695)	(6.172)	(3.127)	(5.401)	(2.582)
ATobinsQ	0.0630***	-0.0018	0.0235***	0.0737***	0.0148*	0.0217***
	(7.147)	(-0.189)	(3.569)	(9.063)	(1.713)	(8.550)
AROA	0.0663	0.1093	0.0464	0.1323*	-0.0927	0.0404*
	(0.912)	(0.804)	(1.506)	(1.857)	(-0.731)	(1.909)
ALEVERAGE	0.2070***	-0.1837*	0.0426	0.2088***	-0.2181**	0.0648***
	(3.200)	(-1.677)	(1.390)	(3.271)	(-1.995)	(3.411)
SIXTH	0.3497***	0.0405	0.1403***	0.4139***	0.0832**	0.1216***
	(11.080)	(0.957)	(4.504)	(16.766)	(1.983)	(14.118)
Constant	0.3351***	-2.5647***		0.3149***	-2.4397***	
	(4.474)	(-4.998)		(4.172)	(-4.307)	
Year fixed effects	No	Yes	Yes	No	Yes	Yes
Fixed effects	No	No	No	No	No	No
N	21,402	21,402	21,402	21,402	21,402	21,402
No. of Acquirers	5,344	5,344	5,344	5,344	5,344	5,344
Chi² statistic	3,531.33	3,531.33		2,647.35	2,647.35	
p-value	0.0000	0.0000		0.0000	0.0000	
Chi² of exogeneity	13.10	13.10		5.40	5.40	
p-value of exogeneity	0.0003	0.0003		0.0201	0.0201	

Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1

3.9 Discussion and conclusion

The analysis shows that the choice of the advising investment bank particularly by its familiarity with the bidder has a positive effect on the probability of a successor transaction and the formation of acquisition sequences. Similar to the neoclassical theory of mergers and acquisitions those companies are more likely to make successive acquisitions that are more profitable and have better investment opportunities (Harford, 2005; Andrade & Stafford, 2004; Klasa & Stegemoller, 2007). The process of bank advisor hiring and retention, banks' accumulation of expertise and client relationships and the increasing likelihood of successor transactions is self-enforcing over several rounds of repeated interaction.

Since investment banks are paid for advising M&As, which includes the finding of targets for bidders, their incentives are strong to get access to the information necessary to match bidders and targets. These monetary incentives are the economic rationale behind the building of advisory relationships with serial bidders who make the largest and most frequent transactions (Anand & Galetovic, 2006; Chemmanur & Fulghieri, 1994). The loop of the decision whether to employ a bank as advisor and which bank to choose in particular is repeated over successive transactions with an increasing likelihood of the employment of a familiar bank in each M&A. Furthermore, the bidder-bank matches later in acquisition sequences are more often between frequent bidders and more experienced bulge-bracket banks. The empirical observations are in line with the theoretical argument that bulge-bracket banks more often form advisory relationships with serial bidders (Anand & Galetovic, 2006). This empirical support is driven by the observation that banks with a greater industry expertise and advisory relationship strength are more likely to be chosen as advisors in advised deals. Over the course of advising transactions banks accumulate industry expertise and form stronger advisory relationships. Finally these related and repeated decisions increase the probability of successor transactions and thus the formation of acquisition sequences and the hierarchical separation of the investment banking market with the more experienced bulge-bracket banks at the top advising repeat bidders with the largest investment opportunity sets. Whether the repeated interaction between frequent bidding companies and familiar investment banks advising these companies to exploit their investment opportunities is beneficial for serial bidders requires further research, shown in the previous chapter. The past performance is positively related to the probability of hiring bank advisors and extending the acquisition series.

4. A Three-step Heckit estimator for panel data with fixed effects - An application to bidders' advisor choice and returns in acquisition sequences

4.1 Introduction

This study introduces a Three-step Heckit estimator for panel data with fixed effects to control two-step sequential selection applied in a panel of acquisition sequences. The first two steps analyze sequential double selection with a bivariate probit model with selection (Greene, 2008b). The concept of sequential double selection was introduced by (Tunali, Behrman, & Wolfe, 1980) and the bivariate probit model with selection formalized and applied by (van de Ven & van Praag, 1981). The bivariate probit model is used to estimate the regressions' coefficients of the first and second selection equation. The estimated coefficients of the selection equations are needed to compute the inverse mills ratios that are added as selection correction factors in the third step structural regression estimated with pooled OLS. The Three-step Heckit estimator for panel data extends the methodology to correct for selection of (Wooldridge, 1995) by replacing the first step univariate probit model with a bivariate probit model with selection to derive two inverse mills ratios instead of one. The derivation of the estimator reveals that the Heckit Two-step estimator of (Wooldridge, 1995) is just a special case of the more general Three-step estimator if only one selection regression is significant with no correlation between the selection regressions. The resulting Three-step Heckit estimator is suitable for pooled and panel data and can be adapted to control for fixed effects, for instance with the (Mundlak, 1978) correction as one method in line with the linear fixed effects assumption of (Chamberlain, 1980). The asymptotic variance of the estimated regression coefficients of the third step structural equation can be adjusted for heteroscedasticity arising from sample estimation of the inverse mills ratios and serial correlation with the formulas of (Wooldridge, 1995; 2002c) or by bootstrapping (Adkins & Hill, 2004; Efron, 1979; Hill, Adkins, & Bender, 2003). In this study bootstrapping with 1,000 repetitions incorporating the panel structure is used, because it is easy to implement.

The first and second step selection equations are estimated with exclusion restrictions taken from the mergers and acquisitions (M&A) literature analyzing the influence of bank advisors (Li & Prabhala, 2007; Golubov, Petmezas, & Travlos, 2012). The estimation of the influence of chosen bank advisors' expertise in the target's industry and the strength of their client relationship with the acquirer in M&As reveals the positive effect of banks' expertise on bidders' returns while correction for sequential two-step selection. The three studies that also observe a positive influence of advising investment banks on the acquirers' returns are (Kale, Kini, & Ryan, 2003), (Sibilkov & McConnell, 2013) and (Golubov, Petmezas, & Travlos, 2012).

In this study the advisory skills of investment banks are not assumed to be represented by a measure of reputation, the SDC Top-50 M&A League Table market share MS (Ma, 2005; Rau, 2000; Kale, Kini, & Ryan, 2003; Hunter & Jagtiani, 2003). The SDC M&A League Table market share MS is biased against smaller banks. Banks also ratchet up their SDC League Table rankings (Derrien & Dessaint, 2012). Modeling the expertise directly makes it possible to compare all 1,854 banks in the sample on an industry level. The banks' industry expertise modeled as the fraction of M&As advised in the target's (Fama & French, 1997) industry in the previous three years approximates their relative advisory experience compared to other banks and access to industry information. This direct measure of advisory skills is adapted and advanced from (Sibilkov & McConnell, 2013) and (Chang, Shekhar, Tam, & Zhu, 2013) and used in the previous chapters as well. The average industry expertise of bulge-bracket banks is three times larger than the average industry expertise of more specialized non-bulge-bracket banks, whereas their league table market share is ten times larger (Song, Zhou, & Wei, 2013). The acquirer-advisor relationship strength over the past three years with the bidders is adapted and calculated in every year (Benveniste, Busaba, & Wilhelm, 2002; Sibilkov & McConnell, 2013; Chang, Shekhar, Tam, & Zhu, 2013; Forte, Iannotta, & Navone, 2010).

The positive influence the advising bank's industry expertise and advisory relationship strength have on the returns differs from the at best mixed observations previous studies made. Hiring a bank that has advised one more deal in the target industry in the last 3 years is associated with an equity gain of 965,800 to 1,668,200 dollar. Hiring a bank advisor that has advised one more deal of the bidder in the last 3 years has a positive equity effect of 790,200 to 1,053,600 dollar. Compared to an average equity increase of 7,463,000 dollar around the acquisition announcement it is economic beneficial to hire more experienced and familiar bank advisors. (Bao & Edmans, 2011) observe an inverse relationship between the bidder's returns and the M&A league table ranking of investment banks. Earlier studies such as (Rau, 2000), (Servaes & Zenner, 1996) and (Hunter & Jagtiani, 2003) find mixed results regarding the benefits in terms of a better performance that M&A advisors provide.

For the Three-step Heckit analysis of the bidders' returns a panel of 30,908 bids or acquisitions with 31,954 observations is used, one to six for 7,840 advised deals with 8,886 bid-bank matches and 23,068 unadvised deals. The panel includes acquisition series of 1 to 98 M&As from 1979 to 2006 by 10,280 bidders. The panel is constructed from the SDC M&A, Compustat and CRSP databases. The bivariate probit model with selection is estimated on a sample of 9,749,781 potential bid-bank matches composed of the 30,908 deals matched annually with all possible bank advisors in the SDC M&A sample. The SDC M&A sample includes 1,854 different M&A advisors, or 45 to 392 per year.

In which way the empirical observations are obtained with the developed Three-step Heckit estimator is subject of the next sections. Section 2 discusses the theory development of the three-step Heckit estimator for panel data. Section 3 includes the empirical application of the Three-step Heckit estimator on the decision whether to hire an investment bank as M&A advisor at all, which bank to choose as advisor in particular, and the effect of the hiring decision on acquisition performance. Section 4 includes the discussion and conclusion. The econometric appendices E.3 to E.6 include the derivations and proofs, the statistical appendix additional tables of the annually estimated bivariate selection regressions.

4.2 The Three-step Heckit estimator

Modeling banks' advisory skills by their industry expertise and advisory relationship strength the influence of these skill approximations on the cumulative announcement returns (CAR) y_{itj}^{3} can be observed only for those banks that are hired as M&A advisors y_{itj}^{2} by the acquirer in his bid or acquisition y_{it}^{1} such that the problem is to estimate $\mathrm{E}\left(y_{itj}^{3} \mid y_{itj}^{2}=1 \cap \mathrm{y}_{it}^{1}=1\right)$. This estimation problem inspired the development of the Three-step Heckit estimator.

The general Three-step Heckit estimator for a panel $N \times T$ of $i=1,\ldots,N$ individuals each having a times series $t=1,\ldots,T$ of observations of continuous random variables $\left(y_{it}^{3} \in \left\{Y^{3}: \Omega \rightarrow R\right\}\right)_{N \times T}$ begins with the sequential selection problem that observations y_{it}^{3} can be observed only for the binary random variable $\left(y_{it}^{2} \in \left\{Y^{2}: 0,1\right\}\right)_{N \times T}$, which itself can be observed only if the binary random variable $\left(y_{it}^{1} \in \left\{Y^{1}: 0,1\right\}\right)_{N \times T}$ is observed. In this sequential selection process first the three outcome possibilities $P\left(y_{it}^{2}=1 \mid \mathrm{y}_{it}^{1}=1\right)$, $P\left(y_{it}^{2}=0 \mid \mathrm{y}_{it}^{1}=1\right)$ and $P\left(\mathrm{y}_{it}^{1}=0\right)=P\left(\mathrm{y}_{it}^{2}=0 \cap \mathrm{y}_{it}^{1}=0\right)$ have to be estimated. The three outcome probabilities of the selection process are modeled by the familiar bivariate probit model with selection (van de Ven & van Praag, 1981; Maddala, 1983b; Greene, 2008b). The two selection equations are $y_{it}^{1}=z_{it}^{\prime}\gamma+u_{it}$ [1] and $y_{it}^{2}=x_{it}^{\prime}\beta+\varepsilon_{it}$ [2]. According to (Greene, 2008a; 2008b) the conditional probability $P\left(y_{it}^{2}=1 \mid \mathrm{y}_{it}^{1}=1\right)=\dfrac{\Phi_{2}\left(x_{it}^{\prime}\beta, z_{it}^{\prime}\gamma, \rho_{\mathrm{UE}}\right)}{\Phi\left(z_{it}^{\prime}\gamma\right)}$ with correlation $\rho_{\mathrm{UE}}=cor(\mathrm{U},\mathrm{E})=\dfrac{\sigma_{\varepsilon u}}{\sigma_{\varepsilon}\sigma_{u}}=\sigma_{\varepsilon u}=\operatorname{cov}(\mathrm{U},\mathrm{E})$, $U=\left(u_{it}\right)_{N \times T}$ and $\mathrm{E}=\left(\varepsilon_{it}\right)_{N \times T}$, is used to build up the likelihood function with the unconditional probabilities of the three possible outcomes. The first assumption of the bivariate probit model with selection is:

Assumption 1:

1a) $\varepsilon_{it}, u_{it} \approx N(0,\Sigma)$ with $\Sigma = \begin{pmatrix} 1 & \sigma_{\varepsilon u} \\ \sigma_{\varepsilon u} & 1 \end{pmatrix}$ as $Var[\varepsilon_{it} \mid x_{it}, z_{it}] = Var[u_{it} \mid x_{it}, z_{it}] = 1$

and

1b) $E[\varepsilon_{it} \mid x_{it}, z_{it}] = E[u_{it} \mid x_{it}, z_{it}] = 0$

The three possible outcomes and their unconditional probabilities are:

$y_{it}^1 = 0 : \mathrm{P}(y_{it}^1 = 0 \mid x_{it}, z_{it}) = 1 - \Phi(z_{it}'\gamma)$

$y_{it}^2 = 0, y_{it}^1 = 1 : \mathrm{P}(y_{it}^2 = 0, y_{it}^1 = 1 \mid x_{it}, z_{it}) = \Phi_2(-x_{it}'\beta, z_{it}'\gamma, -\rho_{\mathrm{UE}})$ [7]

$y_{it}^2 = 1, y_{it}^1 = 1 : \mathrm{P}(y_{it}^2 = 1, y_{it}^1 = 1 \mid x_{it}, z_{it}) = \Phi_2(x_{it}'\beta, z_{it}'\gamma, \rho_{\mathrm{UE}})$

The likelihood function from (Greene, 2008b) and (van de Ven & van Praag, 1981) of the bivariate probit model with selection adapted to a panel is

$$L = \prod_{i=1}^{n_1} \prod_{t=1}^{t_1} \left(1 - \Phi(z_{it}'\gamma)\right) \times \prod_{i=n_1+1}^{n_2} \prod_{t=t_1+1}^{t_2} \Phi_2(-x_{it}'\beta, z_{it}'\gamma, -\rho_{\mathrm{UE}}) \times \prod_{i=n_2+1}^{N} \prod_{t=t_2+1}^{T} \Phi_2(x_{it}'\beta, z_{it}'\gamma, \rho_{\mathrm{UE}})$$

---

[7] $\Phi(x_{it}'\beta)$ and $\Phi(z_{it}'\gamma)$ are the univariate normal cumulative distribution functions and $\Phi_2(z_{it}'\gamma, x_{it}'\beta, \rho_{UE})$ denotes the bivariate normal cumulative distribution function $\mathrm{Prob}(Y^1 < z_{it}'\gamma, Y^2 < x_{it}'\beta) = \int_{-\infty}^{z_{it}'\gamma} \int_{-\infty}^{x_{it}'\beta} \phi_2(\delta_1, \delta_2, \rho_{UE})\, d\delta_1 d\delta_2$ with the bivariate normal probability density function $\phi_2(z_{it}'\gamma, x_{it}'\beta, \rho_{UE})$ (Greene, 2008c; 2008a). $\phi(x_{it}'\beta)$ and $\phi(z_{it}'\gamma)$ are the univariate normal probability density function (See econometric appendix E.3).

where the first $n_1 \times t_1$ observations y_{it}^1 are unobserved with $\left(y_{it}^1 = 0\right)_{n_1 \times t_1}$, the following $\left(n_2 - n_1\right) \times \left(t_2 - t_1\right)$ observations y_{it}^1 are observed but not y_{it}^2 such that $\left(y_{it}^2 = 0 \cap y_{it}^1 = 1\right)_{\left(n_2 - n_1\right) \times \left(t_2 - t_1\right)}$, and the last $\left(N - n_2\right) \times \left(T - t_2\right)$ observations y_{it}^1 and y_{it}^2 are observed such that $\left(y_{it}^2 = 1 \cap y_{it}^1 = 1\right)_{\left(N - n_2\right) \times \left(T - t_2\right)}$.

From the bivariate probit model with selection estimated on sample A of size $N \times T$ the consistently estimated regression coefficient vectors $\hat{\gamma}$ and $\hat{\beta}$ are used to calculate the bivariate inverse mills ratios $\lambda_{it}^1 = \frac{\phi\left(z_{it}'\gamma\right)\Phi\left(\frac{x_{it}'\beta - \rho_{\mathrm{UE}} z_{it}'\gamma}{\sqrt{1 - \rho_{\mathrm{UE}}^2}}\right)}{\Phi_2\left(z_{it}'\gamma, x_{it}'\beta, \rho_{\mathrm{UE}}\right)}$ and $\lambda_{it}^2 = \frac{\phi\left(x_{it}'\beta\right)\Phi\left(\frac{z_{it}'\gamma - \rho_{\mathrm{UE}} x_{it}'\beta}{\sqrt{1 - \rho_{\mathrm{UE}}^2}}\right)}{\Phi_2\left(z_{it}'\gamma, x_{it}'\beta, \rho_{\mathrm{UE}}\right)}$ according to (Maddala, 1983b; Poirier, 1980) and the univariate inverse mills ratios $\lambda_{it}^3 = \frac{\phi\left(z_{it}'\gamma\right)}{\Phi\left(z_{it}'\gamma\right)}$ and $\lambda_{it}^4 = \frac{\phi\left(x_{it}'\beta\right)}{\Phi\left(x_{it}'\beta\right)}$ according to (Heckman, 1979; 1976). The univariate inverse mills ratios are needed if correlation $\rho_{\mathrm{UE}} = 0$. The selection equations can be estimated separately with univariate probit models if they are uncorrelated (Maddala, 1983b). Furthermore, the bivariate inverse mills ratios converge in the limit for $\rho_{\mathrm{UE}} \to 0$ to the univariate inverse mills ratios, which is shown in econometric appendix E.3. If the bivariate normal cumulative distribution function $\Phi_2\left(x_{it}'\beta, \mathrm{z}_{it}'\gamma, \rho_{\mathrm{UE}}\right) = 0$ the random variables Y^1 and Y^2 are independent as the probability of their simultaneous observation $P\left(Y^1 = 1 \cap Y^2 = 1\right)$ is zero. In this case the denominator of the bivariate inverse mills ratios is zero, such that the bivariate inverse mills ratios do not exist. Hence if $\Phi_2\left(x_{it}'\beta, z_{it}'\gamma, \rho_{UE}\right)=0$ the univariate inverse mills ratios λ_{it}^3 and λ_{it}^4 are inserted into structural equation $y_{it}^3=\alpha_{it}'\delta+v_{it}$ $[3]$. The limit of the bivariate inverse mills ratios is useful, as will be shown, for observations with $\Phi_2\left(x_{it}'\beta, z_{it}'\gamma, \rho_{UE}\right)=0$ that would otherwise drop out of the sample if their missing bivariate inverse mills ratios are not replaced by their univariate counterparts.

The concept of the Three-step Heckit estimator for panel data is derived for a balanced panel of dimension $N \times T$, where T is fixed and $N \rightarrow \infty$ to derive the asymptotic properties, with sufficient observations in each time period t to estimate L_t. The Three-step Heckit estimator works for unbalanced panels as well. In the procedure of (Wooldridge, 1995) the likelihood function L_t is estimated for each time period t to obtain the time period specific coefficient vectors $\hat{\gamma}_t$ and $\hat{\beta}_t$ as well as correlation coefficients $\hat{\rho}_{UE,t}$ to calculate the inverse mills ratios. If the sample is unbalanced the coefficient vectors, correlation coefficients and inverse mills ratios differ in their estimation by the number of individuals i per time period t. This might be a problem if few observations for some time periods are available with the inverse mills ratio being weakly estimated. The problem of insufficient observations for some time periods in unbalanced panels is mitigated by calculating the inverse mills ratios for each observation it with time invariant coefficients $\hat{\gamma}$, $\hat{\beta}$ and $\hat{\rho}_{UE}$ obtained from a time series pooled estimator of the likelihood function L.

Likelihood function L of the bivariate probit model with selection can be estimated for each time period and pooled as well if unobserved fixed effects ζ_i^1 or ζ_i^2 in selection equations [1] or [2] exist (Wooldridge, 2002e). To correct for selection biases in panels with fixed effects the assumptions of (Wooldridge, 1995) are extended to the case of two selection equations with binary selection indicators Y^1 and Y^2:

<u>Assumption 2:</u>

2a) $E\left(v_{it} \mid \alpha_{i(t_2+1)},...,\alpha_{iT},u_{it},\varepsilon_{it}\right)=E\left(v_{it} \mid u_{it},\varepsilon_{it}\right)=L\left(v_{it} \mid u_{it},\varepsilon_{it}\right)=\kappa^1 g\left(u_{it}\right)+\kappa^2 g\left(\varepsilon_{it}\right)$ for $t=t_2+1,...,T$

2b) $E\left(\xi_i \mid \alpha_{i(t_2+1)},...,\alpha_{iT},\varepsilon_{it},u_{it}\right)=L\left(\xi_i \mid 1,\alpha_{i(t_2+1)},...,\alpha_{iT},\varepsilon_{it},u_{it}\right)$

2c) $y_{it}^1 = z_{it}'\gamma + u_{it} + \zeta_i^1$

2d) $y_{it}^2 = x_{it}'\beta + \varepsilon_{it} + \zeta_i^2$

2e) $\zeta_i^1 = \eta_0 + z_{i1}\eta_1 + ... + z_{iT}\eta_T + c_i$

2f) $\zeta_i^2 = \tau_0 + x_{i1}\tau_1 + ... + x_{iT}\tau_T + o_i$

2g) $c_i, o_i \approx \mathrm{N}\left(0,\sigma^2\right)$

Assumption 2a implies with the linear operator $L\left(*|*\right)$ that v_{it} of [3] is a linear combination of the error terms u_{it} and ε_{it} of selection equations [1] and [2]. The derivation of the correction terms is shown in econometric appendix E.4. Assumption 2b implies with the linear operator that the unobserved fixed effect ξ_i of structural equation [3] is a linear combination of all explanatory variables $\left(1,\alpha_{i(t_2+1)},...,\alpha_{iT}\right)_{(N-n_2)\times(T-t_2)}$ and the error terms u_{it} and ε_{it}. Assumption 2b with 2e and 2f was imposed first by (Chamberlain, 1980) for unobserved effects in probit models and used by (Verbeek & Nijman, 1992). The linear predictor 2b allows correcting for selection, because it can be written for each t as

$$L\left(\xi_i \mid 1, \alpha_{i(t_2+1)}, \ldots, \alpha_{i(T)}, \varepsilon_{it}, u_{it}\right) = \psi_{t0} + \alpha_{i(t_2+1)}\psi_{t(t_2+1)} + \alpha_{i(t_2+2)}\psi_{t(t_2+2)} + \\ \ldots + \alpha_{i(T)}\psi_{t(T)} + \pi_t^1 \varepsilon_{it} + \pi_t^2 u_{it}$$

where ψ_{t0} is a scalar and ψ_{tr}, $r = t_2 + 1, \ldots, T$ are $K_3 \times 1$ vectors. From assumptions 2c and 2d as well as $E\left(\varepsilon_{it} \mid \alpha_{i(t_2+1)}, \ldots, \alpha_{iT}\right) = E\left(u_{it} \mid \alpha_{i(t_2+1)}, \ldots, \alpha_{iT}\right) = 0$ and $E\left(\varepsilon_{it}\varepsilon_{it} \mid \alpha_{i(t_2+1)}, \ldots, \alpha_{iT}\right) = E\left(u_{it}u_{it} \mid \alpha_{i(t_2+1)}, \ldots, \alpha_{iT}\right) = 1$ it follows that vectors ψ_{tr} are constant over t, independent of the selection equations' error terms ε_{it} and u_{it} [8]. Applying the law of iterated expectations the expectation of the fixed effect of structural equation [3] becomes:

$$\begin{aligned} E\left(\xi_i \mid \alpha_{i(t_2+1)}, \ldots, \alpha_{iT}, \varepsilon_{it}, u_{it}\right) &= \psi_{t0} + \alpha_{i(t_2+1)}\psi_{t(t_2+1)} + \alpha_{i(t_2+2)}\psi_{t(t_2+2)} + \ldots + \alpha_{iT}\psi_{tT} \\ &\quad + \pi_t^1 E\left(\varepsilon_{it} \mid \alpha_{i(t_2+1)}, \ldots, \alpha_{iT}\right) \\ &\quad + \pi_t^2 E\left(u_{it} \mid \alpha_{i(t_2+1)}, \ldots, \alpha_{iT}\right) \\ &= \psi_{t0} + \alpha_{i(t_2+1)}\psi_{t(t_2+1)} + \alpha_{i(t_2+2)}\psi_{t(t_2+2)} + \ldots + \alpha_{iT}\psi_{tT} \\ &= \psi_0 + \alpha_{i(t_2+1)}\psi_{(t_2+1)} + \alpha_{i(t_2+2)}\psi_{(t_2+2)} + \ldots + \alpha_{iT}\psi_T \end{aligned}$$

Structural equation $y_{it}^3 = \alpha_{it}'\delta + v_{it}$ [3] becomes $y_{it}^3 = \left(\alpha_{i(t_2+1)}, \ldots, \alpha_{iT}\right)\psi + \alpha_{it}'\delta + \varpi v_{it}$ [3'], such that δ can be identified. The same holds for selection equations [1] and [2]. Without the error term ϖv_{it} capturing selection equation [3'] would be

[8] If the error terms of the selection equations are heteroscedastic and correlated with the fixed effects, that are supposed to control for firm specific heterogeneity otherwise captured by those error terms, than the coefficients would be biased and the inverse mills ratios as well. Therefore, the fixed effects are assumed to be constant over time due to the absence of correlation with the remaining residuals, which otherwise would cause changing fixed effects to accommodate the serial correlation. Hence pooled Heckit estimators of panels without fixed effects are biased if the assumption of strict exogeneity, the absence of unobserved fixed effects, is not tested but violated.

comparable to (Chamberlain, 1982). Still the error term $E(\varpi v_{it}) \neq 0$ caused by selection has to be corrected, which refers to assumption 2a. The assumptions of the structure of the fixed effects and error terms allow for serial correlation and heteroscedasticity of v_{it} and serial correlation of ξ_i. No distributional assumptions about v_{it} and ξ_i are made. In selection equations of the form 2c and 2d the existence of unobserved fixed effects ζ_i^1 or ζ_i^2 is likely to cause serial correlation of the error terms ε_{it} and u_{it} as well if not corrected, violating the basic assumption of pooled probit of $E(\varepsilon_{it}\varepsilon_{ir}) = 0$ and $E(u_{it}u_{ir}) = 0$ for $r \neq t$ and $r, t = 1, ..., T$ according to (Wooldridge, 1995). If unobserved fixed effects ζ_i^1, ζ_i^2 or ξ_i are assumed an applicable correction in probit models and in pooled OLS is the (Mundlak, 1978) version of (Chamberlain, 1980) fixed effects assumption 2b, 2e, 2f and 2g as suggested by (Wooldridge, 1995; 2002e), (Nijman & Verbeek, 1992) and (Zabel, 1992). In the (Mundlak, 1978) version $\zeta_i^1 = \bar{z}_i'\eta + c_i$, $\zeta_i^2 = \bar{x}_i'\tau + o_i$ and $\xi_i = \bar{\alpha}_i'\psi + e_i$ are approximated with the time invariant means $\bar{z}_i$, $\bar{x}_i$ and $\bar{\alpha}_i$ of the explanatory variables z_{it}, x_{it} and α_{it} for each individual i. The (Mundlak, 1978) fixed effects are a close approximation of the classic fixed effects correction applied in feasible GLS estimation in which the time constant means are subtracted from the dependent and independent variables, the "within" estimator. Subtraction of fixed effects is unfeasible if the dependent variable is binary like Y^1 and Y^2 (Wooldridge, 2002d). Mean differencing to get the "within" estimator of structural equation [3] is unfeasible as well, because the period specific difference from the time constant mean of selection $-\rho_{\mathrm{UV}}\left(\lambda_{it}^1 - \bar{\lambda}_i^1\right) - \rho_{\mathrm{EV}}\left(\lambda_{it}^2 - \bar{\lambda}_i^2\right)$ is difficult to interpret and to estimate, because error terms ϖv_{it} in [3'] are differently correlated with u_{it} and ε_{it} in every period (See Assumption 2a) (Wooldridge, 1995; 2002e). With fixed effects and potentially serially correlated error terms ε_{it}, u_{it} and v_{it} the standard errors of the bivariate probit model and pooled OLS with selection have to be corrected using the robust variance estimators shown in econometric appendices E.5 and E.6 or by numerical methods such as bootstrapping or jackknifing (Adkins & Hill, 2004; Hill, Adkins, & Bender, 2003). If one assumes random effects assumptions 2b, 2e and 2f simplify to a constant with $\zeta_i^1 = \eta + c_i$ and $\zeta_i^2 = \tau + o_i$, which gives selection equations 2c and 2d of the form $y_{it}^1 = \eta + z_{it}'\gamma + \left(u_{it} + c_i\right)$ and $y_{it}^2 = \tau + x_{it}'\beta + \left(\varepsilon_{it} + o_i\right)$ (Wooldridge, 1995; Verbeek & Nijman, 1992; Nijman & Verbeek, 1992; Vella, 1998). Structural equation [3'] includes a constant under the assumption of random effects as well, such that $\xi_i = \psi + e_i$ and $y_{it}^3 = \psi + \alpha_{it}'\delta + \varpi\left(v_{it} + e_i\right)$.

In the third step the inverse mills ratios are added as correction factors to equation $y_{it}^3 = \left(\alpha_{i(t_2+1)}, \ldots, \alpha_{iT}\right)\psi + \alpha_{it}'\delta + \varpi v_{it}$ [3']. If $\rho_{\mathrm{UE}} = 0$ the selection equations are independent and the error term ϖv_{it} of structural equation $y_{it}^3 = \left(\alpha_{i(t_2+1)}, \ldots, \alpha_{iT}\right)\psi + \alpha_{it}'\delta + \varpi v_{it}$ [3'] is replaced by its expected value $E\left(v_{it} \mid \varepsilon_{it} > -x_{it}'\beta, u_{it} > -z_{it}'\gamma\right) = \rho_{\mathrm{UV}}\lambda_{it}^3 + \rho_{\mathrm{EV}}\lambda_{it}^4$ to get $y_{it}^3 = \left(\alpha_{i(t_2+1)}, \ldots, \alpha_{iT}\right)\psi + \alpha_{it}'\delta + v_{it}^* + \rho_{\mathrm{UV}}\lambda_{it}^3 + \rho_{\mathrm{EV}}\lambda_{it}^4$ [4] (Maddala, 1983b). If $\rho_{\mathrm{UE}} \neq 0$ the expected value of the error term ϖv_{it} is $E\left(v_{it} \mid \varepsilon_{it} > -x_{it}'\beta, u_{it} > -z_{it}'\gamma\right) = \rho_{\mathrm{UV}}\lambda_{it}^1 + \rho_{\mathrm{EV}}\lambda_{it}^2$ and one gets $y_{it}^3 = \left(\alpha_{i(t_2+1)}, \ldots, \alpha_{iT}\right)\psi + \alpha_{it}'\delta + v_{it}^* + \rho_{\mathrm{UV}}\lambda_{it}^1 + \rho_{\mathrm{EV}}\lambda_{it}^2$ [5] with $\sigma_V = \sqrt{\mathrm{var}(V)}$, $V = \left(v_{it}\right)_{(N-n_2)\times(T-t_2)}$, $V^* = \left(v_{it}^*\right)_{(N-n_2)\times(T-t_2)} = \left(v_{it} + e_i\right)_{(N-n_2)\times(T-t_2)}$, $\rho_{\mathrm{UV}} = cor\left(U, V\right)$, $\rho_{\mathrm{EV}} = cor\left(\mathrm{E}, V\right)$ (Heckman, 1976; 1979; Maddala, 1983b). The derivation of the correction terms is shown in econometric appendix E.4. The implicit assumption is that covariances ρ_{UV} and ρ_{EV} are constant over time t. If the influence of selection in each time period $t = t_2 + 1,...,T$ is assumed to be different the period specific regression coefficients $d_{(t_2+1)} \times \left(\rho_{\mathrm{UV},(t_2+1)} \lambda^1_{i(t_2+1)} + \rho_{E\mathrm{V},(t_2+1)} \lambda^2_{i(t_2+1)} \right) + ... + d_T \times \left(\rho_{\mathrm{UV,T}} \lambda^1_{iT} + \rho_{E\mathrm{V,T}} \lambda^2_{iT} \right)$ with d_t being time dummies are inserted into [4] and [5] as suggested by (Wooldridge, 1995; 2002e).

The finally estimated regression equations with the simply to apply (Mundlak, 1978) fixed effects are $y^3_{it} = \alpha'_{it}\delta + \bar{\alpha}'_i \psi + \rho_{\mathrm{UV}} \hat{\lambda}^1_{it} + \rho_{\mathrm{EV}} \hat{\lambda}^2_{it} + v^*_{it}$ [4] and $y^3_{it} = \alpha'_{it}\delta + \bar{\alpha}'_i \psi + \rho_{\mathrm{UV}} \hat{\lambda}^3_{it} + \rho_{\mathrm{EV}} \hat{\lambda}^4_{it} + v^*_{it}$ [5] where $\bar{\mathrm{A}} = \left(\bar{\alpha}_i \right)_{(N-n_2)x1}$ is the vector of time constant means of individuals $i = n_2 + 1,...,N$ of explanatory variables $\mathrm{A} = \left(\alpha_{it} \right)_{(N-n_2)\times(T-t_2)}$ and $\hat{\lambda}^1_{it} = \dfrac{\phi\left(z'_{it}\hat{\gamma}\right)\Phi\left(\dfrac{x'_{it}\hat{\beta} - \hat{\rho}_{\mathrm{UE}} z'_{it}\hat{\gamma}}{\sqrt{1-\hat{\rho}_{\mathrm{UE}}{}^2}} \right)}{\Phi_2\left(z'_{it}\hat{\gamma}, x'_{it}\hat{\beta}, \hat{\rho}_{\mathrm{UE}} \right)}$,
$\hat{\lambda}^2_{it} = \dfrac{\phi\left(x'_{it}\hat{\beta}\right)\Phi\left(\dfrac{z'_{it}\hat{\gamma} - \hat{\rho}_{\mathrm{UE}} x'_{it}\hat{\beta}}{\sqrt{1-\hat{\rho}_{\mathrm{UE}}{}^2}} \right)}{\Phi_2\left(z'_{it}\hat{\gamma}, x'_{it}\hat{\beta}, \hat{\rho}_{\mathrm{UE}} \right)}$, $\hat{\lambda}^3_{it} = \dfrac{\phi\left(z'_{it}\hat{\gamma}\right)}{\Phi\left(z'_{it}\hat{\gamma}\right)}$ and $\hat{\lambda}^4_{it} = \dfrac{\phi\left(x'_{it}\hat{\beta}\right)}{\Phi\left(x'_{it}\hat{\beta}\right)}$ are the sample estimates of the inverse mills ratios. Equations [4] and [5] are estimated consistently by pooled OLS on subsample B with selection $\left(y^2_{it} = 1 \cap y^1_{it} = 1 \right)$ of size $\left(N - n_2\right) \times \left(T - t_2\right)$ (Wooldridge, 1995; 2002e). After correcting for unobserved fixed effects and sequential selection no distributional assumptions about v^*_{it} are made, but still $E\left(v^*_{it} \mid \alpha_{it}, \bar{\alpha}_i, \hat{\lambda}^3_{it}, \hat{\lambda}^4_{it} \right) = E\left(v^*_{it} \mid \alpha_{it}, \bar{\alpha}_i, \hat{\lambda}^1_{it}, \hat{\lambda}^2_{it} \right) = 0$.

The variance-covariance matrices of [4] and [5] have to be adjusted for heteroscedasticity, because the sample inverse mills ratios are estimated and the true population inverse mills ratios are unknown (Wooldridge, 1995; Heckman, 1979). The correlation of ξ_i with $\bar{\alpha}_i$ as $\xi_i = \bar{\alpha}_i'\psi + e_i$ requires adjustment of the standard errors as well. The variance-covariance matrix of the bivariate probit model without fixed effects for instance can be estimated with the observed information matrix (OIM), the inverse Hessian matrix, or with the adjusted sandwich estimator clustered by individuals $i = 1,...,N$ if fixed effects matter (Huber, 1967; Efron & Hinkley, 1978; Wooldridge, 1995; 2002e; White, 1980). Bootstrapping clustered by individuals $i = 1,...,N$ who are grouped by their time series of observations $t = 1,...,T$ to control for the panel structure and serial correlation of the error terms is another option (Efron, 1979). The variance-covariance matrices of equations [4] and [5] can for example be estimated by bootstrapping or jackknifing clustered by individuals $i = n_2 + 1,...,N$ grouped by their time series of observations $t = t_2 + 1,...,T$ to control for the panel structure and potential serial correlation of v_{it}^* as well (Adkins & Hill, 2004; Efron, 1979; Hill, Adkins, & Bender, 2003). The procedure to control and correct for two-step sequential selection with the Three-step Heckit estimator is therefore:

1.) Estimate selection equations $y_{it}^1 = z_{it}'\gamma + u_{it}$ [1] and $y_{it}^2 = x_{it}'\beta + \varepsilon_{it}$ [2], with [2] potentially depending on [1], where $\left(y_{it}^1 \in \left\{Y^1 : 0,1\right\}\right)_{N\times T}$ and $\left(y_{it}^2 \in \left\{Y^2 : 0,1\right\}\right)_{N\times T}$ are binary random variables, in a bivariate probit model with selection with the likelihood function

$$L = \prod_{i=1}^{n_1}\prod_{t=1}^{t_1}\left(1-\Phi\left(z_{it}'\gamma\right)\right) \times \prod_{i=n_1+1}^{n_2}\prod_{t=t_1+1}^{t_2}\Phi_2\left(-x_{it}'\beta, z_{it}'\gamma, -\rho_{\mathrm{UE}}\right) \times \prod_{i=n_2+1}^{N}\prod_{t=t_2+1}^{T}\Phi_2\left(x_{it}'\beta, z_{it}'\gamma, \rho_{\mathrm{UE}}\right)$$

. Estimate the likelihood function L for each time period t if the panel $N \times T$ is sufficiently balanced with enough observations i in each time period t to estimate $\hat{\gamma}_t$, $\hat{\beta}_t$ and $\hat{\rho}_{UE,t}$. If the panel is unbalanced and in some time periods the number of observations, particularly those affected by selection, is relatively small estimate L on the pooled sample to obtain time invariant estimates $\hat{\gamma}$, $\hat{\beta}$ and $\hat{\rho}_{UE}$. Control for potential heteroscedasticity with the adjusted sandwich estimator, by bootstrapping or jackknifing (See econometric appendix E.5). Sequential selection matters if $\rho_{UE} = cor(U, E)$ is significantly different from 0. If $\hat{\rho}_{UE} = 0$ or $\hat{\rho}_{UE,t} = 0$ estimate the selection equations separately with univariate probit models to calculate inverse mills ratios $\hat{\lambda}^3_{it}$ and $\hat{\lambda}^4_{it}$ according to (Heckman, 1976; 1979). If necessary one ought to control for fixed effects with $\zeta^1_i = \bar{z}'_i\eta + c_i$ and $\zeta^2_i = \bar{x}'_i\tau + o_i$ (Mundlak, 1978).

2.) Calculate the sample estimates of inverse mills ratios

$$\hat{\lambda}^1_{it} = \frac{\phi(z'_{it}\hat{\gamma})\Phi\left(\frac{x'_{it}\hat{\beta} - \hat{\rho}_{UE}z'_{it}\hat{\gamma}}{\sqrt{1-\hat{\rho}_{UE}^2}}\right)}{\Phi_2\left(z'_{it}\hat{\gamma}, x'_{it}\hat{\beta}, \hat{\rho}_{UE}\right)}, \qquad \hat{\lambda}^2_{it} = \frac{\phi\left(x'_{it}\hat{\beta}\right)\Phi\left(\frac{z'_{it}\hat{\gamma} - \hat{\rho}_{UE}x'_{it}\hat{\beta}}{\sqrt{1-\hat{\rho}_{UE}^2}}\right)}{\Phi_2\left(z'_{it}\hat{\gamma}, x'_{it}\hat{\beta}, \hat{\rho}_{UE}\right)},$$

$\hat{\lambda}^3_{it} = \dfrac{\phi(z'_{it}\hat{\gamma})}{\Phi(z'_{it}\hat{\gamma})}$ and $\hat{\lambda}^4_{it} = \dfrac{\phi\left(x'_{it}\hat{\beta}\right)}{\Phi\left(x'_{it}\hat{\beta}\right)}$ with $\hat{\theta}_t = \left\{\hat{\gamma}_t, \hat{\beta}_t, \hat{\rho}_{UE,t}\right\}$ or $\hat{\theta} = \left\{\hat{\gamma}, \hat{\beta}, \hat{\rho}_{UE}\right\}$.

3.) Insert inverse mills ratios $\hat{\lambda}^1_{it}$, $\hat{\lambda}^2_{it}$ or $\hat{\lambda}^3_{it}$, $\hat{\lambda}^4_{it}$ into structural equation $y^3_{it} = \alpha'_{it}\delta + \nu_{it}$ [3] with $\left(y^3_{it} \in \left\{Y^3 : \Omega \to R\right\}\right)_{(N-n_2)\times(T-t_2)}$ being a continuous random variable to estimate for instance with (Mundlak, 1978) fixed effects $y^3_{it} = \alpha'_{it}\delta + \bar{\alpha}'_i\psi + \rho_{UV}\hat{\lambda}^1_{it} + \rho_{EV}\hat{\lambda}^2_{it} + \nu^*_{it}$ [4] or

$y_{it}^3 = \alpha_{it}'\delta + \bar{\alpha}_i'\psi + \rho_{\mathrm{UV}}\hat{\lambda}_{it}^3 + \rho_{\mathrm{EV}}\hat{\lambda}_{it}^4 + v_{it}^*$ [5] by pooled OLS on subsample $B_{(N-n_2)\times(T-t_2)}$ affected by selection $\left(y_{it}^2 = 1 \cap \mathrm{y}_{it}^1 = 1\right)$. Control for potential heteroscedasticity caused by the sample estimates of the inverse mills ratios and potential serial correlation of v_{it}^* for instance with the asymptotic variance estimator or by bootstrapping or jackknifing clustered by individuals $i = n_2 + 1, ..., N$ who are grouped by their time series of observations $t = t_2 + 1, ..., T$ to incorporate the panel structure (See econometric appendix E.6). Selection matters if covariances ρ_{UV} or ρ_{EV} or both are significantly different from 0. If $\Phi_2\left(x_{it}'\hat{\beta}, \mathrm{z}_{it}'\hat{\gamma}, \hat{\rho}_{\mathrm{UE}}\right) = 0$ replace the missing inverse mills ratios $\hat{\lambda}_{it}^1$, $\hat{\lambda}_{it}^2$ by $\hat{\lambda}_{it}^3$, $\hat{\lambda}_{it}^4$, because in the limit for $\rho_{UE} \to 0$ $\hat{\lambda}_{it}^1$, $\hat{\lambda}_{it}^2$ converge to $\hat{\lambda}_{it}^3$, $\hat{\lambda}_{it}^4$ (See econometric appendix E.3).

The Three-step Heckit estimator for panel data with fixed effects includes the Two-step Heckit estimator of (Wooldridge, 1995), because if $\rho_{UE} = 0$ and either ρ_{UV} or ρ_{EV} is significant the model simplifies to structural equation [5] with one univariate inverse mills ratio. The bivariate probit model with selection differs from the partially observable bivariate probit models of (Poirier, 1980) and (Abowd & Farber, 1982) in the observability of both dependent variables Y^1 and Y^2. In their models only the product of the dependent variables $\left(y_{it}^1 \in \{0,1\} \cap y_{it}^2 \in \{0,1\}\right)$ is observed with four possible outcomes. Besides the joint outcome $\left(y_{it}^1 \cap y_{it}^2 \in \{1\}\right)$ the product $\left(y_{it}^1 \cap y_{it}^2 \in \{0\}\right)$ implies three indistinguishable outcome combinations, $\left(y_{it}^1 = 0 \cap y_{it}^2 = 0\right)$, $\left(y_{it}^1 = 1 \cap y_{it}^2 = 0\right)$ and $\left(y_{it}^1 = 0 \cap y_{it}^2 = 1\right)$. The joint outcome $\left(y_{it}^1 = 0 \cap y_{it}^2 = 1\right)$ is unobservable in the case of sequential selection and indistinguishable from $\left(y_{it}^{1}=0\cap y_{it}^{2}=0\right)$, such that its probability is zero and therefore not modeled in the bivariate probit model with selection compared to the partially observable bivariate probit model. (Abowd & Farber, 1982) assume in their partially observable bivariate probit model with selection that $\left(y_{it}^{1}\cap y_{it}^{2}\in\{1\}\right)$ or $\left(y_{it}^{1}\cap y_{it}^{2}\in\{0\}\right)$ can be observed only, similar to (Poirier, 1980). The partially observable bivariate probit models can be used as well to model the first two steps of the Three-step Heckit estimator if the selection process fulfills assumptions 1 and 2. The appropriate likelihood functions differ from the likelihood function of the bivariate probit model with selection[9]. The bivariate probit model with partial observability of (Poirier, 1980) has the likelihood function

$$L=\prod_{i=1}^{n_1}\prod_{t=1}^{t_1}\left(1-\Phi_2\left(x_{it}'\beta,z_{it}'\gamma,\rho_{\mathrm{UE}}\right)\right)\times\prod_{i=n_1+1}^{N}\prod_{t=t_1+1}^{T}\Phi_2\left(x_{it}'\beta,z_{it}'\gamma,\rho_{\mathrm{UE}}\right).$$

The bivariate probit model with sequential partial observability of (Abowd & Farber, 1982) has the likelihood function

$$L=\prod_{i=1}^{n_1}\prod_{t=1}^{t_1}\left(1-\Phi\left(x_{it}'\beta\right)\times\Phi\left(z_{it}'\gamma\right)\right)\times\prod_{i=n_1+1}^{N}\prod_{t=t_1+1}^{T}\Phi\left(x_{it}'\beta\right)\times\Phi\left(z_{it}'\gamma\right).$$

The remaining steps of calculating the inverse mills ratios and estimating the pooled OLS model, for instance with (Mundlak, 1978) fixed effects, on the selected subsample remain the same. (Meng & Schmidt, 1985) provide a good discussion of the different costs and benefits in terms of observable alternative outcomes of the three bivariate probit models. (Maddala, 1983b) explains the

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[9] The estimation of partially observable bivariate probit models is straightforward with statistics software like STATA that have the appropriate commands built-in, for instance the “biprobit, partial” command. The inverse mills ratios are calculated with the estimated coefficient vectors.

differences of these probit models to estimate joint or sequential selection with two selection equations.

4.3 Applying the Three-step Heckit estimator on a panel

4.3.1 Preparing the sample and variables

In this study of $i = 1,...,10,280$ acquirers with highly unbalanced sequences of $t = 1,...,98$ bids with $N \times T = 30,980$ of which some are advised by one to six banks the individually estimated inverse mills ratios are necessary to control for selection in this kind of double panel structure. The same panel is used in the previous chapters. Hiring of a particular investment bank j as M&A advisor $\left(y_{itj}^{2} = 1\right)$ can be observed only in advised transaction $\left(y_{it}^{1} = 1\right)$ (Servaes & Zenner, 1996). The decision process of the bidder is sequential as at first the decision is made whether an advising bank at all is needed or whether to do the deal without external advice $\left(y_{it}^{1} \in \{0,1\}\right)$. If the bidder decides to hire an investment bank he has to choose one or more among all banks that are competing for the advisory mandate $\left(y_{itj}^{2} \in \{0,1\} \cap \mathrm{y}_{it}^{1} = 1\right)$. Banks also pitch deals to bidders with the simultaneous observation that the deal is advised and the bank hired as advisor $\left(y_{itj}^{2} = 1 \cap \mathrm{y}_{it}^{1} = 1\right)$. The matching of a particular bank advisor to an unadvised deal $\left(y_{itj}^{2} = 1 \cap \mathrm{y}_{it}^{1} = 0\right)$ is not possible, because a particular hiring decision implies that the deal is advised. In this decision process the three outcome possibilities

$P\left(y_{itj}^2=1 \mid y_{it}^1=1\right)$, $P\left(y_{itj}^2=0 \mid y_{it}^1=1\right)$ and $P\left(y_{it}^1=0\right)=P\left(y_{itj}^2=0 \mid y_{it}^1=0\right)$ have to be estimated with a likelihood function that includes banks $j=1,\ldots,J$ as advisors:

$$L=\prod_{i=1}^{n_1}\prod_{t=1}^{t_1}\prod_{j=1}^{j_1}\left(1-\Phi\left(z_{it}'\gamma\right)\right)\prod_{i=n_1+1}^{n_2}\prod_{t=t_1+1}^{t_2}\prod_{j=j_1+1}^{j_2}\Phi_2\left(-x_{itj}'\beta, z_{it}'\gamma, -\rho_{\mathrm{UE}}\right)$$
$$\times\prod_{i=n_2+1}^{N}\prod_{t=t_2+1}^{T}\prod_{j=j_2+1}^{J}\Phi_2\left(x_{itj}'\beta, z_{it}'\gamma, \rho_{\mathrm{UE}}\right)$$

The first $n_1\times\left(t_1\times j_1\right)$ observations are unadvised deals without advising banks $\left(\mathrm{y}_{it}^1=0\right)=\left(y_{itj}^2=0\cap \mathrm{y}_{it}^1=0\right)$, the following $\left(n_2-n_1\right)\times\left(\left(t_2-t_1\right)\times\left(j_2-j_1\right)\right)$ observations are banks that were not selected as advisors in advised deals $\left(y_{itj}^2=0\cap \mathrm{y}_{it}^1=1\right)$, and the last $\left(N-n_2\right)\times\left(\left(T-t_2\right)\times\left(J-j_2\right)\right)$ observations are the banks matched as advisors to advised deals $\left(y_{itj}^2=1\cap \mathrm{y}_{it}^1=1\right)$. Outcome $\left(y_{itj}^2=1\cap y_{it}^1=1\right)$ has 8,886 observations, outcome $\left(y_{itj}^2=0\cap y_{it}^1=1\right)$ has 2,480,373 observations and outcome $\left(y_{itj}^2=0\cap y_{it}^1=0\right)$ has 7,260,522 observations, in total 9,749,781 shown in table 1. The trick is to define $\left(y_{it}^1=0\right)=\left(y_{itj}^2=0\cap \mathrm{y}_{it}^1=0\right)$ that makes it possible to create sample $A_{N\times(T\times J)}$ of 9,749,781 possible bid-bank matches $\left(y_{it}^1\in\{0,1\}\cup y_{itj}^2\in\{0,1\}\right)$ composed of all bidders and their deals $\left(N\times T=30{,}980\right)$, advised and unadvised $\left(y_{it}^1\in\{0,1\}\right)$, matched with all possible bank advisers J $\left(y_{itj}^2\in\{0,1\}\right)$. The annual number of possible bank advisors J runs from $J=45$ in 1979 to $J=392$ in 1997. With this sample the bivariate probit model with selection can be estimated easily[10].

[10] The bivariate probit model with selection is estimated with the command "heckprob" using STATA. The inverse mills ratios are calculated and inserted into regression equations [4] and [5]. The sandwich

Equations [4] and [5] are estimated by pooled OLS on the selected subsample $B_{(N-n_2)\times((T-t_2)\times(J-j_2))} = 8{,}886$ of bid-bank matches $\left(y_{itj}^2 = 1 \cap y_{it}^1 = 1\right)$ for 7,840 advised deals. The sample of M&As, its preparation and descriptive statistics with all possible bid-bank matches are shown in table 1.

The sample is defined as a kind of double panel distinguishing between acquirers and their acquisition series of bids instead of a pooled sample of bids, which (Golubov, Petmezas, & Travlos, 2012) and (Kale, Kini, & Ryan, 2003) use. Over time bidders with better investment opportunities make more acquisitions in faster succession, which is observed by (Fuller, Netter, & Stegemoller, 2002), (Klasa & Stegemoller, 2007) and (Aktas, Bodt, & Roll, 2009; 2011) as well and shown in table 1 panel F. Furthermore, the panel structure allows controlling for fixed effects in the Three-step Heckit estimator.

Table 2 includes the descriptive statistics of the variables and banks' industry expertise and advisory relationship proxies to estimate selection equation [1] whether the deal is advised (ADVISED=0/1) similar to (Servaes & Zenner, 1996), the selection of the particular M&A advisor [2] (AADVISOR=0/1) and the bidder's bid-bank cumulative announcement returns (CAR) equations [4] and [5]. The variables are similar to the ones used in chapter 2. The cumulative abnormal returns CAR(-2, 2) calculated with the Beta-1 model are used to avoid the problem of overlapping M&As in the pre-merger estimation period (Fuller, Netter, & Stegemoller, 2002; Aktas, Bodt, & Cousin, 2007).

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estimator is built into the command and applied with clustering by acquirers i. The OLS estimates are bootstrapped with 1,000 replications clustered by acquirers i grouped by their sequences of bid-bank-matches tj.

Table 1: Data preparation and sample statistics

The sample is taken from the SDC Mergers & Acquisitions database. The sample includes US targets only. The deals included are M&As (1, 2), spinoffs & splitoffs (4), tender offers (5), minority stake purchases (10), acquisitions of remaining interest (11), and privatizations (12). The initial sample of 208,654 deals from 01/01/1979 to 12/31/2008 is reduced by missing Compustat data as well as incomplete variables. The sample includes only M&As of corporate acquirers as well as stake purchases. Most deals without Compustat data involve private acquirers. The final sample includes deals from 01/01/1979 to 12/31/2006. Panel F includes the major statistics of the acquisition sequences. Panel G reports the distribution of the bids and acquisitions over time, the number of advised bids/acquisitions per year, the number of investment banks included in the SDC M&A sample and SDC M&A League Tables and the actually chosen bid-bank matches.

Panel A: Observation elemination before merging the data with Compustat

Steps in the Process	deals excluded	M&As
1. The total SDC M&A sample		208,654
2. Excluding self tenders, recapitalisations and repurchases	20,328	188,326
3. Excluding "Creditors", "Investor", "Investors", "Investor Group", "Shareholders", "Undisclosed Acquiror", "Seeking Buyer", and "Employee Stock Ownership Plan"	21,548	166,778
4. Excluding deals with status of "Unknown Status", "Rumor", "Discontinued Rumor", "Intended", "Intent withdrawn", "Pending" and "Seeking Target"	23,640	143,138
5. Excluding acquisitions/bids with undisclosed transaction values	76,073	67,065
6. Excluding individual and financial acquirers	5,352	61,713
7. Excluding bids in which the target is the same company as the acquirer	37	61,676
Sample A before the merging processes, used to compute the industry experience and acquirer-advisor relationship strengh variables		61,676

Panel B: Merging with the Compustat sample

Steps in the Process	deals excluded	M&As
8. Complete Compustat annual files from 1976 to 2006 (Industrial North America)		609,162
9. Keeping the consolidated parent with common stock (cic = 1xx)	8,965	600,197
10. Keeping company-years with positiv total assets	41,934	558,263
Compustat sample before the merging processes, used to compute the industry variables in each (Fama & French, 1997) industry		558,263
11. Deals with Compustat data available for the acquirer, merged by the CUSIP		39,053

Panel C: Merging with the CRSP sample

Steps in the Process	deals excluded	M&As
12. Deals with available announcement returns after merging with CRSP		33,231

Panel D: Observation elimination after merging with Compustat & CRSP

Steps in the Process	deals excluded	M&As
13. Excluding acquisitions/bids without acquirer's leverage, ROA and Tobin's Q	2,323	30,908
Sample for the analysis of acquisitions/bids with anouncement returns		30,908
Thereof unadvised acquisitions/bids (1)		23,068
Thereof advised acquisitions/bids		7,840
Bank matches with the advised acquisitions/bids (2)		8,886
Final sample B for estimation of unadvised and bank matched advised M&As (1+2)		31,954

Panel E: Preparing the SDC Global Debt & Equity Issues to calculate the exclusion restriction

Steps in the Process	issues excluded	Issues
14. Debt and equity issues from 1976 to 2006		852,896
15. Excluding issues with missing transaction values	97,629	755,267
16. Excluding issues without an underwriter	1	755,266
Final sample C to calculate the exclusion restriction SCOPE		755,266

Table 1 (cont.): Data preparation and sample statistics

Panel F: Major acquisitions series characteristics in the final sample

Variable	N	Mean	Median	Std.Dev.	Min	Max
Number of acquisitions/bids in the final sample	30,908	---	---	---	---	---
Number of acquirers/bidders in the final sample	10,280	---	---	---	---	---
Acquisitions per acquirer and sequence	---	3.0	2.0	4.0	1	98
Days between acquisitions/bids	---	499.7	224.0	760.1	0	9289
Days between the 1st and 2nd bid in SDC	---	736.6	369.5	1012.6	0	9289
Days between the 2nd and 3rd bid in SDC	---	600.0	305.0	798.6	0	8141
Days between the 3rd and 4th bid in SDC	---	504.5	263.0	705.5	0	6070
Days between the 4th and 5th bid in SDC	---	438.5	198.5	631.4	0	6177
Days between the 5th and 6th and higher bid in SDC	---	303.6	135.0	473.6	0	5517

Panel G: Time series of acquisitions/bids and possible bid-bank matches

	advised and unadvised bids/acquisitions		banks		possible bid-bank matches				
Year	Bids / Acquisitions	Advised Deals	Banks in the SDC Universe	SDC M&A League Table Banks (#)	Possible advised bid-bank Matches	Observed advised bid-bank Matches	Unobserved advised bid-bank Matches	Unadvised bid-bank Matches	All possible bid-bank matches
					(2) x (3)			(1-2) x (3)	(1) x (3)
	(1)	(2)	(3)			a	b	c	a+b+c
1979	9	6	45	20	270	7	263	135	405
1980	45	22	83	49	1,826	23	1,803	1,909	3,735
1981	289	62	136	50	8,432	65	8,367	30,872	39,304
1982	402	68	172	50	11,696	73	11,623	57,448	69,144
1983	540	89	170	50	15,130	95	15,035	76,670	91,800
1984	615	110	164	51	18,040	115	17,925	82,820	100,860
1985	303	111	148	50	16,428	124	16,304	28,416	44,844
1986	479	176	210	50	36,960	193	36,767	63,630	100,590
1987	482	121	242	50	29,282	129	29,153	87,362	116,644
1988	546	167	261	50	43,587	180	43,407	98,919	142,506
1989	687	166	295	50	48,970	194	48,776	153,695	202,665
1990	646	118	256	50	30,208	132	30,076	135,168	165,376
1991	731	112	263	50	29,456	129	29,327	162,797	192,253
1992	965	158	271	51	42,818	167	42,651	218,697	261,515
1993	1,229	230	281	50	64,630	282	64,348	280,719	345,349
1994	1,600	351	345	50	121,095	398	120,697	430,905	552,000
1995	1,651	404	342	50	138,168	438	137,730	426,474	564,642
1996	1,989	477	351	50	167,427	515	166,912	530,712	698,139
1997	2,627	635	392	50	248,920	710	248,210	780,864	1,029,784
1998	2,669	613	351	50	215,163	681	214,482	721,656	936,819
1999	2,079	579	355	50	205,545	642	204,903	532,500	738,045
2000	1,919	597	318	50	189,846	695	189,151	420,396	610,242
2001	1,396	462	312	50	144,144	537	143,607	291,408	435,552
2002	1,330	365	292	50	106,580	407	106,173	281,780	388,360
2003	1,293	367	292	50	107,164	413	106,751	270,392	377,556
2004	1,387	421	336	50	141,456	494	140,962	324,576	466,032
2005	1,508	441	366	50	161,406	531	160,875	390,522	551,928
2006	1,492	412	351	50	144,612	517	144,095	379,080	523,692
Total	30,908	7,840			2,489,259	8,886	2,480,373	7,260,522	9,749,781

In the sensitivity analyses CARs over event windows (-1, 1) and (-3, 3) based on the CAPM, estimated for each deal from -270 to -21 trading days to exclude the pre-announcement stock price run-up period, are used as well (Mitchell, Pulvino, & Stafford, 2004; Brown & Warner, 1985; 1980).

The industry expertise and access to the bidder are approximated with the target industry expertise IEDT and IEVT and the advisory relationship strength ARSD and ARSV. The industry expertise $\mathrm{IE}_{\mathrm{j,k,s}}$ is the proxy of investment bank's j advisory skills and its access to information in industry k at time s, adapted from previous research (Benveniste, Busaba, & Wilhelm, 2002; Chang, Shekhar, Tam, & Zhu, 2013; Sibilkov & McConnell, 2013; Forte, Iannotta, & Navone, 2010). The approximation of the industry expertise is based on the M&As advised in the past three years. With more transactions advised the bank learns how to advise M&As better by accumulating advisory skills (Chemmanur & Fulghieri, 1994). The industry expertise is measured either by the number (D) or dollar value (V) of acquisitions advised with respect to the total number or dollar value of advised acquisitions in each of the $k = 1,...,49$ (Fama & French, 1997) industries in the three years $s-1$, $s-2$, $s-3$ preceding the year s of the acquisition or bid. The measure of the industry expertise of bank j in industry k in year s measured by the relative number of deals (D) advised is defined as

$$\mathrm{IED}_{\mathrm{j,k,s}} = \frac{\left(\frac{\mathrm{advised\_deals}_{\mathrm{j,k,s-1}}}{\mathrm{advised\_industry\_deals}_{\mathrm{k,s-1}}} + \frac{\mathrm{advised\_deals}_{\mathrm{j,k,s-2}}}{\mathrm{advised\_industry\_deals}_{\mathrm{k,s-2}}} + \frac{\mathrm{advised\_deals}_{\mathrm{j,k,s-3}}}{\mathrm{advised\_industry\_deals}_{\mathrm{k,s-3}}} \right)}{3}$$

For instance in the year 1998 Goldman Sachs had an industry expertise by acquisitions or bids advised in the ship building industry of 0.1111. This is computed by the number of M&As Goldman Sachs advised in the preceding year 1997 divided by the sum of advised M&As in the ship building industry in 1997.

Goldman Sachs did not advice any deal in the ship building industry in years 1996 and 1995. The industry expertise of Goldman Sachs in "Ships" 1998 is $IED_{GS,Ships,1998} = \left(0.\overline{3}+0+0\right)/3=0.\overline{1}$. The normalization with 3 ensures that the industry expertise is a ratio between 0 and 1. The maximum industry expertise of 1 corresponds to 100% if Goldman Sachs had participated in the preceding three years as advisor on the acquirers' or targets' sides in all advised deals in the ship building industry. The variable of the industry expertise based on the number (D) or dollar volume (V) of deals in the target's (T) industry are IEDT and IEVT.

The proxy for the advisory relationship strength ARS is based on the arguments of (Anand & Galetovic, 2006) that building relationships with bidding companies enables investment banks to get access to the private information of acquirers. The advisory relationship strength is based on the relative number of deals (D) or dollar volume (V) the bank advised with respect to the number of all advised M&As the acquirer conducted in the three years preceding the bid considered. The variables of the advisory relationship strength are ARSD and ARSV. The statistics of the Top-25 banks in sample A are summarized in table A in the statistical appendix, which is shared with the previous chapters.

Finally the past performance PASTBBCAR of previous bidder-bank matches is modeled comparably to (Rau, 2000) and (Hunter & Jagtiani, 2003). PASTBBCAR is the value weighted bidder-bank matched CAR (-2, 2) of the acquirer's previous M&A if he was advised by the same bank, or of the previous unadvised deal if no advisor is chosen in the current bid.

The market share MS of the SDC Top-50 M&A League Tables, which is set to 0.1 if the bank is not in the annual league tables, is used as an exclusion restriction (Li & Prabhala, 2007). The market share MS as a measure of reputation is expected to be a proxy for the visibility of a bank in the advisory market (Rau, 2000; Carter &

Manaster, 1990; Francis, Hasan, & Sun, 2008; Kale, Kini, & Ryan, 2003). The market share and ranking in the league tables is so important for the banks that they have incentives to ratchet it up (Derrien & Dessaint, 2012). The variable SCOPE serves as exclusion restriction in selection equation [1] similar to (Golubov, Petmezas, & Travlos, 2012). SCOPE is a dummy whether the bidder hired an underwriter in an equity or debt offering in the previous three years. The market share MS serves as exclusion restriction in selection equation [2] of the particular bank advisor choice.

The calculation of the industry expertise, advisory relationship strength, market share and past performance requires the tracking and controlling of bank mergers and banks' name changes. The assumption is that merging banks inherit the expertise and advisory relationships of their predecessors. The ultimate parent bank has inherited the relationships and expertise of its predecessors. Table B in the statistical appendix includes the bank mergers and name changes of all 395 banks in the SDC Top-50 M&A League Tables from 1979 to 2006 together with their 201 ultimate parents as of 12/31/2006. The name changes and mergers of banks not in the SDC Top-50 M&A League Tables are not tracked, because sample A includes 1,854 different banks from 1979 to 2006. The 395 banks in the league tables advise almost 75% of all M&As. In years 2007 and 2008 during the financial crisis many banks went bankrupt, among them two leading investment banks, Lehman Brothers and Bear Sterns. Tracking their remains is difficult as many key bankers left the industry entirely according to the press. Therefore, the sample is truncated after 2006 because of sample attrition of bankrupt banks (Wooldridge, 2002e).

The transaction and bidder characteristics are taken from the literature. The acquisition experience of the acquirer is approximated by the number of bids or acquisitions he conducted in the previous three years, measured by the variable

DEALS3YEARS (Servaes & Zenner, 1996). The return on assets compared to bidders' industry average, abnormal AROA, is used an approximation of acquirers' profitability to make acquisitions (Heron & Lie, 2002). Opposing the effect of a high profitability is a high abnormal leverage ALEVERAGE above the industry mean that constraints bidder's management in debt financing the acquisition. (Masulis, Wang, & Xie, 2007). The assessment of bidders' investment opportunities by the market is modeled with Tobin's Q relative to the industry average, ATobinsQ, adapted from (Andrade & Stafford, 2004). The logarithm of the industry size LNIS measures the number of potential targets in the bidder's (Fama & French, 1997) industry (Maksimovic & Phillips, 2001; 2002). The logarithm of the market value of equity LOGME at the end of the fiscal year before the M&A announcement year controls for the bidder's size (Moeller, Schlingemann, & Stulz, 2004).

The transaction variables approximate the transaction's contracting costs and information asymmetry that affect the bidder's gain. The first one is the dummy DIVERS for a diversifying acquisition (Servaes & Zenner, 1996). The target's industry diversification as the number of its primary industries is measured with the continuous variable DIVERSIFICATION (Servaes & Zenner, 1996). The purchase of a controlling majority of the target is modeled with the dummy MAJORITY (Servaes & Zenner, 1996). If the target or acquirer or both are in high-tech industries with a large share of intangible assets the information asymmetry is high, measured with the dummy HIGHTECH (Loughran & Ritter, 2004). The bidder's access to insider target information is measured by his pre-merger ownership stake TOEHOLD (Song, Zhou, & Wei, 2013). Relatively larger targets, associated with a higher relative deal size RDS, have more bargaining power that increases the transaction costs (Servaes & Zenner, 1996; Ahern, 2008; Fuller, Netter, & Stegemoller, 2002; Moeller, Schlingemann, & Stulz, 2004). The existence and potential entry of competition from other bidders makes the acquirer's bidding strategy more complex, modeled with the variable MULTIPLE (Boone & Mulherin, 2008).

Table 2: Descriptive statistics of variables

This table reports the sample statistics of the dependent, bank, bidder and transaction variables. Panel A includes the descriptive statistics of the first selection equation whether the deal is advised (ADVISED=0/1). Panel B includes the descriptive statistics of the second selection equation of the particular acquirer advisor choice (AADVISOR=0/1). Panel C includes inverse mills ratios 1, 2, 3, and 4 and correlation ρ_{UE} of the annual and pooled bivariate probit model, estimated with IEDT and ARSD as well as IEVT and ARSV (4 versions). Panel D includes the descriptive statistics of the structural equation of the particular acquirer advisor choice's influence on the cumulative announcement returns. Panel E includes the acquirer specific means of variables (Mundlak, 1978). The variables are described in table C in the statistical appendix. The continuous variables are winsorized at the upper and lower 1 percentile to exclude outliers.

Variable	N	Mean	Median	Std.Dev.	Min	Max
Panel A: Descriptive statistics of variables in the first selection equation						
ADVISED	9,749,781	0.2553	0.0000	0.4360	0.0000	1.0000
TADVISORTIER	9,749,781	0.5008	0.0000	0.7285	0.0000	2.0000
SCOPE	9,749,781	0.3099	0.0000	0.4624	0.0000	1.0000
DEALS3YEARS	9,749,781	1.7814	1.0000	3.0328	0.0000	41.0000
DIVERS	9,749,781	0.4285	0.0000	0.4949	0.0000	1.0000
MAJORITY	9,749,781	0.9502	1.0000	0.2175	0.0000	1.0000
HOSTILE	9,749,781	0.0078	0.0000	0.0879	0.0000	1.0000
ANTITAKEOVER	9,749,781	0.0357	0.0000	0.1855	0.0000	1.0000
FAMILY	9,749,781	0.0024	0.0000	0.0491	0.0000	1.0000
LITIGATION	9,749,781	0.0131	0.0000	0.1139	0.0000	1.0000
REGULATORY	9,749,781	0.2876	0.0000	0.4526	0.0000	1.0000
CROSSBORDER	9,749,781	0.0591	0.0000	0.2358	0.0000	1.0000
TOEHOLD	9,749,781	1.7710	0.0000	10.0098	-0.0300	99.8000
HIGHTECH	9,749,781	0.2922	0.0000	0.4548	0.0000	1.0000
DIVERSIFICATION	9,749,781	0.4855	0.0000	0.5680	0.0000	3.2189
MULTIPLE	9,749,781	1.0226	1.0000	0.1868	1.0000	8.0000
RDS	9,749,781	0.2271	0.0639	0.4748	0.0002	3.6040
LNIS	9,749,781	6.6491	6.7845	0.9239	1.6094	7.9491
PUBLIC	9,749,781	0.1928	0.0000	0.3945	0.0000	1.0000
STOCK	9,749,781	0.1909	0.0000	0.3930	0.0000	1.0000
CASH	9,749,781	0.2467	0.0000	0.4311	0.0000	1.0000
MIXED	9,749,781	0.1965	0.0000	0.3974	0.0000	1.0000
OTHER	9,749,781	0.0602	0.0000	0.2378	0.0000	1.0000
ATobinsQ	9,749,781	0.0229	-0.2317	1.8885	-5.1792	14.9771
AROA	9,749,781	0.0912	0.0723	0.1678	-1.1947	0.7949
ALEVERAGE	9,749,781	-0.0246	-0.0514	0.1841	-0.4599	0.8223
SIXTH	9,749,781	0.2612	0.0000	0.4393	0.0000	1.0000

Table 2 (cont.): Descriptive statistics of variables

Variable	N	Mean	Median	Std.Dev.	Min	Max
Panel B: Descriptive statistics of variables of the second selection equation						
AADVISOR	9,749,781	0.0009	0.0000	0.0302	0.0000	1.0000
IEDT	9,749,781	0.0119	0.0000	0.0357	0.0000	0.8333
ARSD	9,749,781	0.0002	0.0000	0.0092	0.0000	1.0000
IEVT	9,749,781	0.0157	0.0000	0.0581	0.0000	0.9704
ARSV	9,749,781	0.0002	0.0000	0.0093	0.0000	1.0000
MS	9,749,781	0.7729	0.1000	3.3135	0.1000	94.6000
PASTBBCAR	9,749,781	0.0000	0.0000	0.0012	-0.1994	0.3135
LOGME	9,749,781	20.3683	20.2763	2.1567	15.0841	25.7360
RDS	9,749,781	0.2271	0.0639	0.4748	0.0002	3.6040
meanIEDT	9,749,781	0.0119	0.0111	0.0044	0.0000	0.0762
meanARSD	9,749,781	0.0002	0.0000	0.0006	0.0000	0.0142
meanIEVT	9,749,781	0.0119	0.0111	0.0044	0.0000	0.0762
meanARSV	9,749,781	0.0002	0.0000	0.0006	0.0000	0.0142
meanMS	9,749,781	0.7729	0.7647	0.1021	0.5899	4.6533
meanPASTBBCAR	9,749,781	0.0000	0.0000	0.0000	-0.0003	0.0012
meanLOGME	9,749,781	20.3683	20.2735	2.0765	15.0841	25.7360
meanRDS	9,749,781	0.2271	0.1190	0.3584	0.0002	3.6040
Panel C: Descriptive statistics of the inverse mills ratios and correlation coefficients						
For IEDT and ARSD, annually:						
ρ_1	8,886	-0.0112	-0.0074	0.0287	-0.0632	0.0860
invmills_1	8,886	0.8969	0.7964	0.5347	0.0000	2.9078
invmills_2	8,886	2.5616	2.8265	0.7540	0.0000	5.8190
invmills_3	8,886	0.8771	0.7829	0.5282	0.0000	2.8891
invmills_4	8,886	2.5511	2.8171	0.7522	0.0000	5.8115
For IEVT and ARSV, annually:						
ρ_2	8,886	0.0011	-0.0022	0.0252	-0.0628	0.0931
invmills_1_v	8,886	0.8776	0.7784	0.5283	0.0000	2.8854
invmills_2_v	8,886	2.5906	2.9125	0.7602	0.0000	5.7769
invmills_3_v	8,886	0.8771	0.7829	0.5282	0.0000	2.8891
invmills_4_v	8,886	2.5900	2.9129	0.7598	0.0000	5.7664
For IEDT and ARSD, pooled:						
ρ_3	8,886	-0.0392	-0.0392	0.0000	-0.0392	-0.0392
invmills_1_p	8,886	0.9524	0.8434	0.5528	0.0068	2.9390
invmills_2_p	8,886	2.4403	2.6493	0.7955	0.0001	4.1645
invmills_3_p	8,886	0.8880	0.7815	0.5310	0.0049	2.9104
invmills_4_p	8,886	2.4053	2.6143	0.7878	0.0001	4.0946
For IEVT and ARSV, pooled:						
ρ_4	8,886	-0.0375	-0.0375	0.0000	-0.0375	-0.0375
invmills_1_p_v	8,886	0.9502	0.8402	0.5521	0.0066	2.9337
invmills_2_p_v	8,886	2.4695	2.7190	0.7981	0.0000	4.2620
invmills_3_p_v	8,886	0.8880	0.7815	0.5310	0.0049	2.9104
invmills_4_p_v	8,886	2.4361	2.6835	0.7907	0.0000	4.2081

Table 2 (cont.): Descriptive statistics of variables

Variable	N	Mean	Median	Std.Dev.	Min	Max
Panel D: Descriptive statistics of the selected subsample of bid-bank matches						
CAR_(-2,2)_BETA1_vw	8,886	0.0085	0.0013	0.0881	-0.1994	0.3135
IEDT	8,886	0.0743	0.0521	0.0787	0.0000	0.6574
ARSD	8,886	0.0553	0.0000	0.1536	0.0000	1.0000
IEVT	8,886	0.1190	0.0513	0.1466	0.0000	0.8879
ARSV	8,886	0.0557	0.0000	0.1550	0.0000	1.0000
SIXTH	8,886	0.2559	0.0000	0.4364	0.0000	1.0000
PASTBBCAR	8,886	0.0024	0.0000	0.0384	-0.1994	0.3135
LOGME	8,886	21.0566	20.9537	2.0205	15.0841	25.7360
LNIS	8,886	6.6272	6.7845	0.9498	1.6094	7.9491
ALEVERAGE	8,886	-0.0274	-0.0537	0.1756	-0.4545	0.8071
ATobinsQ	8,886	0.0207	-0.1802	1.8604	-5.1723	14.5082
AROA	8,886	0.1057	0.0806	0.1556	-1.1152	0.7949
TADVISORTIER	8,886	1.1200	1.0000	0.7946	0.0000	2.0000
DEALS3YEARS	8,886	1.4931	1.0000	2.3953	0.0000	28.0000
DIVERS	8,886	0.3745	0.0000	0.4840	0.0000	1.0000
MAJORITY	8,886	0.9737	1.0000	0.1601	0.0000	1.0000
HOSTILE	8,886	0.0277	0.0000	0.1641	0.0000	1.0000
ANTITAKEOVER	8,886	0.0925	0.0000	0.2898	0.0000	1.0000
FAMILY	8,886	0.0055	0.0000	0.0741	0.0000	1.0000
LITIGARTION	8,886	0.0457	0.0000	0.2088	0.0000	1.0000
REGULATORY	8,886	0.5145	1.0000	0.4998	0.0000	1.0000
CROSSBORDER	8,886	0.0807	0.0000	0.2724	0.0000	1.0000
TOEHOLD	8,886	2.3969	0.0000	11.6292	0.0000	99.7000
HIGHTECH	8,886	0.3098	0.0000	0.4624	0.0000	1.0000
DIVERSIFICATION	8,886	0.6843	0.6931	0.6351	0.0000	3.2189
MULTIPLE	8,886	1.0647	1.0000	0.3030	1.0000	4.0000
RDS	8,886	0.4424	0.1979	0.6430	0.0002	3.6040
PUBLIC	8,886	0.3928	0.0000	0.4884	0.0000	1.0000
STOCK	8,886	0.2605	0.0000	0.4389	0.0000	1.0000
CASH	8,886	0.2570	0.0000	0.4370	0.0000	1.0000
MIXED	8,886	0.2795	0.0000	0.4488	0.0000	1.0000
OTHER	8,886	0.0618	0.0000	0.2408	0.0000	1.0000

Table 2 (cont.): Descriptive statistics of variables

Variable	N	Mean	Median	Std.Dev.	Min	Max
Panel E: Descriptive statistics of acquirer specific means of the selected subsample's variables						
meanIEDT	8,886	0.0461	0.0344	0.0467	0.0000	0.6574
meanARSD	8,886	0.0346	0.0000	0.0712	0.0000	0.6667
meanIEVT	8,886	0.0734	0.0487	0.0819	0.0000	0.8033
meanARSV	8,886	0.0348	0.0000	0.0714	0.0000	0.6667
meanSIXTH	8,886	0.2455	0.0000	0.3023	0.0000	0.9490
meanPASTBBCAR	8,886	0.0050	0.0000	0.0246	-0.0997	0.1914
meanLOGME	8,886	21.0212	20.8983	1.9466	15.0841	25.7360
meanLNIS	8,886	6.6251	6.7719	0.9421	1.8405	7.9491
meanATobinsQ	8,886	0.0263	-0.1521	1.5356	-5.0724	14.5082
meanALEVERAGE	8,886	-0.0295	-0.0517	0.1560	-0.4091	0.7906
meanAROA	8,886	0.1032	0.0825	0.1423	-1.1152	0.7766
meanTADVISORTIER	8,886	0.8614	0.8750	0.5462	0.0000	2.0000
meanDEALS3YEARS	8,886	1.4891	1.0000	1.8065	0.0000	18.7755
meanDIVERS	8,886	0.3975	0.3333	0.3656	0.0000	1.0000
meanMAJORITY	8,886	0.9533	1.0000	0.1173	0.0000	1.0000
meanHOSTILE	8,886	0.0172	0.0000	0.0767	0.0000	1.0000
meanANTITAKEOVER	8,886	0.0649	0.0000	0.1582	0.0000	1.0000
meanFAMILY	8,886	0.0042	0.0000	0.0358	0.0000	1.0000
meanLITIGATION	8,886	0.0327	0.0000	0.1229	0.0000	1.0000
meanREGULATORY	8,886	0.4193	0.4000	0.3397	0.0000	1.0000
meanCROSSBORDER	8,886	0.0806	0.0000	0.2708	0.0000	1.0000
meanTOEHOLD	8,886	2.3379	0.0000	7.2534	0.0000	99.7000
meanHIGHTECH	8,886	0.3114	0.0000	0.4388	0.0000	1.0000
meanDIVERSIFICATION	8,886	0.6084	0.5973	0.4052	0.0000	2.5649
meanMULTIPLE	8,886	1.0499	1.0000	0.1761	1.0000	4.0000
meanRDS	8,886	0.3191	0.1759	0.4417	0.0002	3.6040
meanPUBLIC	8,886	0.3073	0.2500	0.3047	0.0000	1.0000
meanSTOCK	8,886	0.2223	0.0741	0.2942	0.0000	1.0000
meanCASH	8,886	0.2667	0.2000	0.2824	0.0000	1.0000
meanMIXED	8,886	0.2216	0.1364	0.2685	0.0000	1.0000
meanOTHER	8,886	0.0721	0.0000	0.1699	0.0000	1.0000

The last variables modelling the complexity of the transaction are dummy variables adapted and extended from (Kale, Kini, & Ryan, 2003). ANTITAKEOVER controls for anti-takeover measures (Comment & Schwert, 1995). The dummy

CROSS-BORDER controls for cross-border deals (Moeller & Schlingemann, 2005; Francis, Hasan, & Sun, 2008). The dummy REGULATORY models the requirement of regulatory approval, FAMILY models family ownership, and LITIGATION a pending litigation against the target. (Kale, Kini, & Ryan, 2003) show that the acquirer's advisor choice depends on the target advisor's tier, which is modelled with the discrete variable TADVISORTIER.

A hostile acquisition is more complex and increases the costs to remove the resistance of target's management, controlled with the dummy HOSTILE (Schwert, 2000). The payment by stock increases the complexity and thus the transaction costs, because the shares of the acquirer and target have to be valued to determine how many shares he has to bid for one share of the target company. The payment methods are modeled with the dummies STOCK, CASH, MIXED and OTRHER (Servaes & Zenner, 1996; Song, Zhou, & Wei, 2013; Chang S. , 1998; Martin, 1996). The dummy SIXTH is set to one if the transaction is the sixth and later one of the bidding company (Fuller, Netter, & Stegemoller, 2002). All continuous variables are winsorized at the upper and lower 1% percentile.

4.3.2 Estimating the selection equations with a bivariate probit model

Tables D and E, put in the statistical appendix due to their length, show the annual regressions of the bivariate probit model with selection as suggested by (Wooldridge, 1995; 2002e) and proposed as annual method to obtain regressions coefficients for the first and second selection equation and the correlation coefficient ρ_{UE}. The strict estimation of $T = 98$ separate selection equations for each bid t, from the $t = 1$ to $t = 98$, is unfeasible as the number of observations decreases from $n = 10,280$ for $t = 1$ to $n = 1$ for $t = 98$. Therefore, the bid-bank matches tj are clustered each year s to estimate annual selection regressions with a sufficient number of observations $n \times t \times j$. The problems arising in the annual estimation are non-convergence of regressions in years with few observed bid-bank matches, because the mean of the dependent variable AADVISOR is close to zero with little variation. Besides non-convergence also multicollinearity among the transaction characteristics of the first selection equation and the bank variables, particularly IEDT or IEVT and the market share MS, is problematic if the mean of AADVISOR is close to zero. In years 1979 to 1981, 1986, 1994 and 2004 to 2006 only is the correlation coefficient ρ_{UE} significant. The correlation coefficient ρ_{UE} is almost zero, causing the bivariate inverse mills ratios invmills_1 and invmills_2 to converge to the univariate inverse mills ratios invmills_3 and invmills_4 with the proof shown in econometric appendix E.3.

The pooled model of the bivariate probit with selection is shown in table 3. The fit is better, because multicollinearity and non-convergence do not pose problems. The two sequential selection equations are correlated. Industry expertise IEDT and IEVT, advisory relationship strength ARSD or ARSV, as well as the past returns of the bank advisor in the bidder's previous deal PASTBBCAR and the bank's market share MS are significantly positively correlated to the probability of its selection as advisor. This is comparable to the observation of (Sibilkov & McConnell, 2013) concerning the retention of old advisors and the theoretical arguments of (Anand & Galetovic, 2006) and (Chemmanur & Fulghieri, 1994) of advisor selection, and the observation of (Chang, Shekhar, Tam, & Zhu, 2013) of banks being selected by their industry expertise and advisory relationships. The positive effect of the past announcement returns on hiring a bank as advisors is contrary to the observation made by (Bao & Edmans, 2011) and (Rau, 2000) that past performance would be irrelevant for the advisor choice.

Table 3: Pooled regressions of the bivariate probit model with selection

Table 4 shows the pooled estimation of the bivariate probit model with selection. Pooled model 1 uses IEDT and ARSD as bank variables. Pooled model 2 uses IEVT and ARSV as bank variables. The descriptive statistics are shown in table 2 and the variables are described in table C in the statistical appendix. The transaction variables, year fixed effects and (Fama & French, 1997) industry fixed effects of the primary acquirer industry are included but not reported. The standard errors are corrected for potential heteroscedasticity with the Huber & White sandwich estimator (Huber, 1967; White, 1980).

	(1)	(2)	(3)	(4)
	Pooled Model 1		Pooled Model 2	
VARIABLES	AADVISOR	ADVISED	AADVISOR	ADVISED
IEDT	2.8406***			
	(31.605)			
ARSD	4.9910***			
	(18.452)			
IEVT			0.7539***	
			(13.683)	
ARSV			5.1876***	
			(20.140)	
MS	0.0429***		0.0463***	
	(68.735)		(65.662)	
PASTBBCAR	5.2506**		5.5148**	
	(2.055)		(2.136)	
LOGME	-0.0259***		-0.0313***	
	(-5.122)		(-6.400)	
RDS	0.0142**	0.4135***	0.0127*	0.4135***
	(2.116)	(19.092)	(1.957)	(19.092)
meanIEDT	-1.5841			
	(-1.571)			
meanARSD	-119.1972***			
	(-10.049)			
meanIEVT			0.5141	
			(0.557)	
meanARSV			-114.2725***	
			(-10.708)	
meanMS	-0.3006***		-0.3105***	
	(-8.067)		(-8.341)	
meanPASTBBCAR	-82.3384*		-89.0685*	
	(-1.821)		(-1.893)	
meanLOGME	0.0094		0.0148**	
	(1.425)		(2.277)	
meanRDS	-0.0237**		-0.0218**	
	(-2.540)		(-2.419)	
Constant		-2.1348***		-2.1348***
		(-18.286)		(-18.286)
Transaction characteristics	No	Yes	No	Yes
Year fixed effects	Yes	No	Yes	No
Industry fixed effects	Yes	No	Yes	No
N	9,749,781	9,749,781	9,749,781	9,749,781
N of acquirers	10,280	10,280	10,280	10,280
Chi²-statistic	345,993.28	345,993.28	370,219.16	370,219.16
p-value	0.0000	0.0000	0.0000	0.0000
Chi²-statistic of exogeneity	45.67	45.67	42.81	42.81
p-value of exogeneity	0.0000	0.0000	0.0000	0.0000

Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1

The transaction variables that are not shown in table 3 are significant. The extended table is available upon request. The more complex the deal is the more likely is the transaction advised (Servaes & Zenner, 1996). Bidders with better investment opportunities, measured by ATobinsQ, are more likely to be advised, because banks sense opportunities for follow-on business (Chemmanur & Fulghieri, 1994; Hunter & Walker, 1990; Klasa & Stegemoller, 2007). The advisory opportunities arise for investment banks, because companies with larger sets of investment opportunities make more acquisitions (Servaes, 1991; Klasa & Stegemoller, 2007). Larger deals are more likely to be advised, because the advisory fees increase with deal size (McLaughlin, 1990; 1992; Hunter & Walker, 1990; Hunter & Jagtiani, 2003).

A more prestigious bank advisor on the target's side increases the likelihood that the acquirer hires a bank advisor (Servaes & Zenner, 1996; Kale, Kini, & Ryan, 2003). On the other hand more experienced bidders who have announced more bids or acquisitions in the previous three years are more experienced and thus less likely to hire an investment bank (Aktas, Bodt, & Roll, 2009; 2011; Servaes & Zenner, 1996).

In the estimation of the bivariate probit model with selection the correlation ρ_{UE} of the selection equations is significant. In the pooled model the bivariate inverse mills ratios differ from the univariate inverse mills ratios more than in the annual regressions. The fixed effects are significantly different from zero (Mundlak, 1978). Without the fixed effects the coefficients of the explanatory variables do not change. The standard errors are corrected for potential heteroscedasticity of residuals u_{it} and ε_{it} with the Huber & White sandwich estimator clustered by acquirers i derived in econometric appendix E.6 (Huber, 1967; White, 1980).

4.3.3 Estimating the structural equation on the selected subsample

Finally estimating the effect of the particular advisor selection by the bidder on his acquisition returns reveals the positive influence that the chosen bank's target industry expertise and advisory relationship strength have on returns, shown in table 4. The announcement return of the bidder's deal previously advised by the same bank chosen as advisor in the current bid PASTBBCAR is insignificant. The inclusion of the bivariate and univariate inverse mills ratios shows the significance of the second selection equation, the choice of the particular bank advisor. The annual inverse mills ratios have a greater influence on the returns than the pooled inverse mills ratios. However, the inclusion of annual inverse mills ratios is difficult if the number of observations affected by selection is relatively small in some years, less than 100 per year in the first five years from 1979 to 1984. Therefore, time constant regression coefficients of the inverse mills ratios are used in the regressions in tables 4 to 7.

The remaining explanatory variables have the expected signs. Bidders with above industry average investment opportunities ATobinsQ experience higher announcement returns (Lang, Stulz, & Walkling, 1989; Klasa & Stegemoller, 2007). Making more acquisitions the announcement returns decrease, even though the acquisition experience of the bidder DEALS3YEARS increases, which corresponds to the learning hypothesis of serial bidders (Aktas, Bodt, & Roll, 2009; 2011; Croci & Petmezas, 2009). On the other hand highly profitable bidders experience lower announcement returns, which could be related to managerial hubris and overpayment for targets (Roll, 1986; Malmendier & Tate, 2005a; 2005b; 2008; Morck, Shleifer, & Vishny, 1990). The logarithm of the market value of equity LOGME is also negatively correlated with returns, indicating that large companies often make value destroying acquisitions (Moeller, Schlingemann, &

Stulz, 2004; 2005; Dong, Hirshleifer, Richardson, & Teoh, 2006). Finally excessive leverage ALEVERAGE and a more reputable target advisor are not associated with smaller announcement returns compared to previous studies (Masulis, Wang, & Xie, 2007; Kale, Kini, & Ryan, 2003). The transaction variables shown in table 2 panel D are included but not reported, having the expected signs.

The (Mundlak, 1978) fixed effects proposed by (Wooldridge, 1995; 2002e) are included but not reported and overall significant. The F-statistic of the fixed effects coefficients' joint significance and its p-value are reported besides the Skewness and Kurtosis test of the distribution of the error terms v_{it}^{*} and a two-sided t-test whether they are truly indistinguishable from zero (D'Agostino, Belanger, & D'Agostino Jr., 1990; Wooldridge, 1995). The diagnostic statistics indicate the reasonability of the absence of any distributional assumption of the error terms v_{it}^{*} that are not normally distributed. The model's fit is good, because the error terms are indistinguishable from zero, the adjusted R^2 is fairly high for a returns regression and the Root MSE small. The overall fit of the regression of structural equations [4] and [5] is significant. The variance-covariance matrices of equations [4] and [5] in tables 4 to 7 are based on 1,000 bootstrapped samples clustered by acquirers i grouped by their sequences of bid-bank matches tj. For some bids t one to six banks are matched as advisors, such that observation it occurs up to six times in subsample B (Adkins & Hill, 2004; Efron, 1979; Hill, Adkins, & Bender, 2003).

Table 4: Regressions of the announcement returns of bid-bank matches in advised deals

Table 4 shows the primary regressions of structural equations [4] and [5] on subsample B affected by selection. The chosen bank advisors' industry expertise and advisory relationship strength are approximated by IEDT and ARSD. The diagnostic statistics of the models' fit, the distribution and mean of the error terms are reported as well (D'Agostino, Belanger, & D'Agostino Jr., 1990). The standard errors are corrected for potential heteroscedasticity and serial correlation by bootstrapping with 1,000 repetitions, clustered by bidders and their bid-bank matches (Adkins & Hill, 2004; Hill, Adkins, & Bender, 2003; Efron, 1979).

	(1)	(2)	(3)	(4)	(5)
VARIABLES	CAR_(-2,2)_BETA1_vw				
IEDT	0.0189	0.0573***	0.0573***	0.0355**	0.0362**
	(1.554)	(3.022)	(3.053)	(2.209)	(2.371)
ARSD	-0.0089	0.0223*	0.0224*	0.0037	0.0042
	(-1.357)	(1.806)	(1.757)	(0.393)	(0.440)
PASTBBCAR	-0.0155	0.0067	0.0069	-0.0013	-0.0008
	(-0.479)	(0.203)	(0.212)	(-0.039)	(-0.025)
TADVISORTIER	-0.0010	-0.0005	0.0001	-0.0017	-0.0023
	(-0.574)	(-0.201)	(0.055)	(-0.420)	(-0.578)
DEALS3YEARS	-0.0016**	-0.0017**	-0.0018***	-0.0016**	-0.0015**
	(-2.409)	(-2.451)	(-2.596)	(-2.198)	(-2.098)
ATobinsQ	0.0025*	0.0024*	0.0024	0.0025*	0.0024*
	(1.801)	(1.747)	(1.625)	(1.759)	(1.779)
AROA	-0.0475**	-0.0480**	-0.0483**	-0.0475**	-0.0479**
	(-2.188)	(-2.277)	(-2.296)	(-2.360)	(-2.274)
ALEVERAGE	0.0055	0.0058	0.0058	0.0055	0.0055
	(0.365)	(0.380)	(0.395)	(0.380)	(0.382)
LOGME	-0.0078***	-0.0075***	-0.0074***	-0.0077***	-0.0077***
	(-3.157)	(-3.090)	(-2.891)	(-3.178)	(-3.206)
SIXTH	0.0011	0.0016	0.0017	0.0013	0.0013
	(0.297)	(0.417)	(0.444)	(0.346)	(0.355)
invmills_1		0.0012			
		(0.292)			
invmills_2		0.0091***			
		(2.936)			
invmills_3			0.0029		
			(0.673)		
invmills_4			0.0092***		
			(2.902)		
invmills_1_p				-0.0018	
				(-0.219)	
invmills_2_p				0.0037	
				(1.631)	
invmills_3_p					-0.0032
					(-0.397)
invmills_4_p					0.0038*
					(1.757)
Fixed effects	Yes	Yes	Yes	Yes	Yes
Transaction characteristics	Yes	Yes	Yes	Yes	Yes
N	8,886	8,886	8,886	8,886	8,886
Number of acquirers	4,164	4,164	4,164	4,164	4,164
Chi²-statistic	1,016.12	917.65	827.94	1,074.36	991.49
p-value	0.0000	0.0000	0.0000	0.0000	0.0000
RMSE	0.0814	0.0814	0.0814	0.0814	0.0814
R^2 adjusted	0.1539	0.1550	0.1552	0.1540	0.1540
N of bootstrap repetitions	1,000	1,000	1,000	1,000	1,000
F-Statistic of fixed effects	361.01	315.89	314.57	337.74	337.74
F-Statistic p-value	0.0000	0.0000	0.0000	0.0000	0.0000
Skewness-Kurtosis test p-value	0.0000	0.0000	0.0000	0.0000	0.0000
T-test $v_{it}^{*}=0$ p-value	0.8135	0.8798	0.8890	0.8348	0.8348

Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 5: Regressions of the announcement returns of bid-bank matches in advised deals

Table 5 shows the primary regressions of structural equations [4] and [5] on subsample B affected by selection. The chosen bank advisors' industry expertise and advisory relationship strength are approximated by IEVT and ARSV. The diagnostic statistics of the models' fit, the distribution and mean of the error terms are reported as well (D'Agostino, Belanger, & D'Agostino Jr., 1990). The standard errors are corrected for potential heteroscedasticity and serial correlation by bootstrapping with 1,000 repetitions, clustered by bidders and their bid-bank matches (Adkins & Hill, 2004; Hill, Adkins, & Bender, 2003; Efron, 1979).

	(1)	(2)	(3)	(4)	(5)
VARIABLES			CAR_(-2,2)_BETA1_vw		
IEVT	0.0109*	0.0368***	0.0368***	0.0244***	0.0247***
	(1.682)	(3.347)	(3.383)	(2.799)	(2.808)
ARSV	-0.0082	0.0290**	0.0292**	0.0115	0.0120
	(-1.232)	(2.053)	(2.046)	(1.064)	(1.201)
PASTBBCAR	-0.0153	0.0141	0.0143	0.0077	0.0081
	(-0.476)	(0.434)	(0.434)	(0.223)	(0.249)
TADVISORTIER	-0.0011	-0.0002	0.0003	-0.0015	-0.0021
	(-0.641)	(-0.092)	(0.118)	(-0.388)	(-0.536)
DEALS3YEARS	-0.0016**	-0.0017***	-0.0018***	-0.0016**	-0.0015**
	(-2.500)	(-2.595)	(-2.693)	(-2.196)	(-2.194)
ATobinsQ	0.0026*	0.0025*	0.0025*	0.0025*	0.0025*
	(1.899)	(1.766)	(1.739)	(1.811)	(1.853)
AROA	-0.0482**	-0.0496**	-0.0499**	-0.0487**	-0.0491**
	(-2.276)	(-2.496)	(-2.487)	(-2.400)	(-2.464)
ALEVERAGE	0.0053	0.0055	0.0054	0.0050	0.0050
	(0.369)	(0.372)	(0.377)	(0.333)	(0.336)
LOGME	-0.0079***	-0.0078***	-0.0076***	-0.0079***	-0.0078***
	(-3.239)	(-3.232)	(-3.184)	(-3.397)	(-3.156)
SIXTH	0.0010	0.0012	0.0012	0.0010	0.0011
	(0.259)	(0.323)	(0.318)	(0.281)	(0.292)
invmills_1_v		0.0022			
		(0.501)			
invmills_2_v		0.0108***			
		(3.023)			
invmills_3_v			0.0034		
			(0.801)		
invmills_4_v			0.0108***		
			(3.042)		
invmills_1_p_v				-0.0014	
				(-0.173)	
invmills_2_p_v				0.0055**	
				(2.310)	
invmills_3_p_v					-0.0026
					(-0.315)
invmills_4_p_v					0.0056**
					(2.445)
Fixed effects	Yes	Yes	Yes	Yes	Yes
Transaction characteristics	Yes	Yes	Yes	Yes	Yes
N	8,886	8,886	8,886	8,886	8,886
N of acquirers	4,164	4,164	4,164	4,164	4,164
Chi²-statistic	1,082.81	971.69	897.40	1,028.94	1,071.20
p-value	0.0000	0.0000	0.0000	0.0000	0.0000
RMSE	0.0814	0.0814	0.0814	0.0814	0.0814
R^2 adjusted	0.1540	0.1553	0.1555	0.1543	0.1543
N of bootstrap repetitions	1,000	1,000	1,000	1,000	1,000
F-Statistic of fixed effects	364.48	321.22	306.08	334.68	352.33
F-Statistic p-value	0.0000	0.0000	0.0000	0.0000	0.0000
Skewness-Kurtosis test p-value	0.0000	0.0000	0.0000	0.0000	0.0000
T-test $v_{it}^*=0$ p-value	0.8063	0.8788	0.8857	0.8342	0.8304

Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1

The regression analysis in table 5 is similar to the one in table 4. The banks' target industry expertise and advisory relationship strength are approximated by the relative dollar deal volume based definitions IEVT and ARSV. The empirical observations are similar. At the mean of 0.0743 and 0.1190 of IEDT or IEVT the average increase of the announcement return is $0.0573 \times 0.0743 = 0.0043$ or $0.0368 \times 0.1190 = 0.0044$. The average 0.435 percentage points higher announcement returns imply a capital gain of $878,000,000 \times 0.00435 = 3,819,300$ dollar for the bidder[11]. Hiring a bank that has advised one more deal in the last three years in the target's industry has an effect on the announcement return of $0.0573 \times 0.0185 = 0.0011$, or in economic terms $965,800$ dollar for the bidder. Measuring the economic value of a higher industry expertise of one more deal by its deal value the economic effect is $0.0368 \times 0.0527 = 0.0019$ or $1,668,200$ dollar[12].

Similarly hiring a bank with average advisory relationship strength ARSD or ARSV the positive effect for the bidder is $878,000,000 \times (0.0223 \times 0.0553) = 1,082,741$ or $878,000,000 \times (0.0290 \times 0.0557) = 1,418,233$ dollar. In other terms having advised one more deal of the bidder in the last three years measured by the relative deal

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[11] The market value of equity two days before the M&A announcement MV_(-2) has a mean of 7,920,000,000 dollar and a median of 878,000,000 dollar. The market value is the product of the outstanding shares and market price $MV\_(t) = shout_t \times prc_t$ in CRSP. MV_(-3) has a mean of 7,910,000,000 and median of 877,000,000. MV_(-1) has a mean of 7,920,000,000 and median of 886,000,000. The mean of the market value of equity at the end of the fiscal year before the M&A announcement year LOGME is $e^{21.0566} = 1,395,613,583$.

[12] The increase of IEDT and IEVT by one more deal is calculated as if one more deal had been advised: For one more deal by number $\text{IEDT+1=IEDT+}(\text{1/advised\_industry\_deal\_number\_3years})$ and for a one deal increase by value $\text{IEVT+1=IEVT+}(\text{average\_deal\_value/advised\_industry\_deal\_volume\_3years})$. The computations are similar for ARSD+1 and ARSV+1. The means are 0.0185 for IEDT+1, 0.0527 for IEVT+1, 0.0418 for ARSD+1 and 0.0424 for ARSV+1

number increases the bidder's equity value by $0.0223 \times 0.0421 = 0.0009$ or $878,000,000 \times 0.0009 = 790,200$ dollar. Measured by the deal volume of advising one more deal of the bidder in the past three years the economic effect is $0.0290 \times 0.0428 = 0.0012$ or $878,000,000 \times 0.0012 = 1,053,600$ dollar. Compared to an average cumulative abnormal return of 0.0085, implying an equity gain of $7,463,000$ dollar, the economic effects of hiring more experienced and familiar investment banks as advisors are fairly high. The hiring of banks based on their target industry expertise, strength of advisory relationship with the bidder and track record of past advisory performance aligns the bidders' and banks' incentives and interests (McLaughlin, 1990; 1992; Hunter & Walker, 1990). Banks earn higher fees while bidders benefit from gains of the market value of their equity.

4.3.4 Sensitivity analysis

The sensitivity analysis of alternative definitions of the cumulative announcement returns (CARs) are shown in tables 6 and 7. The cumulative announcement returns are calculated either by the BETA-1 Model or the CAPM, estimated on the returns from -270 to -21 days before the announcement date, and with the value- or equally-weighted CRSP index as market return proxy.

Table 6 panel A shows that the past bidder-bank matched announcement returns are always significant for event windows (-3, 3). In the case of CARs with a longer event window of (-3, 3) the economic effect of hiring a past bank advisor with a one-standard deviation higher past announcement returns is associated with a $0.0832 \times 0.0205 = 0.0017$ percent higher announcement return.

Table 6: Regressions of alternative announcement returns (CAR) of advised deals

Table 6 shows the regressions of alternative CARs. The CARs are based on the BETA-1 Model with the CRSP value- or equally-weighted index as market proxy and different event windows. The chosen bank advisors' industry expertise and advisory relationship strength are approximated by IEVT and ARSV. PASTBBCAR_(*, *) is calculated with the same CARs used as dependent variable. The diagnostic statistics of the models' fit, the distribution and mean of the error terms are reported as well (D'Agostino, Belanger, & D'Agostino Jr., 1990). The standard errors are corrected for potential heteroscedasticity and serial correlation by bootstrapping with 1,000 repetitions, clustered by bidders and their bid-bank matches (Adkins & Hill, 2004; Hill, Adkins, & Bender, 2003; Efron, 1979).

Panel A: BETA-1 Model CARs	(1)	(2)	(3)	(4)	(5)
	value-weighted CRSP		equally-weighted CRSP		
VARIABLES	(-1, 1)	(-3, 3)	(-1, 1)	(-2, 2)	(-3, 3)
IEVT	0.0302***	0.0560***	0.0275***	0.0355***	0.0562***
	(2.784)	(5.295)	(2.729)	(3.602)	(4.991)
ARSV	0.0283**	0.0440***	0.0257**	0.0282**	0.0452***
	(2.089)	(3.149)	(2.022)	(2.108)	(3.287)
PASTBBCAR_(*, *)	0.0668*	0.0832**	0.0572	0.0095	0.0871**
	(1.750)	(2.450)	(1.485)	(0.293)	(2.565)
TADVISORTIER	0.0008	0.0006	0.0002	-0.0003	0.0009
	(0.375)	(0.211)	(0.091)	(-0.120)	(0.319)
DEALS3YEARS	-0.0014**	-0.0019***	-0.0014**	-0.0017**	-0.0018**
	(-2.502)	(-2.613)	(-2.374)	(-2.499)	(-2.289)
ATobinsQ	0.0012	0.0026*	0.0011	0.0024*	0.0026*
	(0.927)	(1.712)	(0.854)	(1.783)	(1.679)
AROA	-0.0359*	-0.0432*	-0.0433**	-0.0589***	-0.0566**
	(-1.936)	(-1.938)	(-2.372)	(-2.908)	(-2.434)
ALEVERAGE	0.0079	0.0052	0.0015	-0.0011	-0.0018
	(0.597)	(0.316)	(0.117)	(-0.074)	(-0.108)
LOGME	-0.0065***	-0.0109***	-0.0061***	-0.0072***	-0.0099***
	(-3.071)	(-4.000)	(-2.940)	(-3.169)	(-3.762)
SIXTH	0.0001	0.0022	0.0011	0.0019	0.0030
	(0.035)	(0.517)	(0.351)	(0.510)	(0.709)
invmills_1_v	0.0055	0.0011	0.0041	0.0012	0.0007
	(1.520)	(0.231)	(1.188)	(0.318)	(0.153)
invmills_2_v	0.0091***	0.0155***	0.0087***	0.0106***	0.0160***
	(2.602)	(4.682)	(2.585)	(3.269)	(4.725)
Fixed effects	Yes	Yes	Yes	Yes	Yes
Transaction characteristics	Yes	Yes	Yes	Yes	Yes
N	8,886	8,886	8,886	8,886	8,886
N of acquirers	4,164	4,164	4,164	4,164	4,164
Chi^2-statistic	882.06	806.04	729.24	961.83	731.06
p-value	0.0000	0.0000	0.0000	0.0000	0.0000
RMSE	0.0723	0.0898	0.0705	0.0793	0.0879
R^2 adjusted	0.1509	0.1228	0.1429	0.1449	0.1077
N of bootstrap repetitions	1,000	1,000	1,000	1,000	1,000
F-Statistic of fixed effects	198.92	228.87	178.06	361.17	214.54
F-Statistic p-value	0.0000	0.0000	0.0000	0.0000	0.0000
Skewness-Kurtosis test p-value	0.0000	0.0000	0.0000	0.0000	0.0000
T-test $v_{it}^{*}=0$ p-value	0.8622	0.8970	0.8675	0.8938	0.9193

Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 6 (cont.): Regressions of alternative announcement returns (CAR) of advised deals

Panel B: CAPM Model CARs	(1)	(2)	(3)	(4)	(5)	(6)
	value-weighted CRSP			equally-weighted CRSP		
VARIABLES	(-1, 1)	(-2, 2)	(-3, 3)	(-1, 1)	(-2, 2)	(-3, 3)
IEVT	0.0287***	0.0389***	0.0581***	0.0247**	0.0337***	0.0530***
	(2.799)	(3.468)	(5.607)	(2.359)	(3.087)	(5.061)
ARSV	0.0262**	0.0329**	0.0490***	0.0237*	0.0304**	0.0473***
	(2.016)	(2.291)	(3.653)	(1.798)	(2.272)	(3.515)
PASTBBCAR_(*, *)	0.0934**	0.0563*	0.1349***	0.0835**	0.0436	0.1255***
	(2.436)	(1.650)	(3.666)	(2.277)	(1.310)	(3.582)
TADVISORTIER	0.0012	0.0002	0.0012	-0.0003	-0.0010	0.0004
	(0.594)	(0.100)	(0.492)	(-0.172)	(-0.412)	(0.153)
DEALS3YEARS	-0.0011**	-0.0013*	-0.0012	-0.0011*	-0.0013*	-0.0012
	(-2.019)	(-1.924)	(-1.616)	(-1.940)	(-1.846)	(-1.623)
ATobinsQ	0.0008	0.0003	0.0003	0.0006	0.0002	0.0004
	(0.671)	(0.235)	(0.214)	(0.556)	(0.154)	(0.328)
AROA	-0.0373**	-0.0492**	-0.0448*	-0.0457**	-0.0573***	-0.0610***
	(-2.153)	(-2.504)	(-1.933)	(-2.573)	(-3.025)	(-2.703)
ALEVERAGE	0.0058	0.0029	0.0020	-0.0011	-0.0027	-0.0052
	(0.454)	(0.195)	(0.122)	(-0.085)	(-0.187)	(-0.328)
LOGME	-0.0059***	-0.0071***	-0.0097***	-0.0059***	-0.0070***	-0.0091***
	(-2.751)	(-3.014)	(-3.788)	(-2.949)	(-3.252)	(-3.534)
SIXTH	0.0013	0.0023	0.0037	0.0026	0.0034	0.0049
	(0.437)	(0.648)	(0.891)	(0.904)	(0.966)	(1.215)
invmills_1_v	0.0066*	0.0038	0.0023	0.0038	0.0015	0.0002
	(1.804)	(0.943)	(0.514)	(1.202)	(0.371)	(0.052)
invmills_2_v	0.0080**	0.0110***	0.0160***	0.0077**	0.0101***	0.0154***
	(2.360)	(2.984)	(4.981)	(2.234)	(2.892)	(4.792)
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Transaction characteristics	Yes	Yes	Yes	Yes	Yes	Yes
N	8,886	8,886	8,886	8,886	8,886	8,886
N of acquirers	4,164	4,164	4,164	4,164	4,164	4,164
Chi^2-statistic	799.04	774.50	699.72	736.61	825.91	665.77
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
RMSE	0.0685	0.0777	0.0860	0.0663	0.0755	0.0841
R^2 adjusted	0.1468	0.1394	0.1045	0.1453	0.1372	0.0985
N of bootstrap repetitions	1,000	1,000	1,000	1,000	1,000	1,000
F-Statistic of fixed effects	152.50	217.76	180.33	147.37	239.76	189.28
F-Statistic p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Skewness-Kurtosis test p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T-test $v_{it}=0$ p-value	0.8669	0.8719	0.9002	0.8665	0.8775	0.9047

Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1

This higher announcement return implies an equity gain of $877,000,000 \times 0.0017 = 1,490,900$ dollar. The past performance of banks as advisors in the M&A market is of economic significance to be hired as advisor and for the bidder to maximize his gains in the acquisition, contrary to previous empirical observations of (Bao & Edmans, 2011) and (Rau, 2000).

Table 6 panel B shows similar empirical observations that a greater industry expertise IEVT, advisory relationship strength ARSV and past bidder-bank matched announcement return have significant positive effects on the acquisition return. The effect of the past bidder-bank matched returns PASTBBCAR_(*, *) is larger economically if the CARs are estimated with the CAPM. A one standard deviation higher past announcement return for the largest event window (-3, 3) is associated with a $0.1349 \times 0.0194 = 0.0026$ percent higher returns. This higher return implies an equity gain of $877,000,000 \times 0.0026 = 2,280,200$ dollar. Hence the economic effect of the track-record of past returns is significant.

Table 7 panels A and B are similar to table 6 panels A and B except with IEDT and ARSD as approximations of hired banks' target industry expertise and advisory relationship strength. The empirical observations are similar to the ones shown in tables 4 to 6. Interesting is the observation that the dollar deal volume based definitions IEVT and ARSV appear to be better, and more often significant, approximation of banks' skills and client relationships than the deal number based proxies IEDT and ARSD. The regression coefficients of PASTBBCAR_(*, *) for the event window (-2, 2) are insignificant in table 7 as well as in tables 4 and 5. A larger event window like (-3, 3) is more suitable to detect changes in the market value of equity of the bidder related to the hiring of a skilled and familiar bank as advisor.

Table 7: Regressions of alternative announcement returns (CAR) of advised deals

Table 7 shows the regressions of alternative CARs, using IEDT and ARSD as bank variables. The CARs are based on the BETA-1 Model with the CRSP value- or equally-weighted index as market proxy and different event windows. PASTBBCAR_(*, *) is calculated with the same CARs used as dependent variable. The diagnostic statistics of the models' fit and the distribution and mean of the error terms are reported as well (D'Agostino, Belanger, & D'Agostino Jr., 1990). The standard errors are corrected for potential heteroscedasticity and serial correlation by bootstrapping with 1,000 repetitions, clustered by bidders and their bid-bank matches (Adkins & Hill, 2004; Hill, Adkins, & Bender, 2003; Efron, 1979).

Panel A: BETA-1 Model CARs	(1)	(2)	(3)	(4)	(5)
	value-weighted CRSP		equally-weighted CRSP		
VARIABLES	(-1, 1)	(-3, 3)	(-1, 1)	(-2, 2)	(-3, 3)
IEDT	0.0448**	0.0887***	0.0433**	0.0582***	0.0923***
	(2.557)	(4.656)	(2.351)	(3.320)	(4.731)
ARSD	0.0225*	0.0347***	0.0223*	0.0246**	0.0388***
	(1.870)	(2.716)	(1.913)	(2.014)	(2.895)
PASTBBCAR_(*, *)	0.0610*	0.0762**	0.0532	0.0041	0.0816**
	(1.663)	(2.314)	(1.397)	(0.131)	(2.360)
TADVISORTIER	0.0003	0.0004	-0.0005	-0.0007	0.0005
	(0.131)	(0.132)	(-0.203)	(-0.304)	(0.175)
DEALS3YEARS	-0.0013**	-0.0019**	-0.0013**	-0.0017**	-0.0018**
	(-2.419)	(-2.519)	(-2.373)	(-2.400)	(-2.300)
ATobinsQ	0.0011	0.0025*	0.0010	0.0023	0.0024
	(0.870)	(1.663)	(0.805)	(1.614)	(1.610)
AROA	-0.0346**	-0.0408*	-0.0422**	-0.0574***	-0.0543**
	(-1.968)	(-1.695)	(-2.284)	(-2.773)	(-2.355)
ALEVERAGE	0.0083	0.0056	0.0019	-0.0007	-0.0013
	(0.606)	(0.336)	(0.148)	(-0.052)	(-0.082)
LOGME	-0.0063***	-0.0105***	-0.0060***	-0.0070***	-0.0095***
	(-2.830)	(-3.787)	(-2.796)	(-3.118)	(-3.606)
SIXTH	0.0004	0.0028	0.0015	0.0024	0.0037
	(0.134)	(0.645)	(0.471)	(0.664)	(0.842)
invmills_1	0.0040	0.0003	0.0023	-0.0002	-0.0006
	(1.089)	(0.075)	(0.633)	(-0.039)	(-0.129)
invmills_2	0.0078**	0.0134***	0.0081***	0.0098***	0.0146***
	(2.536)	(4.515)	(2.599)	(3.312)	(4.593)
Fixed effects	Yes	Yes	Yes	Yes	Yes
Transaction characteristics	Yes	Yes	Yes	Yes	Yes
N	8,886	8,886	8,886	8,886	8,886
N of acquirers	4,164	4,164	4,164	4,164	4,164
Chi^2-statistic	815.53	868.41	766.29	861.93	707.42
p-value	0.0000	0.0000	0.0000	0.0000	0.0000
RMSE	0.0724	0.0898	0.0705	0.0793	0.0879
R^2 adjusted	0.1502	0.1224	0.1425	0.1449	0.1075
N of bootstrap repetitions	1,000	1,000	1,000	1,000	1,000
F-Statistic of fixed effects	184.60	228.59	179.47	360.36	203.35
F-Statistic p-value	0.0000	0.0000	0.0000	0.0000	0.0000
Skewness-Kurtosis test p-value	0.0000	0.0000	0.0000	0.0000	0.0000
T-test v_{it}=0 p-value	0.8678	0.8960	0.8736	0.8959	0.9195

Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 7 (cont.): Regressions of alternative announcement returns (CAR) of advised deals

Panel B: CAPM Model CARs	(1)	(2)	(3)	(4)	(5)	(6)
	value-weighted CRSP			equally-weighted CRSP		
VARIABLES	(-1, 1)	(-2, 2)	(-3, 3)	(-1, 1)	(-2, 2)	(-3, 3)
IEDT	0.0424**	0.0588***	0.0908***	0.0379**	0.0511***	0.0812***
	(2.358)	(3.202)	(4.818)	(2.132)	(2.745)	(4.549)
ARSD	0.0214*	0.0268**	0.0403***	0.0208*	0.0267**	0.0402***
	(1.794)	(2.137)	(3.218)	(1.743)	(2.117)	(3.303)
PASTBBCAR_(*, *)	0.0885**	0.0492	0.1281***	0.0798**	0.0378	0.1195***
	(2.378)	(1.419)	(3.526)	(2.194)	(1.112)	(3.263)
TADVISORTIER	0.0008	0.0001	0.0011	-0.0008	-0.0013	0.0002
	(0.398)	(0.022)	(0.415)	(-0.429)	(-0.572)	(0.078)
DEALS3YEARS	-0.0010*	-0.0013*	-0.0012	-0.0010*	-0.0013*	-0.0012*
	(-1.873)	(-1.939)	(-1.618)	(-1.898)	(-1.887)	(-1.682)
ATobinsQ	0.0007	0.0002	0.0001	0.0005	0.0001	0.0003
	(0.621)	(0.154)	(0.100)	(0.483)	(0.077)	(0.223)
AROA	-0.0361*	-0.0474**	-0.0422*	-0.0447***	-0.0559***	-0.0588***
	(-1.946)	(-2.356)	(-1.891)	(-2.580)	(-2.813)	(-2.640)
ALEVERAGE	0.0062	0.0033	0.0025	-0.0007	-0.0023	-0.0048
	(0.469)	(0.226)	(0.148)	(-0.057)	(-0.166)	(-0.296)
LOGME	-0.0057***	-0.0068***	-0.0093***	-0.0057***	-0.0068***	-0.0087***
	(-2.625)	(-2.853)	(-3.717)	(-2.860)	(-3.068)	(-3.511)
SIXTH	0.0016	0.0027	0.0043	0.0029	0.0037	0.0055
	(0.510)	(0.741)	(1.044)	(0.937)	(1.026)	(1.371)
invmills_1	0.0053	0.0029	0.0016	0.0022	0.0003	-0.0007
	(1.469)	(0.728)	(0.353)	(0.683)	(0.076)	(-0.156)
invmills_2	0.0070**	0.0095***	0.0139***	0.0072**	0.0092***	0.0137***
	(2.312)	(3.038)	(4.728)	(2.318)	(2.867)	(4.809)
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Transaction characteristics	Yes	Yes	Yes	Yes	Yes	Yes
N	8,886	8,886	8,886	8,886	8,886	8,886
N of acquirers	4,164	4,164	4,164	4,164	4,164	4,164
Chi^2-statistic	792.29	777.65	733.68	657.88	738.45	621.74
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
RMSE	0.0685	0.0777	0.0860	0.0664	0.0755	0.0841
R^2 adjusted	0.1463	0.1391	0.1040	0.1451	0.1372	0.0981
N of bootstrap repetitions	1,000	1,000	1,000	1,000	1,000	1,000
F-Statistic of fixed effects	162.00	225.39	170.78	152.10	236.29	181.88
F-Statistic p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Skewness-Kurtosis test p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T-test v_{it}=0 p-value	0.8720	0.8748	0.9002	0.8710	0.8797	0.9039

Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1

4.4 Discussion and conclusion

The Three-step Heckit estimator for panel data with fixed effects is a direct extension of the Two-step Heckit estimator developed by (Wooldridge, 1995). The problems arising in its application are similar. The annual estimation of the bivariate probit model with selection is difficult if the number of observations affected by selection $\left(y_{it}^{2}=1\right)$ is relatively small compared to the annual sample size. The small fraction of observations affected by selection causes the distribution of the observations to be clustered at $\left(y_{it}^{2}=0\right)$. The relatively small number of observations affected by selection can also cause non-convergence and multicollinearity, caused by to little variation in the explanatory variables. In such a case the regression coefficients $\hat{\beta}$ and $\hat{\gamma}$ and calculated inverse mills ratios are weakly determined. If the number of observations per year, particularly the number of observations affected by selection $\left(y_{it}^{2}=1\right)$ or $\left(y_{it}^{1}=1\right)$, is too small to ensure convergence of the likelihood model and unevenly distributed among the time periods a pooled model is preferable. (Wooldridge, 1995) developed his Two-step Heckit estimator mostly for balanced panels and suggested a pooled estimation of the selection equation if the panel is unbalanced as well. In this case nevertheless, after excluding explanatory variables causing multicollinearity and pooling the first years with few observations affected by selection, the annual selection regressions work well. Another advantage of the proposed Three-step Heckit estimator for panels is the analysis whether sequential selection matters at all. The trick to define $\left(y_{it}^{1}=0\right)$ as $\left(y_{it}^{1}=0 \cap y_{it}^{2}=0\right)$ makes it possible to combine the two selection mechanisms in one bivariate probit model. Depending on the observability of the possible selection outcomes the bivariate probit model with parallel partial observability by (Poirier, 1980) or sequential partial observability by (Abowd & Farber, 1982) are other modeling options, explained in more detail by (Maddala, 1983b). If only one selection mechanism matters the selection equation that affects the outcome of the structural equation can be combined with the structural equation in Two-step Heckit estimation similar to (Wooldridge, 1995) or in a pooled model proposed by (Heckman, 1976; 1979). The proof in econometric appendix E.3 shows that the Two-step Heckit estimator is implied by the Three-step Heckit estimator.

Furthermore, it is known since (Palepu, 1986) that companies do not become acquisition targets randomly but are mostly underperforming relative to their industry peers. This selection mechanism can be modeled with the Three-step Heckit estimator as a first-step before the second-step decision whether the target hires an investment bank as advisor and finally whether the target's advisor choice affects the gains in takeovers, complementary to the analysis of (Kale, Kini, & Ryan, 2003), (Forte, Iannotta, & Navone, 2010) and others. Besides the application in a panel of mergers and acquisitions the modeling of sequential two-step selection in bond and equity underwriting for initial and seasoned public offerings is another possibility, extending the analyses of underwriters' influence on the issuers' proceeds of (Carter & Manaster, 1990), (Benveniste, Busaba, & Wilhelm, 2002), (Ljungqvist, Marston, & Wilhelm, 2006) and others.

In the shown application in a panel of M&As with matched banks the selection of the particular bank advisor has a significantly positive effect on the bidder's announcement returns. Modeling the advisor selection directly the preceding decision whether to hire an advisor at all is insignificant, seen by the significant pooled regression coefficients of inverse mills ratios 2 and 4 and the insignificant ones of inverse mills ratios 1 and 3. Finally the sequential two-step selection analysis of the choice of the particular bank advisor shows that banks with advisory experience in the target's industry, a close client relationship with the bidder, and a good track-record of value increasing past advised acquisitions of the bidder are good advisors. For the bidder the equity gain of millions of dollar associated with the hiring of more experienced and familiar banks pays of for banks as well, because a higher expertise, relationship strength and past acquisition advisory performance increases their chances to win the advisory mandate and to earn the fees. In the end the observation of banks with a good track-record and advisory experience winning advisory mandates is economic efficient.

5. The influence of taxes and tax factors on debt shifting in mergers and acquisitions

5.1 Introduction

In mergers and acquisitions the structure of a company changes immediately, serving as a natural experiment of capital structure adjustments. The acquired company that before the M&A was part of another conglomerate or an independent entity is now a subsidiary. As a new subsidiary it has access to the internal capital market of the company that acquired it. Mergers and acquisitions (M&A) therefore offer the opportunity to examine the economic effects of trade-off theory based tax incentives and tax-related factors to shift debt during and directly after the M&A when the merged companies' structures change immediately (Graham J. R., 1996; 2000; Ruf, Belz, & Steffens, 2011; Huizinga, Laeven, & Nicodeme, 2008). The theoretical foundation of the analyses is the tax-based trade-off theory of (Kraus & Litzenberger, 1973), (Miller, 1977) and (DeAngelo & Masulis, 1980). Form the tax-based trade-off theory the tax-related debt shifting hypothesis is derived particular relevant in M&As. The debt shifting hypothesis argues that during and after the M&A the new subsidiary ought to carry more debt if it enjoys a greater tax advantage of debt regarding its debt capacity and bankruptcy risk relative to its acquirer. The hypothesis is supported by the empirical observations in a sample of 1,844 domestic and cross-border M&As from 2000 to 2008.

During and immediately after the M&A the extended company exploits differences in corporate tax rates and tax-related constructs like holdings to place debt in the extended conglomerate where its tax advantages are maximized. The new subsidiary adjusts its debt-to-asset ratio after the M&A according to the tax incentives it faces regarding its relative profitability, size and tangibility as well as the simple differences in corporate tax rates compared to its acquirer. The significant economic effect of the difference in corporate taxes in cross-border transactions is driven by the tax rate of the target. The economic effect of the tax rate difference of 0.54 percentage points is comparable to the tax effects of debt shifting between subsidiaries found by (Huizinga, Laeven, & Nicodeme, 2008). The trade-off theory based tax incentives have additional economic effects of 0.40 to 1.91 percentage points on target's leverage. Especially the use of holdings by financial acquirers to take over companies, particularly loss-making ones, in cross-border transactions has an economic positive effect on target' leverage of 7 to 8 percentage points (Ruf, 2011; Mintz & Weichenrieder, 2010). The analysis of holdings used by financial investors is challenging, because the economic effects on debt shifting are restricted to a subsample of 2.4% of transactions involving holdings used by financial acquirers. On the other hand an unrestricted loss compensation of targets' loss carry forwards has a significant negative crowding-out effect on leverage, because it reduces the interest tax shield of additional debt. After the M&A the debt-to-assets ratio of the target decreases significantly.

This study extends the previous research in several ways. The international sample provides a greater variation of corporate tax rates that influence capital structures. The analysis of taxes and tax-related factors on capital structure in a multinational setting is possible in M&As, because they are natural experiments of the dynamic process in which the acquired company becomes a new subsidiary in an extended conglomerate. This dynamic research design is complementary to the stationary design that takes the conglomerate's structure at a point in time as given (Desai, Foley, & Hines Jr., 2004; Huizinga & Voget, 2009; Huizinga, Laeven, & Nicodeme, 2008). The study advances the tax incentives of (Huizinga, Laeven, & Nicodeme, 2008) according to the trade-off theory and considers tax-related factors that (Ruf, Belz, & Steffens, 2011) in their matching analysis of debt shifting in M&As and (Ruf, 2011) and others in the analysis of holdings did not consider. The study follows with the literature review and hypothesis development in section 2. Section 3 describes the data set and sample characteristics. Section 4 contains the univariate statistics. Section 5 presents the multivariate analysis. Section 6 finishes with the discussion and conclusion.

5.2 Literature review and hypothesis development

Taking the conglomerate structure at a point in time as given (Desai, Foley, & Hines Jr., 2004) investigate debt shifting within US multinationals and their subsidiaries using internal payments data from 1982, 1989 and 1994. A 10% higher local corporate tax rate is associated with 2.8% more affiliate leverage. Similarly using European data from Amadeus multinational corporations shift debt to subsidiaries located in host countries with high corporate tax rates or use transfer pricing to reduce taxes (Huizinga & Laeven, 2008; Huizinga, Laeven, & Nicodeme, 2008). According to (Huizinga, Laeven, & Nicodeme, 2008) the tax incentive to shift debt has an economic effect of 0.8 percentage points in addition to the regular tax effect for a total of 1.3 to 1.6 percentage points higher subsidiary leverage for a one standard deviation increase in its effective corporate tax rate.

Extending the analyses of debt and income shifting to avoid taxes (Ruf, 2011) examines debt as a tax planning tool for large multinationals that have subsidiaries in Germany. He particularly analyses holding companies and international transfer pricing as means to reduce the tax burden. He finds evidence for the use of holding companies and transfer pricing as tax planning tools but not for the use of debt. All studies have in common that in the USA, Europe and other countries multinational companies use debt on the subsidiary level to shield income from taxes.

Regarding changes in a conglomerate's structure the literature that analyzed leverage in M&As focused on the returns for target and acquirer shareholders (Raad, Ryan, & Sinkey, 1999), the probability of a company being acquired (Billett, 1996), the adjustment of acquirers' debt ratios towards leverage targets (Harford, Klasa, & Walcott, 2009), the deviation of acquirers' debt ratios from leverage targets and the deviation's influence on the probability and financing of acquisitions (Uysal, 2011), theoretical considerations of optimal leverage to maximize target shareholder synergy gains, overall firm value of the target and acquirer, and the probability of being acquired (Israel, 1991; 1992), and the changes of leverage associated with mergers (Ghosh & Jain, 2000). These studies have in common that they focus on US M&As within the US tax system. Looking at international M&As extending the analyses of (Huizinga, Laeven, & Nicodeme, 2008), (Huizinga & Laeven, 2008) and (Desai, Foley, & Hines Jr., 2004) further (Ruf, Belz, & Steffens, 2011) analyze the change of target's leverage and transfer pricing directly after the M&A with respect to differences in acquirer's and target's effective tax rates using a matched sample.

The dynamic analysis of a natural experiment of the immediate changes of the new subsidiary's and acquirer's capital structures by becoming parts of an extended conglomerate complements the static analysis of debt shifting by (Huizinga, Laeven, & Nicodeme, 2008), (Ruf, 2011) and (Desai, Foley, & Hines Jr., 2004).

The tax-related debt shifting hypothesis assumes that comparatively higher tax rate related incentives faced by the newly acquired subsidiary have a positive effect on its leverage. In the primary multivariate analysis the debt shifting hypothesis takes corporate tax rate differences across countries into account with respect to their influence on the level of debt during and after the M&A. Furthermore, M&As are suitable to investigate taxes and tax-related effects that occur in M&As only. Tax-related effects such as group taxation regimes, unlimited loss compensation and whether the acquirer is a financial investor who employs a holding company that possibly affect the target's leverage are unique to M&As.

The analysis of corporate tax rate differences affecting debt shifting is extended in the second part by advancing the tax incentive measure of (Huizinga, Laeven, & Nicodeme, 2008) according to the trade-off theory. Their measure of size weighted differences in tax rates between subsidiaries in the multinational conglomerate is extended to a bilateral tax incentive measure of size weighted tax rate differences between the acquirer and target with respect to their debt capacity. According to the tax-based trade-off theory of (Kraus & Litzenberger, 1973), (DeAngelo & Masulis, 1980) and (Miller, 1977) a company that is larger, has more tangible assets and is more profitable has a higher debt capacity and therefore is better able to exploit the tax shield of interest payments on debt compared to a smaller, less profitable company with less tangibles assets. In a domestic M&A the corporate tax rate serves as a scaling factor on the trade-off theory based incentives to shift debt. The three measures make it possible to analyze debt shifting in cross-border and domestic M&As in a unified theoretical and empirical framework.

The size of a company is associated with less information opaqueness and asymmetry, greater maturity with less risk and in general a higher debt capacity. According to the pecking-order theory the provision of access to the acquirer's internal capital market solves the information asymmetry problem with the subsidiary's outside investors (Myers & Majluf, 1984; Myers S. C., 1984; 2001). The minimization of information problems associated with debt and equity according to the pecking-order theory allows the acquirer to set the leverage levels of the subsidiary at the margin of the costs of financial distress balanced with the benefits of the tax shield, which coincides with the trade-off theory. The tax-size measure TAX_INCENTIVE models the tax incentive to shift debt caused by differences in size.

It follows that a larger acquirer might provide the missing collateral to issue debt to benefit from tax shields, which increases target's leverage. The tax-tangibility measure TAX_TANGIBLES that models the relative tax advantage regarding differences in tangible assets and asset growth (ASSET_GROWTH) multiplied by the target's and acquirer's joint tangible assets post-merger (GROWTH_COLLATERAL) consider the collateral effect on debt shifting. Small high growth companies usually have less debt capacity and prefer retained earnings and equity to finance investment due to information asymmetry problems as uncertain future cash-flows are difficult to pledge as collateral. The importance of collateral to borrow are analyzed by (Campello & Giambona, 2010) rearding redeployable assets in the case of companies in financial distress and by (Rauh & Sufi, 2010) considering bank relations as substitutes for physical collateral. Furthermore, redeployable assets are associated with lower costs of debt due to lower yield spreads and higher credit ratings and loan-to-value ratios (Benmelech & Bergman, 2009). Another reason to provide the missing collateral is the spreading of a negative spillover effect of the decrease in asset value for the acquirer if similar assets are used by his subsidiaries in financial distress (Benmelech & Bergman, 2011). To avoid this negative spread through the collateral channel the acquirer or subsidiary provides the missing collateral to avoid financial distress by increasing the borrowing capacity.

The tax-profitability measure TAX_PROFITABILITY models tax incentives to shift debt with respect to the target's and acquirer's differences in earnings before interest and taxes (EBIT). This construct takes financial distress into account. The advantage of conglomeration to reduce the risk of financial distress if access to extrenal financial markets is limited is analyzed by (Stein, 1997). Less leverage in face of higher distress risks is desirable to avoid a shortfall of corporate investments and the need of cross-subsidization of retained earnings among subsidiaries (Rajan, Servaes, & Zingales, 2000; Scharfstein & Stein, 2000). The influence of financial distress in leveraged buyouts and M&As has been analyzed in the USA empirically by (Andrade & Kaplan, 1998) and (Almeida, Campello, & Hackbarth, 2011) and theoretically by (Parnes, 2009). (Erel, Jang, & Weisbach, 2012) analyse cash holdings and changes in the cash-to-asset ratio of targets and acquirers in an international setting after the M&A. They relate changes in fixed assets as a measure of capital expenditures and the changes in cash to financial distress. The analysis of the tax-related debt shifting hypothesis requires a sample of M&As with target and acquirer data before, during, and after the M&A. The use of M&As to test the relevance of tangibles assets, profitablity, size and taxes for the capital structure after 2000 is likely to show whether the financial crisis of 2007-2009 affected firms' leverage.

5.3 Sample preparation and description

The analysis combines an event study with a window of at least (-3, 3) years around the M&A completion year with a classical capital structure analysis to analyze the capital structure shock caused by the takeover during and after the M&A completion year. Hence for each deal at least 7 years of financial statement data for the target and acquirer are needed, including the M&A completion year, to calculate for instance the net operating loss carry forwards (NOLC) in the years before the M&A. Furthermore, the period of three to four years before the M&A completion year is used to control for the run-up period in which the acquirer's and target's management position the companies strategically. Target managers anticipating acquisitions usually increase the company's leverage to extract more value for their shareholders or to reduce the likelihood of being acquired (Billett, 1996; Raad, Ryan, & Sinkey, 1999; Israel, 1991; 1992). Managers of acquiring companies reduce leverage to have spare debt capacity to finance the upcoming acquisitions (Uysal, 2011).

Econometrically the analysis of capital structure panel characteristics by (Flannery & Hankins, 2013) inspired the preparation of a panel with at least 3 periods before and after the M&A completion year to have a panel length of at least 7 periods of complete deal-company-year data. The analyses of the influence of the employed econometric model on the coefficients of leverage determinants by (Huang & Ritter, 2009), (Flannery & Hankins, 2013), (Elsas & Florysiak, 2011; 2012) and summarized by (Graham & Leary, 2011) shows that a panel as long as possible is needed with at least T=7 periods for each company. Following (Flannery & Rangan, 2006) and (Lemmon, Roberts, & Zender, 2008) the hypothesis is tested with fixed effects feasible GLS panel regressions (Wooldridge, 2002b). (Huang & Ritter, 2009) and (Flannery & Hankins, 2013) show that a fixed effects panel regression of capital structure determinants is very sensitive to the panel length. To avoid the serial autocorrelation of error terms caused by lagged leverage as benchmark in the regressions on a short panel the median and mean industry leverage is used (Flannery & Hankins, 2013; D'Mello & Farhat, 2008; Frank & Goyal, 2009). Additionally the differences in tax rates between the target and acquirer across multiple countries as well as country specific tax-related effects have to be observable as well.

From these data requirements it follows that an international sample of companies with financial statements over a long as possible time period is needed. The non-consolidated financial statements reflect the financial activity of the company as a stand-alone firm or subsidiary itself. Consolidated financial statements summarize the financial activities of the conglomerate or public corporation including all its subsidiaries. Different to (Huizinga, Laeven, & Nicodeme, 2008) the consolidated financial statements are preferred, because the acquirer is considered with all its subsidiaries already in place as one entity that acquires and integrates the target, with all its own subsidiaries, as new subsidiary into his conglomerate structure. This simplifying assumption is made, because the acquirer's and target's subsidiary structure is not observable in the M&A completion year[13].

Similar to (Erel, Jang, & Weisbach, 2012) and (Huizinga, Laeven, & Nicodeme, 2008) the financial statement data is obtained from Amadeus and Orbis, because consolidated and non-consolidated financial statements of worldwide public and private companies are needed. Furthermore, these databases can be merged with the Zephyr database of international mergers and acquisition. These advantages of international M&As and consolidated as well as non-consolidated financial statements before and after the M&A are not offered by Compustat or Compustat Global merged with the SDC M&A database. The sample reducing bottleneck is the fact that Amadeus and Orbis keep only the most recent 10 years of data of a company until it vanishes. It is difficult to obtain panels around the M&A with at least three years before and after the M&A. The data of companies outside Europe is taken from Orbis. Amadeus and Orbis share the same global financial statement

[13] (Huizinga, Laeven, & Nicodeme, 2008) observe the multinational conglomerate's subsidiary, or ownership, structure at a point in time, in 2003, when Amadeus recorded it. The ownership structure is updated annually with the historical ownership structure not being stored. Thus only the most recent ownership structure is available. (Huizinga, Laeven, & Nicodeme, 2008) make the implicit assumption that during the 10 years before 2003 from 1994 onwards the ownership structure did not change significantly. Therefore, in this study the assumption is made that the consolidated acquiring company as a whole is the target's counterparty that has an effect on tax-based debt shifting. The target as complete entity including all its subsidiaries is assumed to be taken over.

format. After merging the Zephyr M&A data in which the acquirer owns less than 50% of the target ex-ante and holds at least 50.1%, and on average 93.1%, ex-post for a controlling majority with Orbis and Amadeus, and after cleaning the sample from observations with incomplete basic capital structure variables and leverage, 15,554 company-deal-years in 1,844 M&As are left[14]. The sample preparation process is summarized in table 1 and shared with the following chapter. The M&A completion year is centered in the middle of the deal period[15], following (Harford, Klasa, & Walcott, 2009). Table 2 includes the descriptive statistics of the final sample. The majority of M&As are announced between 2005 and 2008 in the period of the financial downturns.

The latest event year is 2008 due to the fact that after the M&A at least 3 years of data until the end of 2011 are needed. The sample is used in chapter 6 as well. The USA is underrepresented, because in Orbis almost only consolidated financial statements of public acquirers and independent public targets are available for the USA with the new subsidiary's financial statements usually no longer filed after its takeover[16]. The transactions are distributed over 47 countries with the majority occurring in Europe.

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[14] The deal years with total debt exceeding total assets were mostly British limited liability companies with minimal assets but lots of debt such that total equity was negative. These appeared to be empty corporate shells. Accumulating acquisitions occurred mostly in China in which acquirers used small increments of 2-5 percentage acquisitions to buy up targets. The overlapping deals occurred in Brazil, Czech Republic, Spain, France, Great Britain, Greece, Norway, Russia and the Ukraine. The targets excluded with several takeover completions on the same date appeared to be bought by a consortium of subsidiaries of the same company, because the immediate acquirers' names were similar. In these excluded cases the multiple records referred to one acquisition.

[15] The M&A completion and announcement year coincide in 93.6% of the deals that are small and executed quickly. In a previous version of the study the announcement year was used. According to (Schwert, 2000) the announcement date is not always identical in all sources and a run-up period occurs before this date. The empirical observations do not differ between analyses using the completion or announcement year.

[16] The same problem of missing post-merger subsidiary financial statements occurs in Compustat Global and North America, too. The new subsidiary is fully integrated, such that consolidated statements of the merged company are available only. This made it impossible to add a North American sample to the international sample for a more balanced representation of the larger economies.

Table 1: Data preparation and sample creation

The extracted ORBIS and Amadeus data includes company-years with available total assets in unconsolidated (U1 or U2) or consolidated (C1 or C2) financial statements. If consolidated and unconsolidated statements of a company are available the consolidated statements are taken. Consolidated financial statements are available in most cases for public corporations. Subsidiaries, branches and independent private companies have mostly unconsolidated financial statements.

	M&As or Firm-years	Deal-Firm-Years
1.) Extracting international M&As from Zephyr		
Deals with target and acquirer identifiers in majority transactions	138,754	
dropping incomplete transactions	-22,672	
dropping targets with several completion announcements on the same day	-578	
dropping transactions with a missing completion date	-3	
dropping accumulating acquisitions of the same target by the same acquirer	-4,496	
	111,005	
expanded with 9 years for each deal (-4 to +4 years)		999,045
2.) Extracting ORBIS international company data	964,297	
matching with Zephyr for targets and acquirers		567,874
3.) Extracting Amadeus European company data	325,487	
matching with Zephyr for targets and acquirers		313,449
4.) Merging Zephyr, Amadeus and Orbis into one data set	999,045	
merging Zephyr with Zephyr-Orbis and Zephyr-Amadeus into one data set		578,534
dropping deal-years in which the target and acquirer coincide		-3,057
dropping deal-years with total debt exceeding total assets and negative equity		-53,208
dropping deal-years with missing target total assets		-248,021
dropping finance targets with SIC core code 600 to 699		-46,004
		228,244
5.) After generating the variables		
dropping deal-company-years with incomplete target and acquirer variables		-212,600
dropping deals in which the target is acquired and sold with overlapping time series		-90
Final M&A sample with complete target and acquirer deal-company-year data	1,844	15,554
- thereof deals with 7 years of target and acquirer data and variables	63	
- thereof deals with 8 years of target and acquirer data and variables	916	
- thereof deals with 9 years of target and acquirer data and variables	865	

The sample characteristics are shown in panel D of table 2. The panel shows that the majority of targets and acquirers are relatively small private companies. The targets have median total assets of 7.14 million dollars in 1983 dollars. The mean is significantly larger due to some large public targets. The acquirers are on average 17.8 times larger than the targets. Otherwise the sample extracted from Orbis and

Amadeus exhibits the same characteristics as the one of (Erel, Jang, & Weisbach, 2012) and (Huizinga, Laeven, & Nicodeme, 2008). On average 57.7% of targets are independent companies. Being acquired and integrated by a manifold larger company changes the acquired company's access to internal funds, and thus its ability to adapt its capital structure[17]. The distribution of targets and acquirers among countries in panel E shows that countries hosting at least 10 transactions have companies with assets smaller than one billion dollar on average. Countries with a few transactions stand out with the large targets and acquirers they host. One could argue to drop these deals and countries. However, they are retained to maximize the variance in tax rates and tax effects between countries. The variables used are defined in table F in the statistical appendix. The independent variables are taken from the capital structure literature. Free cash-flow, depreciation and sales growth are not used, because these variables are less complete, which reduced the sample size considerably. Free cash-flow and return on assets are highly correlated, which holds for tangible assets and depreciation as well as sales and asset growth. The dependent variables of leverage are defined similar to (Frank & Goyal, 2009) and (Huizinga, Laeven, & Nicodeme, 2008). The tax and control variables are obtained from various data sources and their definitions are adapted, described in table F in the statistical appendix.

[17] For 17.1% of the deal-years the total assets and total debt of the vendor are available, which is not shown. This illustrates how difficult it is to obtain vendor data. Therefore, the influence of the access to the previous owner's, the vendor's, internal capital market on the target's leverage cannot be analyzed or controlled for.

Table 2: M&As over time and countries

Panel A: Distribution of M&As over time

Year	N	Mergers	Acquisitions
2000	2	0	2
2001	1	0	1
2002	4	0	4
2003	9	0	9
2004	35	0	35
2005	392	3	389
2006	439	4	435
2007	525	2	523
2008	437	1	436
	1,844	10	1,834

Panel B: Panel without gaps

t	Unbalanced
-4	1,370
-3	1,844
-2	1,844
-1	1,844
0	1,844
1	1,844
2	1,844
3	1,844
4	1,276
	15,554

t=0 is the M&A completion year.

Panel C: Company Countries

Country	Acquirer	Target
Austria	18	4
Australia	10	2
Belgium	107	122
Brazil	5	8
Canada	9	2
Switzerland	26	2
China	4	5
Colombia	1	0
Czech Republic	11	27
Germany	62	57
Denmark	8	1
Estonia	1	8
Spain	200	205
Finland	73	65
France	313	326
Great Britain	152	158
Greece	23	26
Hong Kong	4	4
Croatia	15	22
Hungary	12	15
Indonesia	0	1
Ireland	16	5
Israel	2	0
Iceland	1	1
Italy	136	175
Japan	86	77
South Korea	0	3
Lithuania	2	0
Luxembourg	6	2
Mexico	2	0
Malaysia	4	4
Norway	96	106
New Zealand	2	1
Peru	1	6
Philippins	1	1
Poland	46	55
Portugal	36	37
Romania	14	36
Russia	54	59
Sweden	167	172
Singapore	4	2
Slovakia	3	9
Thailand	4	6
Turkey	1	2
Ukraine	14	20
United States	89	3
South Africa	3	2
	1,844	1,844

Table 2 (cont.): M&As over time and countries

Panel D: Characteristics of M&As over time (one year before the M&A)

		Target's total assets ($mil)		Acquirer's total assets ($mil)		Target's leverage	Acquirer's leverage				
Year	N	Mean	Median	Mean	Median	Mean	Mean	Domestic Deals (%)	Independent Targets (%)	Public Targets (%)	Public Acquirers (%)
2000	2	0.27	0.27	6.39	6.39	0.55	0.64	50.00%	100.00%	0.00%	0.00%
2001	1	1.26	1.26	1.56	1.56	0.46	0.89	100.00%	100.00%	0.00%	0.00%
2002	4	9.07	3.76	15.66	12.84	0.80	0.76	100.00%	50.00%	75.00%	50.00%
2003	9	25.58	4.83	263.81	7.11	0.59	0.62	88.89%	33.33%	44.44%	22.22%
2004	35	25.10	5.27	658.92	64.27	0.58	0.56	85.71%	51.43%	48.57%	57.14%
2005	392	125.21	9.47	3,328.85	145.83	0.58	0.60	68.62%	56.38%	42.86%	68.37%
2006	439	107.02	6.39	2,415.54	118.46	0.59	0.60	63.55%	60.36%	32.57%	68.34%
2007	525	104.50	5.90	2,241.03	96.18	0.58	0.60	67.24%	57.52%	33.33%	63.24%
2008	437	143.42	7.95	1,760.16	199.50	0.58	0.57	69.11%	56.98%	38.44%	67.73%
	1,844	116.46	7.14	2,351.72	126.98	0.58	0.59	67.62%	57.65%	36.77%	66.16%

Table 2 (cont.): M&As over time and countries

Panel E: Characteristics of M&As by country (one year before the M&A)

Target Country	N	Target's total assets ($mil) Mean	Target's total assets ($mil) Median	Acquirer's total assets ($mil) Mean	Acquirer's total assets ($mil) Median	Target's leverage Mean	Acquirer's leverage Mean	Domestic Deals (%)	Independent Targets (%)	Public Targets (%)	Public Acquirers (%)
Austria	4	27.01	26.90	73.39	76.54	0.61	0.58	50.00%	25.00%	50.00%	100.00%
Australia	2	108.29	108.29	388.22	388.22	0.37	0.46	50.00%	100.00%	100.00%	100.00%
Belgium	122	113.19	4.82	1,066.19	53.44	0.60	0.59	65.57%	70.49%	24.59%	47.54%
Brazil	8	2,037.26	342.82	6,430.87	4,663.14	0.54	0.64	37.50%	75.00%	50.00%	75.00%
Canada	2	738.34	738.34	8,868.15	8,868.15	0.44	0.44	50.00%	100.00%	100.00%	100.00%
Switzerland	2	15.81	15.81	1,487.55	1,487.55	0.70	0.65	100.00%	50.00%	100.00%	50.00%
China	5	426.43	231.07	3,761.09	1,088.11	0.51	0.55	60.00%	60.00%	100.00%	100.00%
Czech Republic	27	152.54	10.44	2,630.95	135.63	0.45	0.48	40.74%	51.85%	51.85%	92.59%
Germany	57	295.28	31.74	3,857.58	516.65	0.61	0.58	36.84%	42.11%	28.07%	82.46%
Denmark	1	2,264.16	2,264.16	9,544.15	9,544.15	0.53	0.68	0.00%	0.00%	0.00%	100.00%
Estonia	8	4.25	3.11	276.62	62.47	0.53	0.58	12.50%	25.00%	50.00%	62.50%
Spain	205	54.69	8.79	2,186.76	73.13	0.62	0.63	76.59%	50.73%	64.88%	69.27%
Finland	65	12.27	3.40	581.70	14.96	0.56	0.60	75.38%	40.00%	1.54%	35.38%
France	326	112.79	4.94	2,311.63	93.33	0.58	0.60	73.01%	63.80%	19.94%	61.04%
Great Britain	158	24.55	6.68	1,394.35	157.50	0.58	0.58	57.59%	49.37%	1.90%	65.82%
Greece	26	207.67	23.71	1,529.33	218.68	0.57	0.58	76.92%	61.54%	100.00%	96.15%
Hong Kong	4	1,981.71	606.76	5,436.58	3,739.76	0.37	0.42	75.00%	50.00%	100.00%	100.00%
Croatia	22	13.65	5.96	1,886.51	182.22	0.50	0.58	68.18%	77.27%	40.91%	81.82%
Hungary	15	283.74	13.37	7,601.46	794.06	0.51	0.52	60.00%	60.00%	13.33%	53.33%
Indonesia	1	164.16	164.16	307.20	307.20	0.55	0.50	0.00%	100.00%	100.00%	100.00%

Table 2 (cont.): M&As over time and countries

Panel E (cont.): Characteristics of M&As by country (one year before the M&A)

		Target's total assets ($mil)		Acquirer's total assets ($mil)		Target's leverage	Acquirer's leverage				
Target Country	N	Mean	Median	Mean	Median	Mean	Mean	Domestic Deals (%)	Independent Targets (%)	Public Targets (%)	Public Acquirers (%)
Ireland	5	13.45	11.20	863.17	609.43	0.44	0.75	40.00%	60.00%	0.00%	100.00%
Iceland	1	21.31	21.31	100.55	100.55	0.37	0.64	0.00%	100.00%	100.00%	100.00%
Italy	175	187.71	12.61	3,395.24	231.43	0.69	0.64	66.29%	54.86%	62.86%	82.29%
Japan	77	242.61	69.88	5,060.83	1,829.26	0.54	0.58	98.70%	79.22%	98.70%	100.00%
South Korea	3	200.40	4.41	8,133.27	2,410.33	0.45	0.56	0.00%	100.00%	100.00%	66.67%
Luxembourg	2	50.67	50.67	32,360.22	32,360.22	0.46	0.62	50.00%	0.00%	0.00%	100.00%
Malaysia	4	90.70	48.34	2,174.95	1,916.39	0.24	0.59	75.00%	75.00%	100.00%	100.00%
Norway	106	47.77	3.11	617.24	66.92	0.64	0.62	66.04%	68.87%	3.77%	38.68%
New Zealand	1	230.42	230.42	5,410.25	5,410.25	0.57	0.61	0.00%	0.00%	100.00%	100.00%
Peru	6	215.52	197.79	10,678.03	3,523.36	0.49	0.51	16.67%	50.00%	83.33%	100.00%
Philippins	1	421.43	421.43	767.79	767.79	0.26	0.42	100.00%	100.00%	100.00%	100.00%
Poland	55	116.18	9.85	3,196.89	145.54	0.53	0.53	69.09%	43.64%	52.73%	80.00%
Portugal	37	171.42	19.87	2,158.19	146.98	0.69	0.64	70.27%	54.05%	91.89%	89.19%
Romania	36	30.19	3.14	6,738.21	200.66	0.46	0.52	36.11%	44.44%	61.11%	77.78%
Russia	59	38.84	9.01	4,098.30	231.57	0.52	0.56	86.44%	49.15%	62.71%	76.27%
Sweden	172	19.20	2.21	415.13	25.23	0.55	0.57	69.19%	61.63%	0.58%	44.77%
Singapore	2	128.16	128.16	793.87	793.87	0.29	0.30	100.00%	50.00%	100.00%	100.00%
Slovakia	9	24.54	3.77	2,210.00	99.59	0.48	0.52	22.22%	55.56%	55.56%	88.89%
Thailand	6	16.01	12.56	3,744.63	608.89	0.60	0.47	50.00%	50.00%	16.67%	66.67%
Turkey	2	979.83	979.83	2,832.16	2,832.16	0.64	0.78	50.00%	50.00%	100.00%	50.00%
Ukraine	20	42.39	11.14	1,126.33	134.83	0.31	0.47	65.00%	45.00%	55.00%	50.00%
United States	3	29.58	8.38	1,093.21	1,564.08	0.53	0.54	66.67%	33.33%	66.67%	66.67%
South Africa	2	2,072.73	2,072.73	12,907.83	12,907.83	0.53	0.51	0.00%	100.00%	100.00%	100.00%
		116.46	7.14	2,351.72	126.98	0.58	0.59	67.62%	57.65%	36.77%	66.16%

5.4 Univariate analysis

The dependent variables total debt-to-assets ratio LEVERAGE and adjusted leverage ADJLEVERAGE are defined according to (Huizinga, Laeven, & Nicodeme, 2008) and (Huizinga & Voget, 2009). Financial leverage FINLEVERAGE is defined according to (Frank & Goyal, 2009) as long-term interest bearing debt plus short-term interest bearing debt in current liabilities[18]. The median industry total leverage and adjusted leverage as well as the mean industry financial leverage are on average larger than targets' means and medians, shown in table 3[19].

The statutory corporate tax rate STR_T is the most important taxation variable used in the capital structure literature and associated with the tax-shield of debt according to the trade-off theory (Graham J. R., 1996; 2000). The differences in the statutory corporate tax rates are driven by international transactions. The identification of tax effects on leverage is difficult if national group taxation regimes allow the consolidated of gains and losses for tax purposes of subsidiaries as if they were one company (Hebous, Ruf, & Weichenrieder, 2011). The dummy

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[18] The US based capital structure and taxation literature often uses a different definition of leverage than the international, or rather European, literature. To compare the effects in this study with those studies using Compustat data the financial leverage defined as long-term debt (item #9) plus debt in current liabilities (item #34) is similar to financial leverage defined as long-term debt (Orbis item 417 or Amadeus item 15) plus loans (Orbis item 420 or Amadeus item 18) (see Amadeus and Orbis handbooks).

[19] The Amadeus universe downloaded annually from WRDS including all very large, large, medium and small companies with consolidated and unconsolidated financial statements is merged with the 964,297 Orbis company years. The universe exhibits large positive outliers for total and adjusted leverage. To avoid skewness caused by outliers the median industry total and adjusted leverage is used. For financial leverage however the median was 0, because more than half of the companies have missing or negative financial leverage. For industry financial leverage the mean provides more reasonable values for those companies that have financial leverage above 0. In the final sample 12.5% of acquirers and 8.3% of targets are from Orbis outside Europe.

variable NOGROUPTAX approximates the missing possibility of tax planning if the target's or acquirer's host country does not allow group taxation (van Boeijen-Ostaszewska & Schellekens, 2012).

LOSSFORWARD is a dummy for unrestricted loss compensation, the ability to carry accumulated losses of the acquired company over into the new company to retain the tax shield of tax-loss carry forwards, multiplied with the pre-merger net operating loss carry forward (NOLC) (Erickson & Wang, 2007; Frank & Goyal, 2009).

On the acquirer's side the motive to buy targets mostly for financial rather than strategic reasons is approximated with the financial investor and asset ratio variable FININV_RATIO_A (Andrade & Kaplan, 1998). This variable approximates the amount of relative assets invested by the acquirer into the target, given that the acquirer is a financial investor using a holding company. This variable is constructed with the dummy HOLDING_A whether the immediate acquirer is a holding or investment company (Mintz & Weichenrieder, 2010; Hebous, Ruf, & Weichenrieder, 2011). The variables FINANCIALINV_A and HOLDING_A are components of FININV_RATIO_A. The dummy FINANCEFIRM_A is 1 if the acquirer is a financial company of any type. In the primary regressions the financial investor ratio FININV_RATIO_A is used as the only financial acquirer variable to avoid multicollinearity.

Table 3: Descriptive Statistics of Variables

The independent, target, acquirer and post-merger variables are winsorized at the 1% and 99% percentiles. The post-merger and tax variables, except the statutory corporate tax rate STR_T, are 0 before the M&A completion year. Not for all transactions are all variables in the years -4 and +4 available as Amadeus and Orbis have data only for the recent 10 years, such that the panel is unbalanced. The statutory corporate tax rate STR_T is used according to (Graham, 1996; 2000). The variables' definitions are presented in table F in the statistical appendix.

Panel A: Dependent Variables	N	Mean	Std. Dev.	Min.	Median	Max.
LEVERAGE_T	15,523	0.5754	0.2351	0.0000	0.6006	0.9951
ADJLEVERAGE_T	15,346	0.4237	0.2909	0.0000	0.4318	1.0000
FINLEVERAGE_T	14,561	0.1494	0.1838	0.0000	0.0675	0.8534
Panel B: Target Variables	**N**	**Mean**	**Std. Dev.**	**Min.**	**Median**	**Max.**
SIZE_T	15,554	16.0108	2.1043	4.9242	15.7926	22.6000
TAR_T	15,539	0.2334	0.2394	0.0000	0.1471	0.9483
CASH_T	15,524	0.1230	0.1598	0.0000	0.0584	0.9967
ROA_T	15,544	0.0823	0.1519	-0.9377	0.0626	0.7604
RnD_T	15,554	0.0010	0.0131	0.0000	0.0000	0.6233
MLEVERAGE_T	15,554	0.6225	0.0627	0.3779	0.6421	0.7105
MADJLEVERAGE_T	15,554	0.4480	0.0878	0.1519	0.4798	0.5735
MFINLEVERAGE_T	15,554	0.1368	0.0302	0.0840	0.1340	0.2398
ASSET_GROWTH_T	15,554	0.0627	0.3926	-7.3316	0.0073	10.4821
INDEPENDENT	15,554	0.5761	0.4942	0.0000	1.0000	1.0000
INFLATION_T	15,512	0.0267	0.0294	-0.0448	0.0213	0.4567
PRIVATE_T	15,554	0.6384	0.4805	0.0000	1.0000	1.0000
AFTER_MERGER	15,554	0.5563	0.4968	0.0000	1.0000	1.0000
Panel C: Acquirer Variables	**N**	**Mean**	**Std. Dev.**	**Min.**	**Median**	**Max.**
SIZE_A	15,344	18.8226	2.5840	10.1475	18.7502	25.7373
TAR_A	15,342	0.2101	0.2041	0.0000	0.1445	0.8784
CASH_A	15,323	0.0980	0.1160	0.0000	0.0599	0.8569
ROA_A	15,341	0.0645	0.0902	-0.5197	0.0578	0.4518
ALEVERAGE_A	15,338	0.0178	0.2194	-0.5837	0.0282	0.6192
Panel D: Post-Merger Tax Variables	**N**	**Mean**	**Std. Dev.**	**Min.**	**Median**	**Max.**
STR_T	15,454	0.3062	0.0554	0.1250	0.3000	0.5160
TAXDIFF_T_A	15,464	-0.0033	0.0350	-0.2750	0.0000	0.2149
TAX_INCENTIVE_T_A	15,436	-0.1228	0.1434	-0.4068	-0.0588	0.3929
TAX_TANGIBLES_T_A	15,426	-0.0237	0.0482	-0.3193	0.0000	0.2558
TAX_PROFITABILITY_T_A	15,434	-0.0072	0.0232	-1.5918	0.0000	0.3517
Panel E: Post-Merger Variables	**N**	**Mean**	**Std. Dev.**	**Min.**	**Median**	**Max.**
ASSETRATIO_T_A	15,344	0.8581	0.1058	0.5003	0.8561	1.1921
GROWTH_COLLATERAL_T	15,500	0.0041	0.0695	-1.2790	0.0000	1.4762
LOSSFORWARD_T	15,554	-0.0278	0.2369	-7.2077	0.0000	0.0000
NOGROUPTAX_T	15,554	0.0728	0.2599	0.0000	0.0000	1.0000
FININV_RATIO_A	15,513	0.0069	0.0813	0.0000	0.0000	1.2943
FINANCEFIRM_A	15,554	0.1353	0.3420	0.0000	0.0000	1.0000
HOLDING_A	15,554	0.0244	0.1542	0.0000	0.0000	1.0000
FINANCIALINV_A	15,554	0.0130	0.1132	0.0000	0.0000	1.0000

The political and economic control variables used by (Djankov, McLiesh, & Shleifer, 2007), (La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1997; 1998), (Booth, Aivazian, Demirguc-Kunt, & Maksimovic, 2001) and (Huizinga, Laeven, & Nicodeme, 2008) were analyzed but turned out to be highly correlated[20]. Therefore, only INFLATION as economic control variable is taken from the World Bank's economic indicators. INDEPENDENT is a dummy whether the target was an independent company before the M&A. AFTER_MERGER is a dummy to control for the break the takeover constitutes, 0 before the M&A completion year and 1 for the completion year and afterwards (Harford, Klasa, & Walcott, 2009; Ghosh & Jain, 2000; Erel, Jang, & Weisbach, 2012). After the M&A the tax and tax-related variables are nonzero and zero before the M&A as they can have an effect only during and after the M&A on targets' leverage. The statutory corporate tax rates are nonzero before the M&A completion year. From the correlation analysis it followed that the capital structure control variables are correlated. Size, tangible assets, cash and the return on assets are correlated, which could cause multicollinearity. The tax variables are correlated due to their construction.

The changes of the most important variables before and after the merger are shown in table 4. The univariate analysis over time shows that after the M&A targets' total leverage decreases significantly. The acquirer's abnormal leverage ALEVERAGE is negative before the M&A. The acquirer is underleveraged with spare debt capacity compared to his industry. Financing the acquisition with debt causes ALEVERAGE to jump up during and after the M&A. This financing effect is observed by (Harford, Klasa, & Walcott, 2009) as well.

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[20] The economic and political control variables used in the literature were missing for some countries, such as the creditor rights rating and accounting disclosure ratings from (La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1997; 1998), reducing the sample considerably, or highly correlated causing multicollinearity. In general economies with higher statutory corporate tax rates are politically less risky, have better creditor protection rights and a higher accounting disclosure as well as larger debt and equity markets and are more likely to restrict the carryover of accumulated losses after the acquisition. The tables of the preliminary regression analysis of possible control variables are available upon request.

On the target's side the statutory corporate tax rate, its tangible asset ratio, cash ratio, profitability and asset growth decrease significantly. The decrease in cash and profitability of the target is observed by (Erel, Jang, & Weisbach, 2012), too. The tax differences adjusted for differences in size, tangible assets and profitability shown in panel D decrease in absolute value after the merger, which is likely to reduce the tax-based incentive to shift debt. However, the simple tax rate difference driven by international transactions is increasing in absolute value. Whether the tax differences and tax incentive related to the trade-off theory affect targets' post-merger debt and associated debt shifting is analyzed further in the multivariate analysis.

Table 4: Differences of variables before and after the M&A

Table 4 shows the time series of variables before and after the M&A. The values are the variables' means in the respective time period. The t-test shows the differences of the variables before and after the M&A with the p-values. The variables are summarized in table 3 and the definitions are shown in table A in the appendix.

	t	-4	-3	-2	-1	0	1	2	3	4	T-test	[-1 to 1]	T-test	[-3 to 3]
Panel A: Leverage Variables	n	1,370	1,844	1,844	1,844	1,844	1,844	1,844	1,844	1,276	Diff	p-value	Diff	p-value
LEVERAGE_T_w	mean	0.6060	0.5965	0.5936	0.5820	0.5695	0.5647	0.5608	0.5579	0.5466	-0.0173	0.0000	-0.0386	0.0000
ADJLEVERAGE_T_w	mean	0.4431	0.4346	0.4268	0.4152	0.4061	0.4181	0.4208	0.4265	0.4285	0.0029	0.3738	-0.0080	0.1767
FINLEVERAGE_T_w	mean	0.1606	0.1618	0.1553	0.1523	0.1448	0.1445	0.1429	0.1449	0.1369	-0.0078	0.0073	-0.0169	0.0015
MLEVERAGE_T_w	mean	0.6340	0.6323	0.6302	0.6296	0.6264	0.6209	0.6145	0.6084	0.6034	-0.0087	0.0000	-0.0239	0.0000
MADJLEVERAGE_T_w	mean	0.4732	0.4691	0.4630	0.4587	0.4507	0.4427	0.4344	0.4231	0.4131	-0.0159	0.0000	-0.0460	0.0000
MFINLEVERAGE_T_w	mean	0.1225	0.1247	0.1289	0.1333	0.1414	0.1450	0.1457	0.1453	0.1427	0.0116	0.0000	0.0206	0.0000
ALEVERAGE_A_w	mean	-0.0062	-0.0063	-0.0008	-0.0015	0.0234	0.0327	0.0358	0.0403	0.0421	0.0342	0.0000	0.0467	0.0000
Panel B: Target Variables														
SIZE_T_w	mean	15.5846	15.7423	15.8799	16.0016	16.0692	16.1657	16.2033	16.1712	16.2408	0.1641	0.0000	0.4289	0.0000
TAR_T_w	mean	0.2385	0.2433	0.2416	0.2364	0.2280	0.2315	0.2280	0.2251	0.2275	-0.0049	0.0506	-0.0182	0.0000
CASH_T_w	mean	0.1399	0.1324	0.1294	0.1327	0.1352	0.1161	0.1096	0.1057	0.1042	-0.0166	0.0000	-0.0267	0.0000
ROA_T_w	mean	0.0803	0.0888	0.0934	0.0991	0.0882	0.0842	0.0741	0.0646	0.0614	-0.0149	0.0000	-0.0242	0.0000
RnD_T_w	mean	0.0005	0.0007	0.0010	0.0008	0.0013	0.0015	0.0011	0.0013	0.0010	0.0006	0.0200	0.0006	0.0193
ASSET_GROWTH_T	mean	0.0000	0.1109	0.1376	0.1218	0.0676	0.0965	0.0376	-0.0321	-0.0161	-0.0253	0.0257	-0.1430	0.0000
GROWTH_COLLATERAL_T	mean	0.0000	0.0000	0.0000	0.0000	0.0131	0.0195	0.0073	-0.0045	-0.0019	0.0195	0.0000	-0.0045	0.0000
LOSSFORWARD_T	mean	0.0000	0.0000	0.0000	0.0000	-0.0361	-0.0411	-0.0505	-0.0628	-0.0639	-0.0411	0.0000	-0.0628	0.0001

Table 4 (cont.): Differences of variables before and after the M&A

Table 4 shows the time series of variables before and after the M&A. The values are the variables' means in the respective time period. The t-test shows the differences of the variables before and after the M&A with the p-values. The variables are summarized in table 3 and the definitions are shown in table A in the appendix.

	t	-4	-3	-2	-1	0	1	2	3	4	T-test	[-1 to 1]	T-test	[-3 to 3]
Panel C: Acquirer Variables	n	1,370	1,844	1,844	1,844	1,844	1,844	1,844	1,844	1,276	Diff	p-value	Diff	p-value
SIZE_A_w	mean	18.2172	18.3475	18.5247	18.7359	18.9582	19.0867	19.1378	19.1284	19.1711	0.3508	0.0000	0.7809	0.0000
TAR_A_w	mean	0.2142	0.2231	0.2197	0.2133	0.2054	0.2062	0.2038	0.2018	0.2029	-0.0071	0.0005	-0.0213	0.0000
CASH_A_w	mean	0.1108	0.1083	0.1092	0.1078	0.0910	0.0889	0.0894	0.0892	0.0891	-0.0188	0.0000	-0.0192	0.0000
ROA_A_w	mean	0.0612	0.0699	0.0761	0.0803	0.0715	0.0627	0.0546	0.0510	0.0456	-0.0176	0.0000	-0.0188	0.0000
ASSETRATIO_T_A_w	mean	0.8657	0.8672	0.8654	0.8616	0.8538	0.8528	0.8526	0.8515	0.8538	-0.0088	0.0046	-0.0158	0.1274
Panel D: Post-Merger Tax Variables														
STR_T	mean	0.3287	0.3205	0.3151	0.3110	0.3048	0.2994	0.2945	0.2912	0.2908	-0.0116	0.0000	-0.0293	0.0000
TAXDIFF_T_A	mean	0.0000	0.0000	0.0000	0.0000	-0.0054	-0.0058	-0.0061	-0.0063	-0.0065	-0.0058	0.0163	-0.0063	0.0569
TAX_INCENTIVE_T_A	mean	0.0000	0.0000	0.0000	0.0000	-0.2264	-0.2250	-0.2213	-0.2197	-0.2165	-0.2250	0.0000	-0.2197	0.0000
TAX_TANGIBLES_T_A	mean	0.0000	0.0000	0.0000	0.0000	-0.0439	-0.0436	-0.0425	-0.0418	-0.0418	-0.0436	0.0006	-0.0418	0.0003
TAX_PROFITABILITY_T_A	mean	0.0000	0.0000	0.0000	0.0000	-0.0163	-0.0139	-0.0123	-0.0114	-0.0097	-0.0139	0.0000	-0.0114	0.0000

5.5 Multivariate analysis

5.5.1 Analysis of primary tax incentives to shift debt

Before estimating the equations using fixed effects feasible GLS panel models the multivariate outliers are analyzed with the Mahalanobis distance D^2 measure (Mahalanobis, 1936; Bar-Hen & Daudin, 1995). The Mahalanobis distance measure has the useful property of rescaling the variables onto a common scale, be they continuous or binary. The measure calculates the joint distance of an observation from the average observation, the centroid, in the middle of the sample. Under the assumption of a multivariate normal distribution the 99% and 99.9% confidence intervals for all observations are computed. Multivariate outliers are calculated whether they fall outside the confidence interval of the normal distribution around the n-dimensional sphere in which all observations around the centroid are clustered (Hair, Anderson, Tatham, & Black, 1998). At the 1% and 0.1% level multivariate outliers with n=23 target and acquirer variables and degrees of freedom are not detected.

The (Breusch & Pagan, 1980) LM test does not reject the hypothesis of the random effects model being appropriate. The (Hausman, 1978) test on the other hand rejects the random effects model in favor of the fixed effects model. With year dummies the remaining degrees of freedom are not sufficient to cluster the error terms by targets to correct for potential heteroscedasticity with the Huber & White sandwich estimator (Huber, 1967; White, 1980)[21]. Including year dummies and using the conventional variance-covariance estimator the year dummies are mostly insignificant. Controlling for heteroscedasticity is therefore more important than controlling for possible unobservable time effects. The year dummies are highly correlated with the statutory corporate tax rates, because the larger European economies reduced corporate taxes during and after the financial crisis.

In the basic tax-related debt shifting regressions of the target the coefficients of the capital structure control variables are similar to (Lemmon, Roberts, & Zender, 2008), (Frank & Goyal, 2009), and (Wald, 1999). The statutory corporate tax rate in the target's country is significantly positively correlated with its debt-to-assets ratio. In table 5 of the target's leverage the basic tax-related debt shifting effect caused by differences in the statutory corporate tax rates is shown. A one-standard deviation increase in the target's statutory corporate tax rate increases its total debt-to-assets ratio by $0.6627 \times 0.0554 = 0.0367$ or 3.67 percentage points. The economic effect of the tax rate difference is $0.1542 \times 0.0350 = 0.0054$ 0.1542x0.0350=0.0054 or 0.54 percentage points for a one standard deviation increase. The total effect of 4.21 percentage points during and after the M&A is larger than the combined economic effect of the tax rate and tax incentive according to (Huizinga, Laeven, & Nicodeme, 2008).

In addition to the tax rates the other tax-related effects have the expected signs. Their individual economic effects are smaller than the tax effects whereas their joint effect on leverage is economic significant. A one standard deviation increase

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[21] (Wooldridge, 2002b) explains the differences in panel models in detail. The loss of degrees of freedom due to year dummies causes the robust variance-covariance matrix to be singular, such that the F-statistic for the fixed effects model cannot be computed. Therefore, a fixed effects model without year dummies and a target clustered robust variance-covariance estimator is estimated to control for potential heteroscedasticity. The Root MSE is shown to compare the fit with the fixed effects capital structure regressions estimated on short Compustat panels by (Flannery & Hankins, 2013). The fit of the models estimated around the M&A is as good as the fit of (Flannery & Hankins, 2013) who use Compustat data.

in net operating loss carry forwards, being less negative, that can be transferred after the merger or acquisition by the target is associated with $-0.0446 \times 0.2369 = -0.0106$ or 1.06 percentage points less leverage. Less accumulated losses means less leverage and more retrained earnings. A missing group taxation regime is associated with 2.66 percentage points less target leverage.

These effects are significant for adjusted net leverage that takes out trade credit and cash as net leverage of external and internal debt, as well as financial leverage (Huizinga, Laeven, & Nicodeme, 2008). Inflation has a significant positive effect on target's leverage as in previous studies (Frank & Goyal, 2009). The tax rate difference matters only for total debt, which includes accounts payable compared to adjusted net leverage and financial leverage. Tax rate based debt shifting therefore occurs through a form of trade credit through the accounts payable and receivable between the new subsidiary and parent conglomerate.

The difference in statutory corporate tax rates is insignificant if one controls for tax-related effects. The change in leverage during and after the M&A is likely to be related to means of financing the transactions (Harford, Klasa, & Walcott, 2009; Ghosh & Jain, 2000). The sensitivity analysis therefore analyses the tax rate and tax-related effects in more detail. The potential endogeneity of the target's leverage and acquirer's payment method is analyzed with a Heckman selection model with the selection equation whether the payment is cash (Harford, Klasa, & Walcott, 2009; Heckman, 1976; 1979)[22].

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[22] For 581 M&As is the method of payment available. 104 deals, or 17.9%, are share deals. The majority of 400, or 68.9%, use cash from retained earnings, debt or capital increases. The method of deal financing is available for 235 deals with 152 (64.7%) stated as capital increases through the vendor and 53 (22.6%) using bank lending. The missing information of the method of payment limits the sensitivity analysis of the influence of the payment method in deal financing and thus the shifting of debt.

Table 5: Primary Regressions of tax-based debt-shifting of the target

The dependent variables are the target's total debt-to-assets ratio LEVERAGE_T, adjusted debt-to-assets ratio ADJLEVERAGE_T and financial debt-to-assets ratio FINLEVERAGE_T in 1,844 M&As in the three to four years before and after the M&A completion year (7 to 9 years for each M&A). The error terms are corrected for potential heteroscedasticity with the Huber & White sandwich estimator clustered by targets (Huber, 1967; White, 1980). TAXDIFF_T_A, LOSSFORWARD_T, FININV_RATIO_A and NOGROUPTAX_T are 0 before the M&A completion year t=0. SIZE_T, TAR_T, CASH_T, ROA_T, RnD_T, INFLATION_T, ASSET_GROWTH_T and the median industry leverage variables are capital structure controls. The variables are summarized in table 3 and their definitions in table F in the statistical appendix.

	(1)	(2)	(3)	(4)	(5)
		LEVERAGE_T		ADJLEVERAGE_T	FINLEVERAGE_T
VARIABLES	pre & post	pre & post	pre & post	pre & post	pre & post
STR_T	0.3263***	0.6627***	0.6282***	0.4759***	0.4437***
	(3.365)	(6.713)	(6.272)	(3.794)	(4.934)
TAXDIFF_T_A		0.1542*	0.1294	0.0377	-0.0607
		(1.692)	(1.413)	(0.333)	(-0.920)
FININV_RATIO_A			0.0236	0.0365	0.0131
			(0.817)	(0.936)	(0.443)
LOSSFORWARD_T			-0.0446***	-0.0635***	-0.0103
			(-3.673)	(-4.660)	(-1.449)
NOGROUPTAX_T			-0.0266**	-0.0311**	-0.0054
			(-2.203)	(-2.057)	(-0.522)
AFTER_MERGER	-0.0383***				
	(-8.434)				
SIZE_T	0.0387***	0.0360***	0.0380***	0.0448***	0.0371***
	(6.784)	(6.004)	(6.334)	(6.599)	(8.759)
TAR_T	0.0101	0.0564**	0.0568**	0.2073***	0.1573***
	(0.391)	(2.183)	(2.209)	(6.679)	(6.361)
CASH_T	-0.2077***				-0.0856***
	(-9.608)				(-6.696)
ROA_T	-0.1865***	-0.2017***	-0.2034***	-0.3128***	-0.1023***
	(-10.770)	(-11.605)	(-11.750)	(-13.967)	(-8.054)
RnD_T	0.3725	0.2600	0.2534	0.0065	0.0707
	(1.408)	(0.990)	(0.962)	(0.022)	(0.846)
ASSET_GROWTH_T	0.0255***	0.0302***	0.0298***	0.0310***	-0.0012
	(4.216)	(4.821)	(4.798)	(4.540)	(-0.242)
INFLATION_T	0.3139***	0.2309**	0.2176*	0.3703***	0.0640
	(2.772)	(2.003)	(1.904)	(2.777)	(0.707)
MLEVERAGE_T	0.1981	0.4477***	0.4851***		
	(1.604)	(3.525)	(3.839)		
MADJLEVERAGE_T				0.0801	
				(0.830)	
MFINLEVERAGE_T					-0.3455**
					(-2.565)
Constant	-0.2175*	-0.4866***	-0.5299***	-0.5087***	-0.5560***
	(-1.716)	(-3.456)	(-3.812)	(-3.904)	(-7.094)
Fixed effects	Yes	Yes	Yes	Yes	Yes
N	15,385	15,407	15,379	15,210	14,418
Number of Targets	1,844	1,844	1,844	1,844	1,820
F-statistic	44.30	31.20	24.75	29.30	21.69
p-value	0.0000	0.0000	0.0000	0.0000	0.0000
Root MSE	0.12	0.13	0.13	0.17	0.10

Robust t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 6: Sensitivity analysis of Tax-based Debt-Shifting of the Target

The dependent variable is the target's total debt-to-assets ratio LEVERAGE_T in the three to four years before and after the M&A completion year. For the Heckman selection model the selection equation is comparable to (Harford, Klasa, & Walcott, 2009). Regressions (3) and (4) include domestic and cross-border deals. Regressions (5) and (6) distinguish between target-years with a positive or negative ROA. The variables are summarized in table 3 and their definitions in table F in the statistical appendix.

	(1)	(2)	(3)	(4)	(5)	(6)
	Heckman Selection Model at t=0					
	Structural Eq.	Selection Eq.				
VARIABLES	LEVERAGE_T	CASHPAY	Domestic	Cross-border	positive ROA	negative ROA
STR_T	0.6416***		0.5505***	0.7592***	0.6155***	0.2948
	(3.107)		(4.787)	(4.030)	(6.179)	(0.953)
TAXDIFF_T_A	-0.1685			0.0265	0.1963**	-0.4636
	(-0.812)			(0.294)	(2.126)	(-1.547)
FININV_RATIO_A	0.1018		-0.0121	0.1238*	0.0019	0.1346**
	(1.154)		(-0.364)	(1.848)	(0.067)	(2.366)
LOSSFORWARD_T	-0.0943**		-0.0246	-0.0591***	-0.0478**	-0.0328**
	(-2.045)		(-1.462)	(-3.405)	(-2.057)	(-2.137)
NOGROUPTAX_T	-0.0318		-0.0140	-0.0306*	-0.0011	-0.0750**
	(-0.879)		(-0.879)	(-1.714)	(-0.089)	(-2.556)
SIZE_T	0.0023		0.0532***	0.0018	0.0249***	0.0515***
	(0.432)		(7.488)	(0.168)	(3.824)	(4.451)
TAR_T	-0.0449		0.0289	0.1255***	0.0394	0.0915*
	(-0.925)		(0.930)	(2.845)	(1.380)	(1.774)
ROA_T	-0.2813***		-0.1941***	-0.2142***	-0.2364***	-0.1979***
	(-3.344)		(-8.764)	(-8.033)	(-8.354)	(-5.017)
RnD_T	-0.2387*		0.0672	0.3422	-0.1605	0.4164
	(-1.875)		(0.353)	(0.783)	(-0.558)	(1.262)
ASSET_GROWTH_T	0.1339***		0.0240***	0.0429***	0.0357***	0.0144
	(3.969)		(3.260)	(4.127)	(5.197)	(1.250)
INFLATION_T	-0.0062		0.0412	0.4596**	0.2303*	-0.0428
	(-0.011)		(0.337)	(2.304)	(1.820)	(-0.186)
MLEVERAGE_T	0.1016		0.4507***	0.4179*	0.5854***	-0.3179
	(0.560)		(2.958)	(1.878)	(4.365)	(-0.987)
L1.ALEVERAGE_A		0.1406				
		(0.482)				
L1.ROA_A		1.8272***				
		(2.756)				
L1.CASH_A		-0.6578				
		(-1.318)				
L1.ASSETRATIO_T_A		-0.0760				
		(-0.100)				
L1.PRIVATE_T		-0.0749				
		(-0.506)				
L1.INDEPENDENT		-0.1862				
		(-1.573)				
Constant	0.2490	0.6618	-0.7110***	0.0302	-0.3694**	-0.1570
	(1.588)	(0.979)	(-4.230)	(0.124)	(-2.429)	(-0.671)
Fixed effects	No	No	Yes	Yes	Yes	Yes
N	582	582	10,380	4,999	12,354	3,025
Number of Targets	582	582	1,247	597	1,820	1,115
F-/Chi²-statistic	63.78	63.78	15.47	13.60	18.69	6.60
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Chi²-statistic of selection	0.85	0.85				
p-value of selection	0.3561	0.3561				
Root MSE			0.12	0.13	0.11	0.12

Robust t- and z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

In economic terms a higher probability of a cash payment is associated with higher acquirer profitability and less likely if the target is an independent company. Analyzing domestic and cross-border transactions separately the tax rate difference is insignificant in cross-border deals if one controls for tax-related effects. The use of holdings by financial acquirers is positively correlated with target's leverage the larger the target is relative to the acquirer. Distinguishing between targets with positive or negative ROA the effect of the tax rate difference and statutory tax rate is positive for target-years with profits and insignificant for target-years with losses. The tax shield of debt arising from higher corporate tax rates can be used only if EBIT is positive. In the case of target-years with losses the use of holding by financial acquirers is significant positive as well.

Similarly the lack of a group taxation regime in the target's country in the case of losses and cross-border deals is significantly negative regarding leverage. Without group taxation the losses cannot be used to reduce the overall tax burden of all subsidiaries and have to be carried fully by the loss-making target, making leverage for loss-making targets unattractive due to the bankruptcy risk.

5.5.2 Analysis of trade-off theory based tax incentives to shift debt

The difference in the statutory corporate tax rates during and after the M&A completion year is the primary as yet relatively crude and mostly insignificant measure that is nonzero only in international transactions. The ability to exploit the tax shield of debt depends according to the trade-off theory on the debt carrying capacity and repayment capability (Kraus & Litzenberger, 1973; Miller, 1977; DeAngelo & Masulis, 1980). The tax rate difference is adjusted for differences in size, tangible assets and earnings before interest and taxes between the target and acquirer, weighted by their total assets (Huizinga, Laeven, & Nicodeme, 2008). The tax incentive variables are described in table F in the statistical appendix. The tax incentive variables are nonzero also in domestic transactions. In domestic transactions the statutory corporate tax rate is a scaling factor that indicates the incentives to shift debt based on differences in size, tangibles assets and EBIT.

The first variable of the tax incentive to shift debt is related to size and based directly on the tax incentive measure of (Huizinga, Laeven, & Nicodeme, 2008). They design their tax incentive measure as asset weighted tax rate differences between the multinational's subsidiaries as a multilateral construct. In this study the size related tax incentive to shift debt TAX_ICENTIVE_T_A is a bilateral measure between the target and acquirer[23]. On average the tax incentives to shift debt related to the elements of the trade-off theory are negative for the target, to shift debt away from it. This average effect is caused by the acquirer's larger size, more tangible assets and higher earnings compared to the target.

For the target the tax incentive to shift debt approximated by the three tax incentive measures is shown in table 7 panels A to C. The tax incentive to shift debt related to the differences in size in panel A is statistical significant. A one standard deviation increase in the size based tax incentive measure for the target, either because it is larger than the acquirer or faces a higher tax rate, increases its leverage by $0.1334 \times 0.1434 = 0.0191$ or 1.9 percentage points. The economic effect is almost four times larger than the economic effect of the pure tax rate

[23] The minimum and maximum of the size related tax incentive to shift debt are quite similar to the tax incentive measure of (Huizinga, Laeven, & Nicodeme, 2008). The tax incentive measures to shift debt based on the trade-off theory can be advanced by calculating them with the effective marginal tax rate that accounts for withholding taxes within the international tax regimes after the M&A completion year similar to (Huizinga, Laeven, & Nicodeme, 2008). During the M&A completion year the specific tax regulations determining the effective marginal tax rate of the acquirer and target given the form of the deal can be derived from the KPMG reports of taxation of cross-border M&As.

differences shown in table 5 (3). The effect is half as large for adjusted and financial leverage.

Measuring the debt carrying capacity more directly by the relative advantage of more tangibles assets the economic effect is smaller than the effect of tax incentives with respect to size differences. A one standard deviation increase in the tangible assets related tax incentive to shift debt increases target's leverage by $0.2731 \times 0.0482 = 0.0132$ or 1.32 percentage points. In addition to the tax-related effects of tangible assets the multiplication of target's asset growth with the post-merger joint tangible assets has a smaller economic effect on leverage to finance further growth than its asset growth alone, namely $0.1322 \times 0.0695 = 0.0040$ or 0.40% versus $0.0298 \times 0.3926 = 0.0117$ or 1.17% for a one standard deviation increase.

Finally the profitability related tax incentive to shift debt is significant only for interest bearing financial leverage. A one standard deviation increase in the profitability related tax incentive to shift debt increases target's financial leverage by $0.1306 \times 0.0232 = 0.0030$ or 0.30 percentage points. Controlling for tax-related effects on leverage the effect vanishes for total and adjusted leverage.

The major trade-off theory based effect of the tax incentive to shift debt occurs due to the acquirer's and target's size differences. The tax rate differences themselves are not as economic significant as the differences in the debt capacity and repayment capability, which the analysis in table 7 shows. In the following subsample analysis of acquisitions by strategic and financial acquirers that use holding structures the size related tax incentive to shift debt is used as primary debt shifting variable besides the statutory corporate tax rates and the holding dummy.

Table 7: Alternative measures of Tax-based Debt-Shifting of the Target

The dependent variables are the target's total debt-to-assets ratio LEVERAGE_T, adjusted debt-to-assets ratio ADJLEVERAGE_T and financial debt-to-assets ratio FINLEVERAGE_T in the three to four years before and after the M&A completion year (7 to 9 years for each M&A). The standard errors are corrected for potential heteroscedasticity with the Huber & White sandwich estimator clustered by targets (Huber, 1967; White, 1980). TAX_INCENTIVE_T_A, LOSSFORWARD_T, FININV_RATIO_A and NOGROUPTAX_T are 0 before the M&A completion year t=0. TAR_T, CASH_T, ROA_T, RnD_T, INFLATION_T, ASSET_GROWTH_T and the median industry leverage variables are capital structure controls. The variables are summarized in table 3 and their definitions in table F in the statistical appendix.

Panel A: size related tax incentive	(1)	(2)	(3)	(4)	(5)
to shift debt		LEVERAGE_T		ADJLEVERAGE_T	FINLEVERAGE_T
VARIABLES	pre & post	pre & post	pre & post	pre & post	pre & post
STR_T		0.1973**	0.1884*	0.1638	0.1759**
		(2.032)	(1.928)	(1.302)	(1.982)
TAX_INCENTIVE_T_A	0.1473***	0.1277***	0.1334***	0.0645***	0.0734***
	(9.089)	(7.625)	(7.783)	(2.765)	(4.635)
FININV_RATIO_A			0.0230	0.0376	0.0073
			(0.766)	(0.938)	(0.247)
LOSSFORWARD_T			-0.0449***	-0.0585***	-0.0086
			(-3.631)	(-4.224)	(-1.205)
NOGROUPTAX_T			-0.0023	-0.0154	0.0100
			(-0.189)	(-1.000)	(0.965)
TAR_T	0.0226	0.0607**	0.0612**	0.2171***	0.1578***
	(0.861)	(2.305)	(2.336)	(6.851)	(6.056)
CASH_T	-0.2211***				-0.1098***
	(-9.888)				(-8.605)
ROA_T	-0.1819***	-0.2025***	-0.2031***	-0.3096***	-0.1010***
	(-10.353)	(-11.565)	(-11.678)	(-13.754)	(-7.741)
RnD_T	0.3395	0.2614	0.2541	-0.0122	0.0678
	(1.320)	(1.013)	(0.990)	(-0.042)	(0.797)
ASSET_GROWTH_T	0.0430***	0.0446***	0.0452***	0.0501***	0.0139**
	(6.623)	(6.859)	(6.902)	(6.663)	(2.371)
INFLATION_T	0.2948***	0.2733**	0.2784**	0.3655***	0.0268
	(2.740)	(2.427)	(2.497)	(2.775)	(0.298)
MLEVERAGE_T	0.1524	0.0394	0.0733		
	(1.261)	(0.313)	(0.583)		
MADJLEVERAGE_T				-0.1551	
				(-1.531)	
MFINLEVERAGE_T					0.1390
					(0.908)
Constant	0.5257***	0.4994***	0.4802***	0.4128***	0.0660*
	(6.956)	(6.260)	(6.020)	(7.276)	(1.769)
Fixed effects	Yes	Yes	Yes	Yes	Yes
N	15,367	15,379	15,379	15,210	14,418
Number of Targets	1,844	1,844	1,844	1,844	1,820
F-statistic	50.64	33.95	26.20	29.67	20.25
p-value	0.0000	0.0000	0.0000	0.0000	0.0000
Root MSE	0.13	0.13	0.13	0.17	0.11

Robust t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 7: Alternative measures of Tax-based Debt-Shifting of the Target

The dependent variables are the target's total debt-to-assets ratio LEVERAGE_T, adjusted debt-to-assets ratio ADJLEVERAGE_T and financial debt-to-assets ratio FINLEVERAGE_T in the three to four years before and after the M&A completion year (7 to 9 years for each M&A). The standard errors are corrected for potential heteroscedasticity with the Huber & White sandwich estimator clustered by targets (Huber, 1967; White, 1980). TAX_TANGIBLES_T_A, LOSSFORWARD_T, FININV_RATIO_A and NOGROUPTAX_T are 0 before the M&A completion year t=0. TAR_T, CASH_T, ROA_T, RnD_T, INFLATION_T, GROWTH_COLLATERAL_T and the median industry leverage variables are capital structure controls. The variables are summarized in table 3 and their definitions in table F in the statistical appendix.

Panel B: tangibility related tax incentive to shift debt	(1)	(2)	(3)	(4)	(5)
		LEVERAGE_T		ADJLEVERAGE_T	FINLEVERAGE_T
VARIABLES	pre & post	pre & post	pre & post	pre & post	pre & post
STR_T		0.3859***	0.3653***	0.2405*	0.2326***
		(3.904)	(3.661)	(1.904)	(2.595)
TAX_TANGIBLES_T_A	0.3392***	0.2715***	0.2731***	0.1669**	0.1967***
	(6.487)	(5.113)	(5.031)	(2.456)	(4.048)
FININV_RATIO_A			0.0191	0.0340	0.0047
			(0.647)	(0.851)	(0.164)
LOSSFORWARD_T			-0.0396***	-0.0562***	-0.0063
			(-3.062)	(-4.051)	(-0.891)
NOGROUPTAX_T			-0.0139	-0.0203	0.0060
			(-1.139)	(-1.322)	(0.582)
TAR_T	0.0174	0.0533**	0.0540**	0.2065***	0.1567***
	(0.656)	(2.005)	(2.044)	(6.472)	(6.052)
CASH_T	-0.2202***				-0.1080***
	(-9.591)				(-8.406)
ROA_T	-0.1654***	-0.1865***	-0.1875***	-0.2949***	-0.0966***
	(-9.238)	(-10.472)	(-10.587)	(-12.894)	(-7.626)
RnD_T	0.2771	0.2075	0.2007	-0.0522	0.0331
	(0.995)	(0.745)	(0.722)	(-0.169)	(0.402)
GROWTH_COLLATERAL_T	0.1269***	0.1279***	0.1322***	0.1778***	0.0787***
	(4.779)	(4.736)	(4.877)	(5.510)	(3.731)
INFLATION_T	0.2842**	0.2148*	0.2073*	0.3281**	0.0306
	(2.566)	(1.885)	(1.839)	(2.495)	(0.342)
MLEVERAGE_T	0.4926***	0.2960**	0.3270***		
	(4.019)	(2.344)	(2.591)		
MADJLEVERAGE_T				-0.0565	
				(-0.574)	
MFINLEVERAGE_T					0.0246
					(0.170)
Constant	0.3061***	0.2769***	0.2638***	0.3463***	0.0605
	(4.019)	(3.510)	(3.335)	(6.341)	(1.606)
Fixed effects	Yes	Yes	Yes	Yes	Yes
N	15,366	15,378	15,378	15,209	14,417
Number of Targets	1,844	1,844	1,844	1,844	1,820
F-statistic	40.36	26.30	20.40	24.99	20.31
p-value	0.0000	0.0000	0.0000	0.0000	0.0000
Root MSE	0.13	0.13	0.13	0.17	0.11

Robust t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 7: Alternative measures of Tax-based Debt-Shifting of the Target

The dependent variables are the target's total debt-to-assets ratio LEVERAGE_T, adjusted debt-to-assets ratio ADJLEVERAGE_T and financial debt-to-assets ratio FINLEVERAGE_T in the three to four years before and after the M&A completion year (7 to 9 years for each M&A). The standard errors are corrected for potential heteroscedasticity with the Huber & White sandwich estimator clustered by targets (Huber, 1967; White, 1980). TAX_PROFITABILITY_T_A, LOSSFORWARD_T, FININV_RATIO_A and NOGROUPTAX_T are 0 before the M&A completion year t=0. TAR_T, CASH_T, ROA_T, RnD_T, INFLATION_T, ASSET_GROWTH_T and the median industry leverage variables are capital structure controls. The variables are summarized in table 3 and their definitions in table F in the statistical appendix.

Panel C: profitability related tax	(1)	(2)	(3)	(4)	(5)
incentive to shift debt		FINLEVERAGE_T		LEVERAGE_T	ADJLEVERAGE_T
VARIABLES	pre & post	pre & post	pre & post	pre & post	pre & post
STR_T		0.2426***	0.2717***	0.4334***	0.2642**
		(2.783)	(3.033)	(4.362)	(2.089)
TAX_PROFITABILITY_T_A	0.1437**	0.1391**	0.1306**	0.1657	0.1318
	(2.179)	(2.166)	(2.122)	(1.434)	(1.052)
FININV_RATIO_A			0.0110	0.0263	0.0392
			(0.377)	(0.886)	(0.979)
LOSSFORWARD_T			-0.0046	-0.0383***	-0.0557***
			(-0.669)	(-2.993)	(-4.009)
NOGROUPTAX_T			0.0028	-0.0178	-0.0220
			(0.273)	(-1.496)	(-1.460)
TAR_T	0.1663***	0.1811***	0.1635***	0.0681**	0.2198***
	(6.470)	(7.128)	(6.359)	(2.577)	(6.932)
CASH_T	-0.1036***		-0.1055***		
	(-8.138)		(-8.265)		
ROA_T	-0.0981***	-0.1087***	-0.0995***	-0.2021***	-0.3094***
	(-7.527)	(-8.183)	(-7.628)	(-11.569)	(-13.762)
RnD_T	0.0413	0.0114	0.0462	0.2183	-0.0292
	(0.502)	(0.141)	(0.559)	(0.813)	(-0.099)
ASSET_GROWTH_T	0.0154***	0.0156***	0.0150**	0.0468***	0.0509***
	(2.619)	(2.664)	(2.547)	(7.064)	(6.737)
INFLATION_T	0.0832	0.0121	0.0179	0.1998*	0.3391**
	(0.951)	(0.133)	(0.199)	(1.746)	(2.557)
MFINLEVERAGE_T	-0.2303*	-0.0558	-0.0907		
	(-1.724)	(-0.398)	(-0.655)		
MLEVERAGE_T				0.3396***	
				(2.705)	
MADJLEVERAGE_T					-0.0615
					(-0.639)
Constant	0.1594***	0.0475	0.0587	0.2258***	0.3336***
	(8.097)	(1.264)	(1.553)	(2.889)	(6.316)
Fixed effects	Yes	Yes	Yes	Yes	Yes
N	14,428	14,438	14,417	15,378	15,209
Number of Targets	1,820	1,820	1,820	1,844	1,844
F-statistic	27.08	20.30	18.56	21.36	29.02
p-value	0.0000	0.0000	0.0000	0.0000	0.0000
Root MSE	0.11	0.11	0.11	0.13	0.17

Robust t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

5.5.3 Analyses of the tax incentive to shift debt through holdings

Given that the effect of financial investors using holdings for acquisitions is different in domestic and cross-border transactions shown in table 6 the debt-related effect of the use of holdings is further analyzed. Form the target's perspective holding structures are associated with higher leverage only if the acquirer is a financial company in cross-border deals, shown in table 8. Acquirers that are not finance firms do not appear to employ holding structures for acquisitions. The economic effect of holdings in cross-border transactions of 7% to 8% more target leverage is significant. Furthermore, the dummy HOLDING is one in 2.4% of transactions, which is rarer than the observation of the use of holdings in 6% of German multinationals made by (Mintz & Weichenrieder, 2010; 2005) and (Ruf, 2011).

These former studies examining holding structures, so-called "conduits", use German multinationals and internal payments data of related companies from the Bundesbank's Midi database. In this study the modeling of the use of holdings in domestic and international M&As shows that conduits are employed across 25 target and acquirer countries to shift debt. Related to finance acquirer's use of holding structures affecting target's leverage is the significantly negative influence of unrestricted loss compensation, to be able to use net operating loss carry forwards after the M&A to shield target's income from taxes. The economic effect of $-0.4139 \times 0.2369 = -0.0981$ or -9.81% less leverage for a one standard deviation smaller absolute value, or less negative, loss carry forwards is relatively large.

Table 8: Analysis of tax-based debt-shifting in deals with financial acquirers using holdings

The dependent variable is the target's total debt-to-assets ratio LEVERAGE_T in the three to four years before and after the M&A completion year (7 to 9 years for each M&A). The fixed effects panel analysis distinguishes between M&As with and without financial acquirers using holding structures. The standard errors are corrected for potential heteroscedasticity with the Huber & White sandwich estimator clustered by targets (Huber, 1967; White, 1980). TAX_INCENTIVE_T_A, TAXDIFF_T_A, LOSSFORWARD_T, HOLDING and NOGROUPTAX_T are 0 before the M&A completion year t=0. SIZE_T, TAR_T, CASH_T, ROA_T, RnD_T, INFLATION_T, ASSET_GROWTH_T and the median industry leverage variables are capital structure controls. The variables are summarized in table 3 and their definitions in table F in the statistical appendix.

	(1)	(2)	(3)	(4)	(5)	(6)
			LEVERAGE_T			
	FINANCEFIRM_A=0		FINANCEFIRM_A=1		FINANCEFIRM_A=1	
VARIABLES	all M&As		all M&As		cross-border M&As	
STR_T	0.6242***	0.3434***	0.7496***	0.5092**	0.9647**	0.5933
	(5.707)	(3.252)	(3.134)	(2.213)	(2.493)	(1.651)
TAXDIFF_T_A	0.1178		0.1106		-0.0041	
	(1.218)		(0.408)		(-0.017)	
TAX_INCENTIVE_T_A		0.1648***		0.1757***		0.2270***
		(8.760)		(4.130)		(2.726)
HOLDING	-0.0445	-0.0279	0.0242	0.0251	0.0704**	0.0797**
	(-1.430)	(-0.889)	(0.846)	(0.882)	(2.119)	(2.415)
LOSSFORWARD_T	-0.0438***	-0.0529***	-0.0365	-0.0528	-0.4139*	-0.4753**
	(-3.718)	(-4.686)	(-0.865)	(-1.438)	(-1.875)	(-2.312)
NOGROUPTAX_T	-0.0185	-0.0019	-0.0538*	-0.0341	-0.0949***	-0.0514
	(-1.458)	(-0.153)	(-1.849)	(-1.262)	(-2.824)	(-1.275)
SIZE_T	0.0318***	0.0376***	0.0434**	0.0513***	0.0503	0.0671
	(5.517)	(6.515)	(2.406)	(2.793)	(1.024)	(1.461)
TAR_T	0.0367	0.0250	-0.0485	-0.0573	0.1487	0.1310
	(1.351)	(0.931)	(-0.665)	(-0.790)	(1.565)	(1.397)
CASH_T	-0.2011***	-0.2072***	-0.1934***	-0.1803***	-0.3031**	-0.2775**
	(-8.727)	(-9.151)	(-2.968)	(-2.932)	(-2.517)	(-2.549)
ROA_T	-0.1857***	-0.1880***	-0.1817***	-0.1843***	-0.1025	-0.1027
	(-10.066)	(-10.228)	(-3.668)	(-3.796)	(-1.192)	(-1.248)
RnD_T	0.3567	0.3991	-0.3087	-0.3072	0.5045	0.5130
	(1.313)	(1.507)	(-0.318)	(-0.318)	(0.637)	(0.666)
ASSET_GROWTH_T	0.0317***	0.0272***	0.0180	0.0121	-0.0373	-0.0499
	(4.730)	(4.263)	(1.074)	(0.726)	(-0.800)	(-1.083)
INFLATION_T	0.1410	0.2647**	0.4761**	0.5548**	0.8168	1.1347**
	(1.099)	(2.096)	(2.173)	(2.473)	(1.375)	(2.054)
MLEVERAGE_T	0.6045***	0.2750**	0.2401	0.0111	0.4167	0.1616
	(4.361)	(2.041)	(0.811)	(0.039)	(0.892)	(0.392)
Constant	-0.4735***	-0.2555**	-0.4654	-0.3644	-0.7793	-0.7699
	(-3.481)	(-1.994)	(-1.075)	(-0.849)	(-0.876)	(-0.919)
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N	13,301	13,281	2,083	2,075	489	486
Number of Targets	1,596	1,596	248	248	58	58
F-statistic	29.05	34.35	5.11	5.71	9.41	10.52
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Root MSE	0.13	0.13	0.12	0.12	0.12	0.12

Robust t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Higher loss carry forwards in absolute value are associated with more leverage, because the target company has financed its past losses with retained earnings. The large economic effect of loss carry forwards occurs in deals with financial acquirers using holdings, because mostly loss-making targets are acquired through holding companies, shown in table 6.

5.6 Discussion and conclusion

The empirical analyses show that tax-based debt shifting on the target's side prevails during and after the M&A. The primary analysis in particular reveals the relevance of differences in the target's and acquirer's corporate tax rates for debt shifting. Advancing the tax incentive measure according to the trade-off theory the tax differences augmented by differences in size is the primary driver of the tax incentive to shift debt. Besides the tax rates and their differences the tax-related factors of loss carry forwards with unlimited loss restriction when the target is taken over as well as the absence of group taxation regimes matter. The economic effects of the tax incentives to shift debt in the range of 0.30 to 1.9 percentage points for the target during and directly after the M&A are slightly larger than the economic effects found by (Huizinga, Laeven, & Nicodeme, 2008), while the economic effect of the pure tax rate difference of 0.54 percentage points is similar to their observation. For the target the tax incentive to shift debt away from it is significant mostly because the acquirer is 17.8 times larger, more profitable and has more tangible assets and considers the tax implications of financing the transaction with debt. Finally the use of holdings by financial acquirers with an economic influence of 7% to 8% exceeds the influence of the tax rates and tax incentive measures on target's leverage. Further research might analyze the use of holdings in international acquisitions in more detail.

6. Do firms have tax-influenced capital structure targets? Evidence from taken over companies that became subsidiaries

6.1 Introduction

In mergers and acquisitions the capital structure of a company changes immediately, serving as a natural experiment of capital structure adjustments according to the trade-off theory. The acquired company that before the M&A was part of another conglomerate or an independent entity is now a subsidiary. As a new subsidiary it has access to the internal capital market of the enlarged conglomerate. The new subsidiary's convergence towards a target capital structure is influenced by the capital structure of the acquirer and tax factors relevant in M&As that influence both parties' capital structure choices (Graham J. R., 1996; 2000; Harford, Klasa, & Walcott, 2009). The target capital structure hypothesis influenced by differences in taxes and debt capacity is supported by the empirical observations in a sample of 1,844 domestic and international M&As from 2000 to 2008. The acquired company's pre-merger deviation from its leverage target is positively correlated with the change in its leverage around the M&A completion year. Furthermore, the change in the statutory corporate tax rate faced by the target as well as the pre-merger leverage deviation of the acquirer are positively correlated with the target's change in leverage around the M&A completion year.

Approximately 26% of the pre-merger leverage deviation is reversed until the third year after the M&A. This convergence of the target's leverage towards a benchmark is half as fast as acquirers' adjustment speed of 54% to 75% found by (Harford, Klasa, & Walcott, 2009). After the M&A the debt-to-assets ratio of the target decreases significantly, even though it was on average underleveraged before the merger. The new subsidiary's leverage deviation becomes more negative. These empirical observations of decreasing leverage after the M&A are different to the findings for acquirers and the joint company of (Harford, Klasa, & Walcott, 2009) and (Ghosh & Jain, 2000).

Besides those empirical observations that are related to the trade-off theory the convergence of the new subsidiary's capital structure towards a target or benchmark is influenced by the use of holdings by financial acquirers. The use of holdings is associated with an economic effect of a 4.52 percentage points increase in target's leverage during the M&A completion year (Ruf, 2011; Mintz & Weichenrieder, 2010). In the third year after M&A completion the financial acquirer reduces the debt shifted to the new subsidiary. After the M&A completion year this leverage increasing effect is reversed by a faster adjustment speed of the new subsidiary's debt-to-assets ratio. The analysis of holdings by financial investors is difficult as the economic effects are restricted to the 13.4% of M&As involving financial acquirers.

Comparable to (Harford, Klasa, & Walcott, 2009) and (Kayhan & Titman, 2007) the mostly private target companies adjust their leverage towards their regression based target capital structure after the M&A. The benchmark is the target capital structure calculated from tobit regressions estimated annually on the Amadeus and Orbis databases. The methodology of (Kayhan & Titman, 2007) and (Harford, Klasa, & Walcott, 2009) is adapted to include private companies, because the market-to-book ratio as a proxy for growth opportunities is unavailable for private firms. Instead of the market-to-book ratio the anticipated growth in total assets is used as a proxy for growth opportunities with similar economic effects, and the mean or median industry leverage as benchmark (D'Mello & Farhat, 2008; Graham & Harvey, 2001; Fama & French, 1997).

During the adjustment of leverage after the M&A the potentially high costs of distressed are considered by reducing leverage further if the risk, the standard deviation of changes in past ROA, is higher (Andrade & Kaplan, 1998; Parnes, 2009; Wald, 1999). New subsidiaries that expect a higher growth in assets reduce their leverage deviation faster to have financial slack for financing future growth. This observation corresponds to the model of (Miller, 1977) that overleveraged firms can face an underinvestment problem, making excess leverage costly especially for high-growth companies. (Graham & Harvey, 2001) report as well that financial managers of high-growth firms consider the maintenance of target leverage to be important to avoid the underinvestment problem. (Harford, Klasa, & Walcott, 2009) make a similar observation for acquirers to reduce leverage faster if they have good growth opportunities.

The study follows with the literature review and hypothesis development in section 2. Section 3 describes the data set and sample characteristics. Section 4 presents the analysis of leverage changes around the M&A completion year. Section 5 presents the multivariate analysis of targets’ capital structure convergence after the M&A. Section 6 finishes with the discussion and conclusion.

6.2 Literature review and hypothesis development

From the survey of (Graham & Harvey, 2001) it is known that executives have capital structure targets. The target capital structure hypothesis refers to the adjustment of the debt-to-assets ratio towards a leverage target of the new subsidiary after the M&A, based on the trade-off theory. Considering public US acquirers the studies of (Ghosh & Jain, 2000), (Harford, Klasa, & Walcott, 2009) and (Uysal, 2011) examine changes in leverage and adjustments towards a new leverage target. (Harford, Klasa, & Walcott, 2009) and (Uysal, 2011) look at the bidder's deviation from his leverage target and the influence of that deviation on his financing decision in the acquisition or merger. (Ghosh & Jain, 2000) examine the industry and size adjusted leverage deviations of the acquirer and target before and of the combined firm after the M&A. All these studies have in common that they estimate public companies' leverage targets with regression models including market-to-book ratios of assets and market leverage adapted from the models developed first by (Kayhan & Titman, 2007). For private companies target capital structure regressions have to be adapted as stock market data is missing[24]. To test whether the new subsidiaries adapt their debt-to-assets ratios towards a leverage target their industry means and medians as benchmarks according to (D'Mello & Farhat, 2008) could be used in the empirical analysis. The speed of adjustment estimate is affected little whether one assumes a company-specific time invariante target or one that changes over time, like an annual leverage target obtained from regressions or the median industry leverage as a benchmark (Lemmon, Roberts, & Zender, 2008).

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[24] The first version of the paper used the median industry leverage as target capital structure benchmark with similar empirical results (D'Mello & Farhat, 2008; Frank & Goyal, 2009). The tables are available upon request. The book-value based capital structure target regressions are estimated annually on the Amadeus database merged with the extracted 946,297 Orbis company-years, shown in tables 1 and H in the statistical appendix. Estimating the regressions annually for each country individually was not possible because of too few observations for smaller countries. The inclusion of country dummies was difficult as well, because some country dummies were nonzero for a few companies only, causing singularities in the variance-covariance matrix and missing standard errors for the country dummies' coefficients. The same problem of singularities occurs with industry dummies. The mean or median industry leverage is therefore included directly.

The mean reversion of leverage using partial adjustment models is significant in panels (Auerbach, 1985; Jalilvand & Harris, 1984). The recent studies summarized by (Graham & Leary, 2011) using US panels from Compustat get different estimates of the persistence of leverage and adjustments speed ranging from 9% to 39% per year. The estimation of the adjustment speed towards a leverage target is affected by debt and equity issues (Fama & French, 2002; Baker & Wurgler, 2002; Welch, 2004; Iliev & Welch, 2010). A further problem with the former analyses is the bias introduced by short panels and the econometric method employed (Flannery & Hankins, 2013; Elsas & Florysiak, 2011; 2012).

M&As as natural experiments avoid these shortcomings. The immediate change of the company's structure caused by a M&A might trigger a faster, more significant adjustment towards a leverage target. None of the mentioned studies has considered the acquired companies' leverage targets ex-post. Being part of a larger conglomerate after the M&A changes the capital structure of the new subsidiary as it is usually smaller than the acquirer. The new subsidiary's capital structure is expected to be influenced by the acquirer's capital structure choices, his means of financing the takeover, and its debt capacity relative to the larger acquirer's one. The target capital structure hypothesis argues further that during and after the M&A the capital structure of the newly integrated subsidiary is adjusted towards a target debt-to-assets ratio according to its profitability, tangible assets and size, risk and growth prospects as well as its comparative tax advantage to benefit from debt tax shields.

According to the tax-based trade-off theory of (Kraus & Litzenberger, 1973), (DeAngelo & Masulis, 1980) and (Miller, 1977) a new subsidiary that is larger, has more tangible assets and is more profitable has a higher debt capacity and therefore is better able to exploit the tax shield of interest payments than a smaller, less profitable subsidiary or acquirer with less tangible assets. According to the pecking-order theory the provision of access to the acquirer's internal capital market solves information asymmetry problems and financial frictions associated with issuing securities, which influences the new subsidiary's capital structure as well (Myers & Majluf, 1984; Myers S. C., 1984; 2001).

The target capital structure hypothesis assumes that higher corporate tax rates faced by either the newly acquired subsidiary or the acquirer affect the convergence towards a target debt-to-assets ratio. In the multivariate analysis tax rate differences to shift debt are considered with respect to their influence on the changes and convergence of target's debt during and after the M&A. Regarding taxes the new subsidiary's debt-to-assets ratio can deviate from its target capital structure if the costs of deviation are smaller than the benefits for the subsidiary and the conglomerate, for instance greater tax savings of a debt-to-assets ratio above target leverage, whose estimation excludes tax considerations. Issuing additional debt or shifting debt to the new subsidiary to benefit from tax debt shields is feasible only for those new subsidiaries that are underleveraged and have spare debt capacity. Furthermore, M&As are suitable to investigate taxes and tax-related effects that occur in M&As only. Tax-related effects such as the use of holdings by financial investors that possibly affect target's leverage are unique to M&As (Ruf, 2011; Mintz & Weichenrieder, 2010).

6.3 Sample preparation and description

A sample similar to the one of the previous chapter is used for the empirical analysis. For each M&A at least seven years of financial data of the target and acquirer are needed, because the analysis is an event study with a window of at least (-3, 3) years around the M&A completion year combined with a capital structure convergence analysis. The three year period before the M&A completion year is used to control for the run-up period in which acquirer's and target's management strategically position their companies. Managers anticipating being taken over increase their company's leverage to extract more value for their shareholders or to reduce the likelihood of being acquired (Billett, 1996; Raad, Ryan, & Sinkey, 1999; Israel, 1991; 1992). Managers of acquiring companies reduce leverage to have sufficient debt capacity to finance the upcoming acquisitions (Uysal, 2011). Therefore, calculation of the pre-merger deviation from the target capital structure requires the pre-merger debt data.

Similar to (Erel, Jang, & Weisbach, 2012) and (Huizinga, Laeven, & Nicodeme, 2008) the financial statement data is obtained from Amadeus and Orbis, because consolidated and non-consolidated financial statements of worldwide public and private companies are available. Different to (Huizinga, Laeven, & Nicodeme, 2008) the consolidated financial statements are preferred, because the acquirer is considered with all its subsidiaries already in place as one entity that acquires and integrates the complete target as new subsidiary into its conglomerate structure. The simplifying assumption is made as the ultimate acquirer's and target's subsidiary structure is not observable in the M&A completion year[25]. After merging the Zephyr data of M&As in which the acquirer owns less than 50% of the target ex-ante and holds at least 50.1%, and on average 93.1%, ex-post with Orbis and Amadeus, and after deleting observations with incomplete basic capital

[25] (Huizinga, Laeven, & Nicodeme, 2008) observe the multinational conglomerate's subsidiary, or ownership, structure in 2003 when Amadeus recorded it. The ownership structure is updated annually with the historical ownership structure being overwritten, such that the most recent ownership structure is available only. (Huizinga, Laeven, & Nicodeme, 2008) implicitly assume that in the 10 years before 2003 the ownership structure did not change significantly, which is unlikely giving issues of securities, M&As, spin-offs, split-offs, asset sales etc..

structure variables and leverage 15,554 company-deal-years in 1,844 M&As are left, which is shown in table 1[26].

The descriptive statistics of the sample are presented in table 2. The M&A completion year is centered in the middle of the deal period, following (Harford, Klasa, & Walcott, 2009). The majority of M&As are completed between 2005 and 2008. The latest event year is 2008 due to the fact that after the M&A at least 3 years of data until the end of 2011 are needed. The M&As occur in 47 countries and mostly in Europe. Most targets and acquirers are private companies. The acquiring companies are on average 17.8 times larger than the target companies that have median total assets of 7.14 million dollars in 1983 dollars. Otherwise the sample is comparable to the ones of (Erel, Jang, & Weisbach, 2012), (Huizinga, Laeven, & Nicodeme, 2008) and identical to the one in the previous chapter. On average 57.7% of acquired companies are independent. Countries with few deals host large firms. These countries and deals are retained to maximize the variance in tax rates and tax effects internationally. The variables used are defined in table G in the statistical appendix and their descriptive statistics are shown in table 3. The independent variables for the acquirer and target are taken from the capital structure literature[27].

[26] The deal years with total debt exceeding total assets were mostly British limited liability companies with minimal assets but lots of debt such that total equity was negative. These appeared to be empty corporate shells. Accumulating acquisitions occurred mostly in China in which acquirers used small increments of two to five percentage acquisitions to buy up targets. The overlapping deals occurred in Brazil, Czech Republic, Spain, France, Great Britain, Greece, Norway, Russia and the Ukraine. The targets excluded with several completions on the same date appeared to be bought by a consortium of subsidiaries of the same company, because the immediate acquirers' names were similar. In these excluded cases the multiple records referred to one acquisition.

[27] Free cash-flow, depreciation and sales growth are not used, because these variables are less complete which reduced the sample size considerably. Free cash-flow and return on assets are highly correlated, which holds for tangible assets and depreciation as well.

Table 1: Data preparation and sample creation

The extracted ORBIS and Amadeus data includes company-years with available total assets in unconsolidated (U1 or U2) or consolidated (C1 or C2) financial statements. If consolidated and unconsolidated statements of a company are available the consolidated statements are taken. Consolidated financial statements are available in most cases for public corporations. Subsidiaries, branches and independent private companies have mostly unconsolidated financial statements.

	M&As or Firm-years	Deal-Firm-Years
1.) Extracting international M&As from Zephyr		
Deals with target and acquirer identifiers in majority transactions	138,754	
dropping incomplete transactions	-22,672	
dropping targets with several completion announcements on the same day	-578	
dropping transactions with a missing completion date	-3	
dropping accumulating acquisitions of the same target by the same acquirer	-4,496	
	111,005	
expanded with 9 years for each deal (-4 to +4 years)		999,045
2.) Extracting ORBIS international company data	964,297	
matching with Zephyr for targets and acquirers		567,874
3.) Extracting Amadeus European company data	325,487	
matching with Zephyr for targets and acquirers		313,449
4.) Merging Zephyr, Amadeus and Orbis into one data set	999,045	
merging Zephyr with Zephyr-Orbis and Zephyr-Amadeus into one data set		578,534
dropping deal-years in which the target and acquirer coincide		-3,057
dropping deal-years with total debt exceeding total assets and negative equity		-53,208
dropping deal-years with missing target total assets		-248,021
dropping finance targets with SIC core code 600 to 699		-46,004
		228,244
5.) After generating the variables		
dropping deal-company-years with incomplete target and acquirer variables		-212,600
dropping deals in which the target is acquired and sold with overlapping panels		-90
Final M&A sample with complete target and acquirer deal-company-year data	1,844	15,554
- thereof deals with 7 years of target and acquirer data and variables	63	
- thereof deals with 8 years of target and acquirer data and variables	916	
- thereof deals with 9 years of target and acquirer data and variables	865	

Table 2: M&As over time and countries

Panel A: Distribution of M&As over time

Year	N	Mergers	Acquisitions
2000	2	0	2
2001	1	0	1
2002	4	0	4
2003	9	0	9
2004	35	0	35
2005	392	3	389
2006	439	4	435
2007	525	2	523
2008	437	1	436
	1,844	10	1,834

Panel B: Panel without gaps

t	Unbalanced
-4	1,370
-3	1,844
-2	1,844
-1	1,844
0	1,844
1	1,844
2	1,844
3	1,844
4	1,276
	15,554

t=0 is the M&A completion year.

Panel C: Company Countries

Country	Acquirer	Target
Austria	18	4
Australia	10	2
Belgium	107	122
Brazil	5	8
Canada	9	2
Switzerland	26	2
China	4	5
Colombia	1	0
Czech Republic	11	27
Germany	62	57
Denmark	8	1
Estonia	1	8
Spain	200	205
Finland	73	65
France	313	326
Great Britain	152	158
Greece	23	26
Hong Kong	4	4
Croatia	15	22
Hungary	12	15
Indonesia	0	1
Ireland	16	5
Israel	2	0
Iceland	1	1
Italy	136	175
Japan	86	77
South Korea	0	3
Lithuania	2	0
Luxembourg	6	2
Mexico	2	0
Malaysia	4	4
Norway	96	106
New Zealand	2	1
Peru	1	6
Philippins	1	1
Poland	46	55
Portugal	36	37
Romania	14	36
Russia	54	59
Sweden	167	172
Singapore	4	2
Slovakia	3	9
Thailand	4	6
Turkey	1	2
Ukraine	14	20
United States	89	3
South Africa	3	2
	1,844	1,844

Table 2 (cont.): M&As over time and countries

Panel D: Characteristics of M&As over time (one year before the M&A)

		Target's total assets ($mil)		Acquirer's total assets ($mil)		Target's leverage	Acquirer's leverage				
Year	N	Mean	Median	Mean	Median	Mean	Mean	Domestic Deals (%)	Independent Targets (%)	Public Targets (%)	Public Acquirers (%)
2000	2	0.27	0.27	6.39	6.39	0.55	0.64	50.00%	100.00%	0.00%	0.00%
2001	1	1.26	1.26	1.56	1.56	0.46	0.89	100.00%	100.00%	0.00%	0.00%
2002	4	9.07	3.76	15.66	12.84	0.80	0.76	100.00%	50.00%	75.00%	50.00%
2003	9	25.58	4.83	263.81	7.11	0.59	0.62	88.89%	33.33%	44.44%	22.22%
2004	35	25.10	5.27	658.92	64.27	0.58	0.56	85.71%	51.43%	48.57%	57.14%
2005	392	125.21	9.47	3,328.85	145.83	0.58	0.60	68.62%	56.38%	42.86%	68.37%
2006	439	107.02	6.39	2,415.54	118.46	0.59	0.60	63.55%	60.36%	32.57%	68.34%
2007	525	104.50	5.90	2,241.03	96.18	0.58	0.60	67.24%	57.52%	33.33%	63.24%
2008	437	143.42	7.95	1,760.16	199.50	0.58	0.57	69.11%	56.98%	38.44%	67.73%
	1,844	116.46	7.14	2,351.72	126.98	0.58	0.59	67.62%	57.65%	36.77%	66.16%

Table 2 (cont.): M&As over time and countries

Panel E: Characteristics of M&As by country (one year before the M&A)

Target Country	N	Target's total assets ($mil) Mean	Target's total assets ($mil) Median	Acquirer's total assets ($mil) Mean	Acquirer's total assets ($mil) Median	Target's leverage Mean	Acquirer's leverage Mean	Domestic Deals (%)	Independent Targets (%)	Public Targets (%)	Public Acquirers (%)
Austria	4	27.01	26.90	73.39	76.54	0.61	0.58	50.00%	25.00%	50.00%	100.00%
Australia	2	108.29	108.29	388.22	388.22	0.37	0.46	50.00%	100.00%	100.00%	100.00%
Belgium	122	113.19	4.82	1,066.19	53.44	0.60	0.59	65.57%	70.49%	24.59%	47.54%
Brazil	8	2,037.26	342.82	6,430.87	4,663.14	0.54	0.64	37.50%	75.00%	50.00%	75.00%
Canada	2	738.34	738.34	8,868.15	8,868.15	0.44	0.44	50.00%	100.00%	100.00%	100.00%
Switzerland	2	15.81	15.81	1,487.55	1,487.55	0.70	0.65	100.00%	50.00%	100.00%	50.00%
China	5	426.43	231.07	3,761.09	1,088.11	0.51	0.55	60.00%	60.00%	100.00%	100.00%
Czech Republic	27	152.54	10.44	2,630.95	135.63	0.45	0.48	40.74%	51.85%	51.85%	92.59%
Germany	57	295.28	31.74	3,857.58	516.65	0.61	0.58	36.84%	42.11%	28.07%	82.46%
Denmark	1	2,264.16	2,264.16	9,544.15	9,544.15	0.53	0.68	0.00%	0.00%	0.00%	100.00%
Estonia	8	4.25	3.11	276.62	62.47	0.53	0.58	12.50%	25.00%	50.00%	62.50%
Spain	205	54.69	8.79	2,186.76	73.13	0.62	0.63	76.59%	50.73%	64.88%	69.27%
Finland	65	12.27	3.40	581.70	14.96	0.56	0.60	75.38%	40.00%	1.54%	35.38%
France	326	112.79	4.94	2,311.63	93.33	0.58	0.60	73.01%	63.80%	19.94%	61.04%
Great Britain	158	24.55	6.68	1,394.35	157.50	0.58	0.58	57.59%	49.37%	1.90%	65.82%
Greece	26	207.67	23.71	1,529.33	218.68	0.57	0.58	76.92%	61.54%	100.00%	96.15%
Hong Kong	4	1,981.71	606.76	5,436.58	3,739.76	0.37	0.42	75.00%	50.00%	100.00%	100.00%
Croatia	22	13.65	5.96	1,886.51	182.22	0.50	0.58	68.18%	77.27%	40.91%	81.82%
Hungary	15	283.74	13.37	7,601.46	794.06	0.51	0.52	60.00%	60.00%	13.33%	53.33%
Indonesia	1	164.16	164.16	307.20	307.20	0.55	0.50	0.00%	100.00%	100.00%	100.00%

Table 2 (cont.): M&As over time and countries

Panel E (cont.): Characteristics of M&As by country (one year before the M&A)

Target Country	N	Target's total assets ($mil) Mean	Target's total assets ($mil) Median	Acquirer's total assets ($mil) Mean	Acquirer's total assets ($mil) Median	Target's leverage Mean	Acquirer's leverage Mean	Domestic Deals (%)	Independent Targets (%)	Public Targets (%)	Public Acquirers (%)
Ireland	5	13.45	11.20	863.17	609.43	0.44	0.75	40.00%	60.00%	0.00%	100.00%
Iceland	1	21.31	21.31	100.55	100.55	0.37	0.64	0.00%	100.00%	100.00%	100.00%
Italy	175	187.71	12.61	3,395.24	231.43	0.69	0.64	66.29%	54.86%	62.86%	82.29%
Japan	77	242.61	69.88	5,060.83	1,829.26	0.54	0.58	98.70%	79.22%	98.70%	100.00%
South Korea	3	200.40	4.41	8,133.27	2,410.33	0.45	0.56	0.00%	100.00%	100.00%	66.67%
Luxembourg	2	50.67	50.67	32,360.22	32,360.22	0.46	0.62	50.00%	0.00%	0.00%	100.00%
Malaysia	4	90.70	48.34	2,174.95	1,916.39	0.24	0.59	75.00%	75.00%	100.00%	100.00%
Norway	106	47.77	3.11	617.24	66.92	0.64	0.62	66.04%	68.87%	3.77%	38.68%
New Zealand	1	230.42	230.42	5,410.25	5,410.25	0.57	0.61	0.00%	0.00%	100.00%	100.00%
Peru	6	215.52	197.79	10,678.03	3,523.36	0.49	0.51	16.67%	50.00%	83.33%	100.00%
Philippins	1	421.43	421.43	767.79	767.79	0.26	0.42	100.00%	100.00%	100.00%	100.00%
Poland	55	116.18	9.85	3,196.89	145.54	0.53	0.53	69.09%	43.64%	52.73%	80.00%
Portugal	37	171.42	19.87	2,158.19	146.98	0.69	0.64	70.27%	54.05%	91.89%	89.19%
Romania	36	30.19	3.14	6,738.21	200.66	0.46	0.52	36.11%	44.44%	61.11%	77.78%
Russia	59	38.84	9.01	4,098.30	231.57	0.52	0.56	86.44%	49.15%	62.71%	76.27%
Sweden	172	19.20	2.21	415.13	25.23	0.55	0.57	69.19%	61.63%	0.58%	44.77%
Singapore	2	128.16	128.16	793.87	793.87	0.29	0.30	100.00%	50.00%	100.00%	100.00%
Slovakia	9	24.54	3.77	2,210.00	99.59	0.48	0.52	22.22%	55.56%	55.56%	88.89%
Thailand	6	16.01	12.56	3,744.63	608.89	0.60	0.47	50.00%	50.00%	16.67%	66.67%
Turkey	2	979.83	979.83	2,832.16	2,832.16	0.64	0.78	50.00%	50.00%	100.00%	50.00%
Ukraine	20	42.39	11.14	1,126.33	134.83	0.31	0.47	65.00%	45.00%	55.00%	50.00%
United States	3	29.58	8.38	1,093.21	1,564.08	0.53	0.54	66.67%	33.33%	66.67%	66.67%
South Africa	2	2,072.73	2,072.73	12,907.83	12,907.83	0.53	0.51	0.00%	100.00%	100.00%	100.00%
		116.46	7.14	2,351.72	126.98	0.58	0.59	67.62%	57.65%	36.77%	66.16%

The dependent variables of leverage are defined similar to (Frank & Goyal, 2009) and (Huizinga, Laeven, & Nicodeme, 2008). The changes in leverage deviations after the M&A completion year are calculated similar to (Harford, Klasa, & Walcott, 2009) with the adapted annual target capital structure regressions shown in table H in the statistical appendix. The statutory corporate tax rates, differences in tax rates, tax-related variables such as holdings of financial investors as well as control variables are obtained from various data sources and are similar to the ones of the previous chapter. To assess the influence of the target's pre-merger leverage deviation on the change of its debt-to-assets ratio the dependent variables of the total debt-to-assets ratio LEVERAGE and adjusted net debt-to-assets ratio ADJLEVERAGE are defined according to (Huizinga, Laeven, & Nicodeme, 2008) and (Huizinga & Voget, 2009).

Financial debt FINLEVERAGE is defined according to (Frank & Goyal, 2009) as long-term interest bearing debt plus short-term interest bearing debt in current liabilities to analyze the influence of taxes on the change of financial debt in particular[28]. The changes in leverage targets are calculated comparable to (Harford, Klasa, & Walcott, 2009)[29].

The difference in tax rates shows that during the merger debt is preferably shifted from the target to the acquirer, illustrated in table 3. The differences in tax rates occur in international transactions. Different to previous studies is the inclusion of

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[28] The US American capital structure and taxation literature often uses leverage definitions different to the ones in the international literature. To compare the empirical observations of this study with those using Compustat data financial debt defined as long-term debt (item #9) plus debt in current liabilities (item #34) is similar to a definition using long-term debt (Orbis item 417 or Amadeus item 15) plus loans (Orbis item 420 or Amadeus item 18) in the global balance sheets shared by Amadeus and Orbis.

[29] The Amadeus universe downloaded from WRDS includes all very large, large, medium and small companies with consolidated and unconsolidated financial statements. The Amadeus database is merged with 964,297 Orbis company years. The Amadeus companies have many outliers for total and adjusted leverage below 0 and above 1. To avoid the skewness caused by outliers the median industry total and adjusted leverage is used. For financial leverage the median is 0 as half of the companies have no or negative financial leverage. For industry financial leverage the mean is a more reasonable value for those companies in the industries that have financial leverage above 0. In the final sample 12.5% of acquirers and 8.3% of targets are extracted from Orbis outside Europe.

constructs that approximate the tax planning opportunities of financial acquirers that use holdings. On the acquirer's side the incentive to shift debt through holdings is approximated with the construct FININV_RATIO_A (Andrade & Kaplan, 1998). This variable approximates the amount of relative assets invested by the financial investor into the new subsidiary through the holding. This variable is constructed with the dummy HOLDING_A whether the immediate acquirer is a holding or investment company, also called "conduit", which is used for tax planning (Hebous, Ruf, & Weichenrieder, 2011; Mintz & Weichenrieder, 2010). The variables FINANCIALINV_A and HOLDING_A are elements of FININV_RATIO_A. The dummy FINANCEFIRM_A is 1 if the acquirer is a financial firm of any type according to its SIC code. In the regressions only the financial investor ratio FININV_RATIO_A is used to avoid multicollinearity with its components. Financial investors are assumed to be less risk averse than strategic investors, such that the risk exposure of the equity at stake is controlled with the target's total equity relative to the acquirer's total equity EQUITYRATIO_T_A (Ruf, 2011; Mintz & Weichenrieder, 2010).

The capital structure variables approximating the debt capacity of the target as well as risk and asset growth are taken from (Frank & Goyal, 2009), (Rajan & Zingales, 1995) and (Wald, 1999). The control variables of inflation, independent target companies, whether the target and acquirer are from difference industries and countries and whether they are private firms are similar to (Harford, Klasa, & Walcott, 2009), (Ghosh & Jain, 2000) and (Erel, Jang, & Weisbach, 2012). The independent variables are used in the previous chapter as well.

Table 3: Descriptive Statistics of Variables

The values of the variables are shown during the deal completion year (t=0). L1_F1 refers to the change from t=-1 to t=1 around the M&A completion year. All variables are winsorized at the 1% and 99% percentiles. The variables are similar to (Rajan & Zingales, 1995), (Wald, 1999) and (Frank & Goyal, 2009). The statutory corporate tax rates STR_T and STR_A are used according to (Graham, 1996, 2000). The variables are defined in table G in the statistical appendix.

Panel A: Dependent variables	N	Mean	Std. Dev.	Min.	Median	Max.
LEVERAGE_T	1,844	0.5695	0.2325	0.0000	0.5919	0.9951
FINLEVERAGE_T	1,751	0.1448	0.1804	0.0000	0.0564	0.8125
ADJLEVERAGE_T	1,827	0.4061	0.2923	0.0000	0.4144	1.0000
LEVERAGE_T_L1_F1	1,844	-0.0173	0.1892	-0.9047	-0.0136	0.9257
FINLEVERAGE_T_L1_F1	1,711	-0.0097	0.1649	-0.7790	0.0000	0.8523
ADJLEVERAGE_T_L1_F1	1,817	0.0020	0.2644	-1.0000	0.0000	1.0000
Panel B: Independent variables	N	Mean	Std. Dev.	Min.	Median	Max.
SIZE_T	1,844	16.0692	2.0390	10.4748	15.8325	22.6000
TAR_T	1,844	0.2280	0.2369	0.0000	0.1367	0.9483
CASH_T	1,844	0.1352	0.1661	0.0000	0.0692	0.9967
ROA_T	1,844	0.0882	0.1718	-0.9377	0.0675	0.7604
RnD_T	1,844	0.0013	0.0170	0.0000	0.0000	0.4192
RISK_T	1,844	0.1054	0.0974	0.0010	0.0785	1.0006
ASSET_GROWTH_T	1,844	0.0641	0.3738	-1.4983	0.0464	1.7294
EQUITYRATIO_T_A	1,844	0.5779	2.8073	0.0000	0.0652	29.9397
ALEVERAGE_T	1,844	-0.1328	0.2360	-0.6652	-0.1165	0.3319
AFINLEVERAGE_T	1,751	-0.0913	0.1804	-0.4691	-0.1049	0.4585
AADJLEVERAGE_T	1,827	-0.1381	0.2958	-0.6795	-0.1455	0.5272
ALEVERAGE_A	1,844	-0.1515	0.2086	-0.6518	-0.1459	0.3094
AFINLEVERAGE_A	1,816	-0.1394	0.2001	-0.5367	-0.1577	0.4193
AADJLEVERAGE_A	1,837	-0.1594	0.2578	-0.7264	-0.1578	0.4448
LEVERAGE_T_target_L1_F1	1,844	-0.0035	0.0298	-0.1142	-0.0030	0.1893
FINLEVERAGE_T_target_L1_F1	1,844	0.0240	0.0590	-0.4995	0.0159	0.4292
ADJLEVERAGE_T_target_L1_F1	1,844	0.0004	0.0416	-0.1739	-0.0008	0.2660
Panel C: Tax variables	N	Mean	Std. Dev.	Min.	Median	Max.
STR_T	1,844	0.3048	0.0563	0.1250	0.3140	0.4069
STR_A	1,844	0.3101	0.0578	0.1250	0.3250	0.4069
TAXDIFF_T_A	1,844	-0.0054	0.0486	-0.2750	0.0000	0.2149
STR_T_L1_F1	1,844	-0.0116	0.0212	-0.1000	0.0000	0.0700
STR_A_L1_F1	1,844	-0.0105	0.0210	-0.0900	0.0000	0.0700
TAXDIFF_T_A_L1_F1	1,844	-0.0011	0.0175	-0.0905	0.0000	0.0900
Panel D: Control variables	N	Mean	Std. Dev.	Min.	Median	Max.
INDEPENDENT	1,844	0.5765	0.4943	0.0000	1.0000	1.0000
PRIVATE_T	1,844	0.6323	0.4823	0.0000	1.0000	1.0000
INFLATION_T	1,844	0.0303	0.0263	-0.0027	0.0233	0.2523
FININV_RATIO_A	1,844	0.0123	0.1073	0.0000	0.0000	1.0893
DIFF_IND	1,844	0.5472	0.4979	0.0000	1.0000	1.0000
CROSSBORDER	1,844	0.3238	0.4680	0.0000	0.0000	1.0000

6.4 Analysis of new subsidiaries' leverage changes during M&A completion

The multivariate analysis in table 4 of the change in the newly acquired subsidiary's leverage around the M&A completion year shows that the target's statutory corporate tax rate is positively correlated with its leverage and change in leverage. A one standard deviation increase in the target's statutory tax rate change is associated with a $0.4233 \times 0.0212 = 0.0090$ or 0.90 percentage points leverage change compared to a standard deviation of the change in leverage of 0.1892, which is a relative change of $0.0090/0.1892 = 0.0476$ or 4.76%. A higher level of leverage in the deal completion year arises from a higher statutory corporate tax rate as well. The statutory corporate tax rates on average decrease before and after the merger, because the sample falls into the period of the recent financial crisis in which most countries reduced tax rates.

Comparable to (Harford, Klasa, & Walcott, 2009) the change in the leverage target around the M&A completion year is significantly positively correlated with the change in leverage. Excess leverage compared to the benchmark is positively correlated with the level of leverage but negative correlated with its change. The new subsidiary reduces leverage if overleveraged and increases its leverage if it is underleveraged with spare debt capacity. The change in leverage is more negative to reduce the bankruptcy risk of debt if the target is overleveraged and more risky in terms of a higher standard deviation of ROA.

Similarly excess leverage of the acquirer increases target's leverage, because the acquirer shifts debt to the target, as observed in the previous chapter. The economic effect of a one standard deviation increase of the acquirer's pre-merger leverage deviation on target's leverage change of $0.0655 \times 0.2086 = 0.0137$ or 1.37 percentage points is significant given a standard deviation of the change in debt-to-assets of 0.1892. An overleveraged acquirer shifts excess debt to the newly acquired subsidiary whereas an underleveraged acquirer takes debt from the new subsidiary onto his balance sheet. 7.2% of the target's change in leverage around the M&A is attributed to the acquirer's ex-ante leverage deviation, which is in relation of the target having on average 5.5% of the total assets of the acquirer economic significant. (Harford, Klasa, & Walcott, 2009) do not consider the potential influence of the target's pre-merger leverage deviation on the acquirer's change in leverage and financing decision, even though they focus in their analysis on large acquisitions in which the target has at least 20% of the acquirer's assets. Finally expected growth in assets is positively correlated with debt to finance growth.

Furthermore, the influence of the factors determining debt capacity and leverage is controlled directly with ROA, cash, and R&D that have the expected signs (Frank & Goyal, 2009). Research and development intensive new subsidiaries are more leveraged to finance the creation of intangible assets. Tangible assets are significantly negatively correlated with the change in leverage, which is contrary to expectations. The negative correlation of ROA and cash with debt is explained by a preference for internal retained earnings over external debt according to the pecking-order theory (Myers & Majluf, 1984; Frank & Goyal, 2009). Cash is used to pay back debt to create financial slack through the accumulation of retained earnings (Graham & Leary, 2011).

The same empirical observations are made for financial leverage and adjusted net leverage. The tax effects however are significant only for the total debt-to-assets ratio. The acquirer's statutory corporate tax rate is significantly positively correlated with the target's financial leverage due to financing effects (Erickson, 1998; Harford, Klasa, & Walcott, 2009).

Table 4: Regressions of the change in leverage around the M&A

The dependent variable is the target's debt-to-assets ratio LEVERAGE and its change from the year before (L1) to one year after (F1) the M&A completion year. L1 refers to the variables at the end of the fiscal year before the M&A completion year. F1 refers to the first year after the M&A completion year. All other variables are centered at the M&A completion year t=0. The standard errors of the pooled OLS regressions are corrected for heteroscedasticity with the Huber & White sandwich estimator (Huber, 1967; White, 1980, 1982). Control variables are included but not reported. The variables are summarized in table 3 and described in table G in the statistical appendix.

Panel A: Total leverage	(1)	(2)	(3)	(4)	(5)
	LEVERAGE_T		LEVERAGE_T_L1_F1		
VARIABLES	t=0	t=0	t=0	t=0	t=0
STR_T	0.4880***	0.1845**			
	(3.740)	(2.110)			
STR_A	-0.0420	0.0166			
	(-0.358)	(0.210)			
STR_T_L1_F1			0.4233*		
			(1.779)		
STR_A_L1_F1			-0.2922		
			(-1.304)		
TAXDIFF_T_A_L1_F1				0.3596*	0.4045*
				(1.702)	(1.908)
LEVERAGE_T_target_L1_F1			1.5216***	1.5337***	1.1418***
			(8.080)	(8.274)	(5.919)
L1.ALEVERAGE_T		0.7524***	-0.3164***	-0.3173***	-0.2158***
		(42.276)	(-15.192)	(-15.274)	(-8.300)
L1.ALEVERAGE_A		0.0118	0.0722***	0.0720***	0.0655***
		(0.640)	(3.227)	(3.222)	(3.048)
L1.RISK_T					0.0291
					(0.518)
L1.ALEVERAGE_T x L1.RISK_T					-0.8545***
					(-4.540)
F1.ASSET_GROWTH_T					0.0448***
					(2.602)
L1.ALEVERAGE_T x F1.ASSET_GROWTH_T					-0.1152
					(-1.488)
F1.ROA_T	-0.1103***	-0.0667*	-0.1794***	-0.1802***	-0.1737***
	(-2.700)	(-1.938)	(-5.256)	(-5.302)	(-5.313)
F1.CASH_T	-0.2498***	-0.2005***	-0.1281***	-0.1272***	-0.1259***
	(-6.659)	(-7.539)	(-3.876)	(-3.851)	(-3.899)
F1.TAR_T	-0.0904***	-0.0238	-0.0864***	-0.0869***	-0.0622***
	(-3.593)	(-1.391)	(-4.434)	(-4.470)	(-3.094)
F1.RnD_T	-0.1521	0.2724	0.3526***	0.3464***	0.3750***
	(-0.795)	(0.881)	(3.683)	(3.699)	(2.660)
F1.EQUITYRATIO_T_A	-0.0029	-0.0026	-0.0042*	-0.0042*	-0.0041*
	(-1.544)	(-1.170)	(-1.712)	(-1.712)	(-1.718)
Constant	0.5304***	0.6819***	0.0209	0.0186	0.0139
	(11.868)	(22.943)	(1.643)	(1.529)	(1.110)
Control Variables	Yes	Yes	Yes	Yes	Yes
N	1,844	1,844	1,844	1,844	1,844
F-statistic	10.70	177.84	21.49	22.80	19.71
p-value	0.0000	0.0000	0.0000	0.0000	0.0000
R^2 adjusted	0.0662	0.5860	0.2040	0.2043	0.2336
Root MSE	0.2246	0.1496	0.1688	0.1688	0.1656

Robust t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 4 (cont.): Regressions of the change in leverage around the M&A

The dependent variable is the target's adjusted debt-to-assets ratio ADJLEVERAGE and its change from the year before (L1) to one year after (F1) the M&A completion year. L1 refers to the variables at the end of the fiscal year before the M&A completion year. F1 refers to the first year after the M&A completion year. All other variables are centered at the M&A completion year t=0. The standard errors of the pooled OLS regressions are corrected for heteroscedasticity with the Huber & White sandwich estimator (Huber, 1967; White, 1980, 1982). Control variables are included but not reported. The variables are summarized in table 3 and described in table G in the statistical appendix.

Panel B: Adjusted leverage	(1)	(2)	(3)	(4)	(5)
	ADJLEVERAGE_T		ADJLEVERAGE_T_L1_F1		
VARIABLES	t=0	t=0	t=0	t=0	t=0
STR_T	0.3770**	0.1830			
	(2.384)	(1.548)			
STR_A	-0.0406	-0.0067			
	(-0.287)	(-0.063)			
STR_T_L1_F1			0.0312		
			(0.110)		
STR_A_L1_F1			0.0814		
			(0.280)		
TAXDIFF_T_A_L1_F1				-0.0224	0.0284
				(-0.086)	(0.112)
ADJLEVERAGE_T_target_L1_F1			1.0774***	1.0793***	0.7718***
			(6.341)	(6.361)	(4.581)
L1.AADJLEVERAGE_T		0.6304***	-0.4573***	-0.4577***	-0.3843***
		(32.736)	(-22.503)	(-22.618)	(-13.168)
L1.AADJLEVERAGE_A		0.0165	0.1241***	0.1242***	0.1177***
		(0.865)	(5.425)	(5.426)	(5.370)
L1.RISK_T					0.2108***
					(2.821)
L1.AADJLEVERAGE_T x					-0.6806***
L1.RISK_T					(-3.188)
F1.ASSET_GROWTH_T					0.0609***
					(3.174)
L1.AADJLEVERAGE_T x					-0.1041
F1.ASSET_GROWTH_T					(-1.597)
F1.ROA_T	-0.1779***	-0.1474***	-0.2096***	-0.2100***	-0.2024***
	(-3.510)	(-3.313)	(-4.965)	(-4.975)	(-4.693)
F1.CASH_T	-0.5524***	-0.3910***	-0.3769***	-0.3763***	-0.3913***
	(-11.197)	(-8.802)	(-6.591)	(-6.581)	(-6.669)
F1.TAR_T	0.0194	0.1195***	-0.1548***	-0.1550***	-0.1149***
	(0.661)	(5.623)	(-6.433)	(-6.454)	(-4.724)
F1.RnD_T	-0.4264***	-0.2917	0.2421**	0.2364**	0.2582*
	(-2.816)	(-1.283)	(2.333)	(2.319)	(1.799)
F1.EQUITYRATIO_T_A	-0.0029	-0.0025	-0.0070**	-0.0069**	-0.0065**
	(-1.145)	(-0.925)	(-2.470)	(-2.478)	(-2.296)
Constant	0.4287***	0.5271***	0.0444***	0.0425**	0.0225
	(8.059)	(13.901)	(2.613)	(2.574)	(1.339)
Control variables	Yes	Yes	Yes	Yes	Yes
N	1,827	1,823	1,815	1,815	1,815
F-statistic	18.77	111.12	38.13	40.44	33.66
p-value	0.0000	0.0000	0.0000	0.0000	0.0000
R^2 adjusted	0.1176	0.5004	0.3003	0.3006	0.3250
Root MSE	0.2746	0.2066	0.2213	0.2212	0.2173

Robust t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 4 (cont.): Regressions of the change in leverage around the M&A

The dependent variable is the target's financial debt-to-assets ratio FINLEVERAGE and its change from the year before (L1) to one year after (F1) the M&A completion year. L1 refers to the variables at the end of the fiscal year before the M&A completion year. F1 refers to the first year after the M&A completion year. All other variables are centered at the M&A completion year t=0. The standard errors of the pooled OLS regressions are corrected for heteroscedasticity with the Huber & White sandwich estimator (Huber, 1967; White, 1980, 1982). Control variables are included but not reported. The variables are summarized in table 3 and described in table G in the statistical appendix.

Panel C: Financial leverage	(1)	(2)	(3)	(4)	(5)
	FINLEVERAGE_T		FINLEVERAGE_T_L1_F1		
VARIABLES	t=0	t=0	t=0	t=0	t=0
STR_T	0.3223***	0.1852**	-0.0480		
	(2.986)	(2.064)	(-0.508)		
STR_A	0.0133	0.0920	0.1780**		
	(0.139)	(1.188)	(2.160)		
STR_T_L1_F1				0.1283	
				(0.605)	
STR_A_L1_F1				0.0796	
				(0.384)	
TAXDIFF_T_A_L1_F1					0.0272
					(0.143)
FINLEVERAGE_T_target_L1_F1			0.6515***	0.6474***	0.6513***
			(7.636)	(7.526)	(7.587)
L1.AFINLEVERAGE_T		0.5464***	-0.3782***	-0.3762***	-0.3781***
		(21.523)	(-10.692)	(-10.565)	(-10.659)
L1.AFINLEVERAGE_A		-0.0366*	0.1398***	0.1353***	0.1359***
		(-1.750)	(6.137)	(5.948)	(5.973)
L1.RISK_T			-0.0055	-0.0115	-0.0088
			(-0.141)	(-0.296)	(-0.228)
L1.AFINLEVERAGE_T x L1.RISK_T			-0.5810**	-0.5825**	-0.5786**
			(-2.443)	(-2.428)	(-2.415)
F1.ASSET_GROWTH_T			0.0170	0.0168	0.0172
			(1.204)	(1.189)	(1.218)
L1.AFINLEVERAGE_T x F1.ASSET_GROWTH_T			-0.1157	-0.1137	-0.1145
			(-1.637)	(-1.605)	(-1.611)
F1.ROA_T	-0.0653**	-0.0749***	-0.0888***	-0.0900***	-0.0903***
	(-2.464)	(-3.026)	(-3.514)	(-3.564)	(-3.579)
F1.CASH_T	-0.2044***	-0.1815***	-0.0446**	-0.0455**	-0.0446**
	(-10.205)	(-10.227)	(-2.113)	(-2.172)	(-2.123)
F1.TAR_T	0.2220***	0.2633***	-0.0366*	-0.0389*	-0.0391*
	(10.264)	(14.520)	(-1.807)	(-1.938)	(-1.948)
F1.RnD_T	-0.0997	-0.1462	0.4043***	0.4410***	0.4326***
	(-1.190)	(-1.523)	(4.825)	(5.381)	(5.493)
F1.EQUITYRATIO_T_A	-0.0002	0.0009	-0.0038**	-0.0038**	-0.0038**
	(-0.162)	(0.560)	(-2.175)	(-2.134)	(-2.174)
Constant	0.0304	0.0994***	-0.0746**	-0.0266**	-0.0306**
	(0.883)	(3.559)	(-2.557)	(-2.031)	(-2.426)
Control variables	Yes	Yes	Yes	Yes	Yes
N	1,751	1,721	1,702	1,702	1,702
F-statistic	32.99	68.07	19.37	18.76	19.66
p-value	0.0000	0.0000	0.0000	0.0000	0.0000
R^2 adjusted	0.1702	0.4479	0.2591	0.2571	0.2570
Root MSE	0.1644	0.1337	0.1421	0.1422	0.1423

Robust t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

In the sensitivity analysis the potential influence of the financing choice of the acquiring company on the new subsidiary's financial leverage change is tested with a classical Heckman selection model (Heckman, 1976; 1979)[30]. The selection equation whether the acquiring company pays with cash, which is associated with debt financing of the M&A, is adapted from (Harford, Klasa, & Walcott, 2009). The financing decision has a significant influence on the change of target's financial leverage around the M&A. For overleveraged targets the coefficient of the tax rate difference is insignificant, as expected, compared to a significant tax effect of debt shifting to underleveraged targets with spare debt capacity.

Financial acquirers shift debt to the newly acquired subsidiary during the M&A completion year through holdings. The use of holdings is associated with a 4.52 percentage points increase in subsidiary's total debt-to-assets ratio, which is equivalent in magnitude to the four percentage points jump of financial leverage of acquirers shown in table 6. Financial acquirers using holdings therefore shift the debt used to finance the acquisition in such a manner to the new subsidiary that both, the new subsidiary and the parent holding, experience a similar relative increase in total debt of 4%. The empirical observation of debt shifting trough holdings was observed previously in German acquisitions by (Ruf, 2011) and (Mintz & Weichenrieder, 2010).

However, risk considerations concerning new subsidiaries' pre-merger excess leverage are made by financial investors similar to corporate investors, because the interaction effects of risk and excess total and adjusted net debt have negative signs as well (Graham & Harvey, 2001; Harford, Klasa, & Walcott, 2009; Frank & Goyal, 2009).

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[30] For 581 M&As is the method of payment available. 104 deals, or 17.9%, are share deals. The majority of 400, or 68.9%, use cash from retained earnings, debt or capital increases. The method of deal financing is available for 235 deals with 152 (64.7%) stated as capital increases through the vendor and 53 (22.6%) using bank lending. The missing payment method information limit the sensitivity analysis of the influence of the payment method in deal financing on the change in debt.

Table 5: Sensitivity analysis of the target's change in leverage around the M&A

The dependent variables are the change in FINLEVERAGE_T and LEVERAGE_T from L1 to F1 around the M&A completion year. The (Heckman, 1976, 1979) selection model uses CASHPAY that is 1 if the method of payment is cash in Zephyr as selection dummy (Harford, Klasa, & Walcott, 2009). Regression (2) includes the acquirer's lagged control and capital structure variables. Regressions (3) and (4) distinguish between over- and underleveraged targets, (5) and (6) between financial and nonfinancial, or corporate, acquirers. All standard errors are corrected for heteroscedasticity with the Huber & White sandwich estimator (Huber, 1967; White, 1980). The variables are summarized in table 3 and described in table G in the statistical appendix.

Panel A: Sensitivity Analysis	(1)	(2)	(3)	(4)	(5)	(6)
	Heckman ML Model		LEVERAGE_T_L1_F1			
VARIABLES	FINLEVERAGE_T_L1_F1	CASHPAY	Over-leveraged	Under-leveraged	financial acquirer	corporate acquirer
TAXDIFF_T_A_L1_F1	0.6409**		0.2975	0.4476*	0.2227	0.3821*
	(2.354)		(0.640)	(1.890)	(0.366)	(1.694)
FINLEVERAGE_T_target_L1_F1	0.8957***					
	(4.882)					
L1.AFINALEVERAGE_T	-0.3977***					
	(-4.215)					
L1.AFINALEVERAGE_A	0.1266**					
	(2.222)					
L1.RISK_T	-0.4017***		-0.0272	0.0496	0.0979	0.0279
	(-3.878)		(-0.187)	(0.384)	(0.498)	(0.484)
F1.ASSET_GROWTH_T	-0.0010		0.1011**	0.0245	-0.0039	0.0575***
	(-0.046)		(2.261)	(0.903)	(-0.119)	(3.115)
L1.AFINLEVERAGE_T x L1.RISK_T	-1.8294***					
	(-4.682)					
L1.AFINLEVERAGE_T x F1.ASSET_GROWTH_T	0.0915					
	(1.137)					
L1.FINLEVERAGE_A		0.5489				
		(1.507)				
L1.ASSET_GROWTH_A		-0.4187***				
		(-2.708)				
L1.FINLEVERAGE_A x L1.ASSET_GROWTH_A		1.5381**				
		(2.165)				
LEVERAGE_T_target_L1_F1			1.1521***	1.1848***	1.1491*	1.1117***
			(3.342)	(5.030)	(1.821)	(5.478)
L1.ALEVERAGE_T			-0.2525**	-0.1939***	-0.0890	-0.2341***
			(-2.013)	(-4.573)	(-1.116)	(-8.624)
L1.ALEVERAGE_A			0.0900**	0.0581**	-0.0225	0.0926***
			(2.468)	(2.225)	(-0.541)	(3.636)
L1.ALEVERAGE_T x L1.RISK_T			-0.6198	-0.8385**	-1.0969*	-0.8256***
			(-0.648)	(-2.464)	(-1.697)	(-4.299)
L1.ALEVERAGE_T x F1.ASSET_GROWTH_T			-0.4468*	-0.1379	-0.3458**	-0.0715
			(-1.767)	(-1.213)	(-2.059)	(-0.860)
HOLDING_A					0.0452*	
					(1.893)	
Constant	-0.1204***	-2.6420***	0.0193	0.0203	0.0396	0.0116
	(-3.374)	(-2.757)	(0.847)	(1.048)	(1.171)	(0.869)
Control variables	Yes	No	Yes	Yes	Yes	Yes
Capital structure variables	Yes	No	Yes	Yes	Yes	Yes
Control variables (L1)	No	Yes	No	No	No	No
Capital structure variables (L1)	No	Yes	No	No	No	No
N	538	538	615	1,229	248	1,596
R^2 adjusted			0.1823	0.1892	0.2104	0.2439
p-value of selection	0.0000	0.0000				

Robust z- and t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 5 (cont.): Sensitivity analysis of the target's change in leverage around the M&A

The dependent variables are the changes in the target's leverage ratios from the year before to one year after the M&A completion year. Financial acquirers have SIC code 600 to 699. The standard errors are based on the Huber & White sandwich estimator (Huber, 1967; White, 1980). The variables are summarized in table 3 and described in table G in the statistical appendix.

Panel B: Financial acquirers	(1)	(2)	(3)	(4)	(5)	(6)
	LEVERAGE_T_L1_F1		FINLEVERAGE_T_L1_F1		ADJLEVERAGE_T_L1_F1	
VARIABLES	t=0	t=0	t=0	t=0	t=0	t=0
TAXDIFF_T_A_L1_F1	0.2614	0.2227	-0.3974	-0.3722	0.2627	0.2291
	(0.421)	(0.366)	(-1.089)	(-1.018)	(0.474)	(0.412)
FININV_RATIO_A	0.0230		0.0158		-0.0130	
	(0.813)		(0.390)		(-0.372)	
HOLDING_A		0.0452*		0.0005		0.0089
		(1.893)		(0.015)		(0.278)
LEVERAGE_T_target_L1_F1	1.1831*	1.1491*				
	(1.870)	(1.821)				
L1.ALEVERAGE_T	-0.0910	-0.0890				
	(-1.141)	(-1.116)				
L1.ALEVERAGE_A	-0.0275	-0.0225				
	(-0.672)	(-0.541)				
FINLEVERAGE_T_target_L1_F1			0.7655***	0.7656***		
			(2.694)	(2.691)		
L1.AFINLEVERAGE_T			-0.2341**	-0.2364**		
			(-2.016)	(-2.046)		
L1.AFINLEVERAGE_A			0.1088*	0.1095*		
			(1.806)	(1.813)		
ADJLEVERAGE_T_target_L1_F1					0.9177**	0.9209**
					(2.279)	(2.292)
L1.AADJLEVERAGE_T					-0.2114***	-0.2119***
					(-2.723)	(-2.723)
L1.AADJLEVERAGE_A					0.0332	0.0335
					(0.585)	(0.592)
L1.RISK_T	0.1039	0.0979	0.1352	0.1355	0.3836	0.3810
	(0.523)	(0.498)	(0.724)	(0.725)	(1.628)	(1.630)
L1.ALEVERAGE_T x L1.RISK_T	-1.0853*	-1.0969*				
	(-1.669)	(-1.697)				
L1.AFINLEVERAGE_T x L1.RISK_T			-1.7342	-1.7460		
			(-1.452)	(-1.461)		
L1.AADJLEVERAGE_T x L1.RISK_T					-1.0850*	-1.0764*
					(-1.762)	(-1.752)
F1.ASSET_GROWTH_T	-0.0045	-0.0039	0.0329	0.0331	0.0332	0.0327
	(-0.139)	(-0.119)	(1.395)	(1.402)	(0.979)	(0.969)
L1.ALEVERAGE_T x F1.ASSET_GROWTH_T	-0.3470**	-0.3458**				
	(-2.048)	(-2.059)				
L1.AFINLEVERAGE_T x F1.ASSET_GROWTH_T			0.1227	0.1214		
			(0.906)	(0.901)		
L1.AADJLEVERAGE_T x F1.ASSET_GROWTH_T					-0.3569***	-0.3549**
					(-2.609)	(-2.588)
Constant	0.0424	0.0396	-0.0100	-0.0099	0.0618	0.0610
	(1.240)	(1.171)	(-0.294)	(-0.289)	(1.507)	(1.483)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Capital structure variables	Yes	Yes	Yes	Yes	Yes	Yes
N	248	248	232	232	243	243
R^2 adjusted	0.2037	0.2104	0.2094	0.2087	0.2505	0.2504

Robust t-statistics in parentheses, *** p<0.01, ** p<0.05, * p<0.1

If future growth is expected excess leverage is reduced to create financial slack to finance investments. Finally tax rate differences between the financial investor, rather its holding, and the target do not matter.

6.5 Analysis of new subsidiaries' convergence towards a leverage target

The change of leverage before and after the M&A over time is shown in table 6. The difference between target companies' total debt-to-assets ratio, adjusted net debt-to-assets ratio and financial debt-to-assets ratio less the estimated leverage targets are negative before the M&A completion year and decrease after the M&A. The abnormal adjusted net leverage is decreasing by 1.6 percentage point in the 3 years after the M&A, with abnormal total and financial leverage decreasing even more. The on average underleveraged target companies become more underleveraged after the M&A. For comparison the acquirer's financial debt-to-assets ratio jumps up by 4 percentage points after the M&A, or relatively by 25%, and stays constant afterwards similar to (Ghosh & Jain, 2000) and (Harford, Klasa, & Walcott, 2009).

During the financial crisis the statutory corporate tax rates on average fell, before and after the M&A. With falling tax rates the post-merger incentive to shift debt from the newly acquired subsidiary to the larger acquiring conglomerate company increases. Whether the decreasing tax incentives to shift debt affect the newly acquired subsidiaries' post-merger change in leverage and convergence towards its capital structure target is analyzed in table 8. The variables used in the regression analysis are summarized in table 7.

Table 6: Differences of variables before and after the M&A

Table 6 shows the time series of variables before and after the M&A. The values are the variables' means in the respective time period. The t-tests and p-values show the differences of the variables before and after the M&A. The variables are summarized in table 3 and the definitions are shown in table G in the statistical appendix.

	t	-4	-3	-2	-1	0	1	2	3	4	T-test	[-1 to 1]	T-test	[-3 to 3]
Panel A: Leverage Variables	n	1,370	1,844	1,844	1,844	1,844	1,844	1,844	1,844	1,276	Diff	p-value	Diff	p-value
LEVERAGE_T	mean	0.6060	0.5965	0.5936	0.5820	0.5695	0.5647	0.5608	0.5579	0.5466	-0.0173	0.0000	-0.0386	0.0000
ADJLEVERAGE_T	mean	0.4431	0.4346	0.4268	0.4152	0.4061	0.4181	0.4208	0.4265	0.4285	0.0029	0.3738	-0.0080	0.1767
FINLEVERAGE_T	mean	0.1606	0.1618	0.1553	0.1523	0.1448	0.1445	0.1429	0.1449	0.1369	-0.0078	0.0073	-0.0169	0.0015
ALEVERAGE_T	mean	-0.0782	-0.0923	-0.1026	-0.1204	-0.1328	-0.1339	-0.1315	-0.1330	.	-0.0135	0.0008	-0.0408	0.0000
AADJLEVERAGE_T	mean	-0.0850	-0.0959	-0.1078	-0.1287	-0.1381	-0.1258	-0.1191	-0.1122	.	0.0029	0.3597	-0.0163	0.1022
AFINLEVERAGE_T	mean	-0.0212	-0.0324	-0.0530	-0.0686	-0.0913	-0.1009	-0.1020	-0.1105	.	-0.0322	0.0000	-0.0781	0.0000
Panel B: Target Variables														
SIZE_T	mean	15.5846	15.7423	15.8799	16.0016	16.0692	16.1657	16.2033	16.1712	16.2408	0.1641	0.0000	0.4289	0.0000
TAR_T	mean	0.2385	0.2433	0.2416	0.2364	0.2280	0.2315	0.2280	0.2251	0.2275	-0.0049	0.0348	-0.0182	0.0000
CASH_T	mean	0.1399	0.1324	0.1294	0.1327	0.1352	0.1161	0.1096	0.1057	0.1042	-0.0166	0.0000	-0.0267	0.0000
ROA_T	mean	0.0803	0.0888	0.0934	0.0991	0.0882	0.0842	0.0741	0.0646	0.0614	-0.0149	0.0000	-0.0242	0.0000
RnD_T	mean	0.0005	0.0007	0.0010	0.0008	0.0013	0.0015	0.0011	0.0013	0.0010	0.0006	0.0200	0.0006	0.0193
EQUITYRATIO_T_A	mean	0.0000	0.0000	0.0000	0.0000	327.9414	321.6827	277.5401	307.1381	273.6794	-6.2587	0.4485	-20.8033	0.3489
ASSET_GROWTH_T	mean	0.0000	0.1109	0.1376	0.1218	0.0676	0.0965	0.0376	-0.0321	-0.0161	-0.0253	0.0257	-0.1430	0.0000
Panel C: Acquirer Variables														
LEVERAGE_A	mean	0.6029	0.6005	0.5955	0.5910	0.6076	0.6099	0.6058	0.6045	0.6025	0.0189	0.0000	0.0040	0.1950
ADJLEVERAGE_A	mean	0.4698	0.4741	0.4639	0.4596	0.4920	0.4993	0.4970	0.4991	0.4975	0.0398	0.0000	0.0251	0.0000
FINLEVERAGE_A	mean	0.1986	0.2020	0.1970	0.2024	0.2309	0.2405	0.2426	0.2459	0.2435	0.0381	0.0000	0.0439	0.0000
FININV_RATIO_A	mean	0.0000	0.0000	0.0000	0.0000	0.0123	0.0123	0.0125	0.0125	0.0121	0.0001	0.2942	0.0003	0.0515
Panel D: Post-Merger Tax Variables														
STR_T	mean	0.3287	0.3205	0.3151	0.3110	0.3048	0.2994	0.2945	0.2912	0.2908	-0.0116	0.0000	-0.0293	0.0000
STR_A	mean	0.3306	0.3223	0.3183	0.3157	0.3101	0.3052	0.3006	0.2975	0.2973	-0.0105	0.0000	-0.0249	0.0000
TAXDIFF_T_A	mean	0.0000	0.0000	0.0000	0.0000	-0.0054	-0.0058	-0.0061	-0.0063	-0.0065	-0.0005	0.0163	-0.0009	0.0569

Table 7: Changes in Variables after the Merger or Acquisition

The variables are summarized in tables 3 and 6 and described in table G in the statistical appendix. The change from t=0 to t=3 is not available for all M&As, because the panel is unbalanced with data in t=4 to calculate the leverage target at t=3 missing for some M&As. t=0 is the M&A completion year. The values of TAXDIFF_T_A are shown at F1, F2 and F3.

Panel A: Dependent abnormal leverage changes						
	n	-1	0	0 to 1	0 to 2	0 to 3
ALEVERAGE_T_0_F.	1,844			-0.0011	0.0013	0.0082
AFINLEVERAGE_T_0_F.	1,712			-0.0096	-0.0132	-0.0145
AADJLEVERAGE_T_0_F.	1,817			0.0123	0.0192	0.0337
Panel B: Target variables changes						
	n	-1	0	0 to 1/F1	0 to 2/F2	0 to 3/F3
TAXDIFF_T_A_F.	1,844			-0.0058	-0.0061	-0.0063
TAR_T_0_F.	1,844			0.0035	-0.0001	-0.0029
CASH_T_0_F.	1,844			-0.0191	-0.0256	-0.0295
ROA_T_0_F.	1,844			-0.0040	-0.0141	-0.0236
RnD_T_0_F.	1,844			0.0002	-0.0002	0.0000
EQUITYRATIO_T_A	1,844		0.5779			
INDEPENDENT	1,844		0.5765			
HIGHTECH_T	1,844		0.0211			
SENSITIVE_INDUSTRY_T	1,844		0.1258			
INFLATION_T	1,844		0.0303			
DIFF_IND	1,844		0.5472			
FININV_RATIO_A	1,844		0.0123			
CROSSBORDER	1,844		0.3238			
LEVERAGE_T	1,842	0.5820				
LEVERAGE_T_target	1,842	0.7025				
ALEVERAGE_T	1,842	-0.1204				

The distinction between the three leverage definitions shows that the abnormal total debt-to-assets ratio and abnormal adjusted net debt-to-assets ratio are increasing after the M&A whereas the abnormal financial debt-to-assets ratio is decreasing. From the univariate statistics in tables 6 and 7 the conclusion can be drawn that in the new subsidiary and the acquiring conglomerate a debt substitution effect occurs in which trade credit is increasing while interest bearing debt is decreasing. This substitution effect is likely to be caused by internal debt shifting. The internal debt appears as a form trade credit from the parent company going through the accounts payable and receivable of the subsidiary and parent. The new subsidiaries' debt capacity appears to decrease in the post-merger period as well, because tangible assets and profitability are falling together with cash whereas the tax incentive to shift debt to the target is decreasing, too.

Nevertheless, the post-merger changes of new subsidiaries' leverage deviation show in table 8 that a one standard deviation of the pre-merger leverage deviation, or abnormal leverage, is reversed by 26.57% until the third year after the M&A completion year. Similar empirical observations of 25.50% and 24.89% of the revision of deviations from the financial and adjusted net debt targets are made. The acquired companies' pre-merger underleverage is reversed, thus reduced in terms of increasing leverage compared to the leverage target.

The revision of pre-merger underleverage is accompanied by the positive influence that the acquirer's pre-merger leverage deviation has up to the third year after the merger. The economic effect of a one standard deviation increase of the acquirer's pre-merger leverage deviation on the target's change in its leverage deviation up to the third year is $0.0751 \times 0.2086 = 0.0157$ or 1.57 percentage points, which is a relatively large effect compared to an average change of the leverage deviation of 0.82 percentage points. The economic effects of the acquirer's pre-merger deviations in his financial and adjusted net leverage are comparable.

Besides the direct debt shifting effects of pre-merger deviations from leverage targets the post-merger anticipated tax rate difference in the first through third year has a significant positive effect on the change of new subsidiaries' leverage deviation regarding their total debt-to-assets ratio only. Tax-related debt shifting affecting the post-merger leverage deviation occurs through the use of internal trade credit, because financial and adjusted net debt do not include trade credit denoted as accounts payable to creditors. The economic effect of a one standard deviation increase in the tax rate difference in the third year is a $0.2346 \times 0.0486 = 0.0114$ or 1.14 percentage points greater change in the leverage deviation, which is given an average increase of 0.0082 or 0.82 percentage points an economic large effect.

Table 8: New subsidiaries' post-merger changes in abnormal leverage

The dependent variable is the change in abnormal leverage from t=0 to t=1, 2, and 3 after the M&A completion year. The tax difference TAXDIFF_T_A at t=1, 2 and 3 is used in the regressions with the control variables at t=0. The standard errors of the pooled OLS regressions are corrected for heteroscedasticity with the Huber & White sandwich estimator (Huber, 1967; White, 1980). The variables are summarized in table 6 and 7 and described in table G in the statistical appendix.

Panel A: Abnormal leverage	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	ALEVERAGE_T_0_F.			AFINLEVERAGE_T_0_F.		AADJLEVERAGE_T_0_F.	
VARIABLES	0 to 1	0 to 2	0 to 3	0 to 1	0 to 3	0 to 1	0 to 3
F1.STR_A	-0.1881***						
	(-2.780)						
F1.STR_T	0.1596**						
	(2.129)						
TAXDIFF_T_A_F.		0.1925**	0.2346**	0.0478	0.0726	0.1418	0.1472
		(2.407)	(1.983)	(0.724)	(0.701)	(1.344)	(0.943)
L1.ALEVERAGE_T	-0.1156***	-0.1898***	-0.2657***				
	(-7.123)	(-10.158)	(-10.658)				
L1.ALEVERAGE_A	0.0421**	0.0381*	0.0751***				
	(2.524)	(1.880)	(2.710)				
L1.AFINLEVERAGE_T				-0.1603***	-0.2550***		
				(-7.503)	(-7.614)		
L1.AFINLEVERAGE_A				0.0782***	0.1042***		
				(4.480)	(3.851)		
L1.AADJLEVERAGE_T						-0.1305***	-0.2489***
						(-7.220)	(-10.023)
L1.AADJLEVERAGE_A						0.0514***	0.0478*
						(2.624)	(1.743)
Constant	0.0081	-0.0041	-0.0092	-0.0150*	-0.0102	-0.0099	-0.0127
	(0.341)	(-0.392)	(-0.614)	(-1.845)	(-0.741)	(-0.818)	(-0.649)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capital structure variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1,844	1,844	1,272	1,684	1,147	1,813	1,243
F-statistic	8.23	25.23	14.70	11.04	10.83	12.95	16.16
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
R^2 adjusted	0.0852	0.1420	0.1442	0.0785	0.1241	0.1546	0.2018
Root MSE	0.1257	0.1585	0.1851	0.1133	0.1473	0.1880	0.2389

Robust t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

The analysis of new subsidiaries' conversion towards the anticipated leverage target shown in table 9 provides the same empirical observations. The leverage deviation, or abnormal leverage, is replaced by its components of leverage itself and the regression based expected leverage target. High pre-merger leverage is reversed in the post-merger period similar to abnormal leverage. The expected target leverage has a significant positive effect on leverage, less on financial leverage and no effect on adjusted net debt at all. Hence subsidiaries adjust their total debt-to-assets ratio towards an anticipated total debt target.

Table 9: New subsidiaries' post-merger convergence towards target leverage

The dependent variable is the change in leverage from t=0 to t=1, 2, and 3 after the M&A completion year. The tax difference TAXDIFF_T_A and leverage targets at t=1, 2 and 3 are used in the regressions with the control variables at t=0. The standard errors of the pooled OLS regressions are corrected for heteroscedasticity with the Huber & White sandwich estimator (Huber, 1967; White, 1980). The variables are summarized in table 6 and 7 and described in table G in the statistical appendix.

Panel B: Leverage	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	LEVERAGE_T_0_F.			FINLEVERAGE_T_0_F.		ADJLEVERAGE_T_0_F.	
VARIABLES	0 to 1	0 to 2	0 to 3	0 to 1	0 to 3	0 to 1	0 to 3
TAXDIFF_T_A_F.	0.1904***	0.2082**	0.2634**	0.0643	0.1164	0.1532	0.1973
	(2.919)	(2.565)	(2.196)	(0.969)	(1.145)	(1.441)	(1.246)
L1.LEVERAGE_T	-0.1235***	-0.2015***	-0.2730***				
	(-7.403)	(-10.373)	(-10.356)				
L1.LEVERAGE_A	0.0268	0.0083	0.0477*				
	(1.611)	(0.409)	(1.690)				
F.LEVERAGE_T_target	0.1150***	0.1551***	0.2634**				
	(2.944)	(3.078)	(2.196)				
L1.FINLEVERAGE_T				-0.1719***	-0.2783***		
				(-7.472)	(-7.974)		
L1.FINLEVERAGE_A				0.0418**	0.0630**		
				(2.362)	(2.281)		
F.FINLEVERAGE_T_target				0.0629***	0.0991***		
				(2.740)	(2.754)		
L1.ADJLEVERAGE_T						-0.1446***	-0.2650***
						(-7.652)	(-10.533)
L1.ADJLEVERAGE_A						0.0373*	-0.0007
						(1.893)	(-0.024)
F.ADJLEVERAGE_T_target						0.0093	0.0117
						(0.293)	(0.230)
Constant	-0.0307	-0.0027	-0.0008	-0.0019	0.0006	0.0461**	0.1094***
	(-0.984)	(-0.065)	(-0.014)	(-0.227)	(0.041)	(1.962)	(2.857)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capital structure variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1,844	1,844	1,272	1,684	1,147	1,813	1,243
F-statistic	9.27	22.75	13.91	6.55	7.87	12.28	18.86
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
R^2 adjusted	0.0862	0.1305	0.1316	0.0702	0.1156	0.1525	0.2236
Root MSE	0.1300	0.1634	0.1885	0.1166	0.1506	0.1899	0.2365

Robust t-statistics in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Similar to the empirical observations in table 8 a standard deviation higher expected target total debt-to-assets ratio is incorporated into subsidiary's leverage by 26.34% until the third year. The conversion towards target leverage is half as fast as observed for acquirers by (Harford, Klasa, & Walcott, 2009). The slower conversion towards the anticipated leverage target is caused by debt shifting of acquirer's excess debt to the new subsidiary and tax-related debt shifting through internal trade credit. The positive effect of acquirers' pre-merger financial leverage nevertheless remains if his financial leverage deviation is replaced by financial leverage.

Distinguishing between pre-merger underleveraged and overleveraged taken over companies the differences in tax rates and acquirers' pre-merger leverage deviation have a significant positive effect only for underleveraged new subsidiaries with spare debt capacity, which is shown in table 10. Underleveraged new subsidiaries can carry more debt to exploit a comparative tax advantage that is used by the acquirer to shift a part of the financial debt used for financing the takeover to the new subsidiary in the form of trade credit. For ex-ante overleveraged targets their debt-to-assets ratio can be adjusted downwards only, such that a comparative tax advantage to shift debt to them does not matter. The differences in size, as a general proxy for debt capacity differences according to the trade-off theory, matters mostly for underleveraged new subsidiaries (DeAngelo & Masulis, 1980; Kraus & Litzenberger, 1973).

The negative effect of a pre-merger leverage deviation for newly acquired subsidiaries holds for underleveraged companies as well. This confirms the prior observation that pre-merger underleverage is reversed in terms of leveraging up the new subsidiary. This effect of increasing subsidiaries' leverage occurs through holdings if the companies are taken over by financial investors. The previously observed effect of shifting debt in the form of trade credit through the holding to the new subsidiary during the M&A completion year is reversed in the third year after the M&A. The more assets the financial acquirer has invested into the subsidiary compared to his total assets the faster does the investor reduce subsidiary's total debt.

Table 10: Subsample analysis of post-merger changes in abnormal leverage of new subsidiaries

The dependent variable is the change in abnormal leverage from t=0 to t=1, 2, and 3 after the M&A completion year. The standard errors are corrected for heteroscedasticity with the Huber & White sandwich estimator (Huber, 1967; White, 1980). Overleveraged targets are those with L1.ALEVERAGE_T>=0. Underleveraged targets are those with L1.ALEVERAGE_T<0. SIZEDIFF_T_A is the difference in the natural logarithm of total assets between the target and acquirer. The variables are summarized in table 6 and 7 and described in table G in the statistical appendix.

Panel A: Underleveraged	(1)	(2)	(3)	(4)	(5)	(6)
			ALEVERAGE_T			
VARIABLES	0 to 1	0 to 2	0 to 3	0 to 1	0 to 2	0 to 3
TAXDIFF_T_A_F.	0.2490***	0.2103**	0.2403*	0.2477***	0.2130**	0.2354*
	(3.253)	(2.180)	(1.763)	(3.223)	(2.196)	(1.724)
SIZEDIFF_T_A_0_F.				0.0307**	0.0346***	0.0395***
				(2.523)	(3.385)	(3.822)
L1.ALEVERAGE_T	-0.1380***	-0.1939***	-0.2287***	-0.1418***	-0.2003***	-0.2368***
	(-5.323)	(-6.693)	(-5.851)	(-5.494)	(-6.970)	(-6.106)
L1.ALEVERAGE_A	0.0531**	0.0580**	0.0925***	0.0552**	0.0596**	0.0932***
	(2.369)	(2.306)	(2.708)	(2.502)	(2.420)	(2.781)
ROA_T_0_F.	-0.0769**	-0.1605***	-0.1327***	-0.0795**	-0.1677***	-0.1380***
	(-2.227)	(-5.202)	(-3.235)	(-2.326)	(-5.489)	(-3.404)
CASH_T_0_F.	-0.1115**	-0.1334***	-0.1378***	-0.1084**	-0.1297***	-0.1377***
	(-2.435)	(-3.595)	(-3.124)	(-2.434)	(-3.622)	(-3.249)
TAR_T_0_F.	-0.0293	-0.0080	0.0899*	-0.0266	-0.0114	0.0888*
	(-0.566)	(-0.160)	(1.757)	(-0.518)	(-0.229)	(1.797)
RnD_T_0_F.	-0.0339	1.7925***	1.3597***	0.0635	1.8333***	1.4393***
	(-0.040)	(13.749)	(2.593)	(0.075)	(12.750)	(2.673)
EQUITYRATIO_T_A	0.0018	0.0010	-0.0002	0.0030*	0.0023	0.0012
	(1.232)	(0.713)	(-0.149)	(1.710)	(1.361)	(0.615)
INDEPENDENT	-0.0055	-0.0031	0.0062	-0.0054	-0.0024	0.0068
	(-0.750)	(-0.340)	(0.473)	(-0.734)	(-0.262)	(0.529)
INFLATION_T	0.0224	-0.1069	0.1647	0.0135	-0.1101	0.1294
	(0.150)	(-0.628)	(0.626)	(0.092)	(-0.649)	(0.504)
PRIVATE_T	-0.0088	-0.0097	-0.0029	-0.0066	-0.0082	-0.0026
	(-1.160)	(-1.071)	(-0.225)	(-0.876)	(-0.904)	(-0.203)
FININV_RATIO_A	-0.0321	-0.0298	-0.0908*	-0.0378*	-0.0463*	-0.1144**
	(-1.518)	(-1.197)	(-1.789)	(-1.794)	(-1.898)	(-2.327)
DIFF_IND	0.0096	0.0123	0.0238*	0.0083	0.0109	0.0223*
	(1.287)	(1.323)	(1.836)	(1.130)	(1.188)	(1.737)
CROSSBORDER	-0.0084	0.0014	-0.0045	-0.0100	-0.0010	-0.0047
	(-1.124)	(0.142)	(-0.314)	(-1.355)	(-0.107)	(-0.337)
Constant	-0.0089	-0.0125	-0.0203	-0.0086	-0.0118	-0.0192
	(-0.808)	(-0.884)	(-1.032)	(-0.782)	(-0.837)	(-0.988)
N	1,229	1,229	865	1,229	1,229	865
F-statistic	4.57	21.57	5.51	4.53	17.91	6.24
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
R^2 adjusted	0.1297	0.1582	0.1852	0.1289	0.1569	0.1832
Root MSE	0.0627	0.1051	0.0979	0.0741	0.1204	0.1171

Robust t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 10 (cont.): Subsample analysis of post-merger changes in abnormal leverage of new subsidiaries

The dependent variable is the change in abnormal leverage from t=0 to t=1, 2, and 3 after the M&A completion year. The standard errors are corrected for heteroscedasticity with the Huber & White sandwich estimator (Huber, 1967; White, 1980). Overleveraged targets are those with L1.ALEVERAGE_T>=0. Underleveraged targets are those with L1.ALEVERAGE_T<0. SIZEDIFF_T_A is the difference in the natural logarithm of total assets between the target and acquirer. The variables are summarized in table 6 and 7 and described in table G in the statistical appendix.

Panel B: Overleveraged	(1)	(2)	(3)	(4)	(5)	(6)
	ALEVERAGE_T					
VARIABLES	0 to 1	0 to 2	0 to 3	0 to 1	0 to 2	0 to 3
TAXDIFF_T_A_F.	-0.0188	0.1005	0.3035	-0.0048	0.1153	0.3071
	(-0.184)	(0.654)	(1.142)	(-0.046)	(0.745)	(1.157)
SIZEDIFF_T_A_0_F.				0.0383**	0.0257*	0.0218
				(2.360)	(1.671)	(1.341)
L1.ALEVERAGE_T	-0.1118*	-0.0802	-0.1776	-0.1196*	-0.0956	-0.1957*
	(-1.774)	(-1.015)	(-1.572)	(-1.892)	(-1.209)	(-1.742)
L1.ALEVERAGE_A	0.0263	-0.0052	0.0412	0.0311	-0.0045	0.0449
	(1.168)	(-0.156)	(0.890)	(1.417)	(-0.135)	(0.988)
ROA_T_0_F.	-0.2039***	-0.2940***	-0.2198***	-0.2137***	-0.2992***	-0.2198***
	(-4.873)	(-6.773)	(-3.244)	(-5.557)	(-7.011)	(-3.244)
CASH_T_0_F.	-0.1121*	-0.0685	-0.1574**	-0.0911*	-0.0536	-0.1574**
	(-1.877)	(-1.058)	(-2.287)	(-1.919)	(-0.958)	(-2.287)
TAR_T_0_F.	-0.1706*	-0.1346	-0.1126	-0.1463	-0.1038	-0.1126
	(-1.907)	(-1.446)	(-1.026)	(-1.378)	(-1.003)	(-1.026)
RnD_T_0_F.	0.5313*	-0.3076	10.2947	0.5149*	-0.2486	10.2947
	(1.666)	(-0.218)	(1.322)	(1.691)	(-0.183)	(1.322)
EQUITYRATIO_T_A	0.0004	0.0004	0.0036	-0.0001	0.0003	0.0042
	(0.209)	(0.122)	(1.238)	(-0.052)	(0.098)	(1.446)
INDEPENDENT	0.0084	0.0074	0.0247	0.0075	0.0069	0.0231
	(0.820)	(0.550)	(1.334)	(0.737)	(0.517)	(1.247)
INFLATION_T	-0.0423	-0.3556	-1.2140**	0.0869	-0.2918	-1.1997*
	(-0.154)	(-0.840)	(-1.966)	(0.307)	(-0.673)	(-1.939)
PRIVATE_T	-0.0196*	-0.0208	-0.0430**	-0.0167	-0.0181	-0.0398**
	(-1.760)	(-1.432)	(-2.128)	(-1.529)	(-1.263)	(-1.991)
FININV_RATIO_A	0.0108	-0.0763	-0.0567	0.0196	-0.0665	-0.0529
	(0.526)	(-1.519)	(-0.553)	(0.921)	(-1.297)	(-0.544)
DIFF_IND	-0.0063	-0.0291**	-0.0325*	-0.0072	-0.0289**	-0.0311*
	(-0.699)	(-2.353)	(-1.828)	(-0.814)	(-2.347)	(-1.739)
CROSSBORDER	-0.0130	-0.0220	-0.0158	-0.0151	-0.0233*	-0.0169
	(-1.128)	(-1.583)	(-0.865)	(-1.280)	(-1.654)	(-0.917)
Constant	0.0074	0.0025	0.0263	0.0055	0.0020	0.0273
	(0.594)	(0.119)	(0.917)	(0.441)	(0.096)	(0.944)
N	615	615	407	615	615	407
F-statistic	3.20	4.75	4.11	4.73	4.97	4.03
p-value	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000
R^2 adjusted	0.1029	0.1241	0.1140	0.1286	0.1329	0.1195
Root MSE	0.1158	0.1571	0.1812	0.1142	0.1563	0.1806

Robust t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

A new subsidiary experiences a reduction of its total debt by 9.08% to 11.44% of a standard deviation larger total assets ratio in comparison to the financial acquirer in the third year after the merger. This reduction of its total debt by the financial investor to reduce his share of assets invested into the new subsidiary occurs in addition to the effects of tax rate differences and adjustments of acquirer's and subsidiary's leverage deviations. None of these effects are observed for overleveraged new subsidiaries.

6.6 Discussion and conclusion

The analyses of the changes in leverage of the newly acquired subsidiary around the M&A and in the post-merger period show that the convergence towards a target capital structure are determined by changes in the subsidiary's debt capacity with respect to its profitability, cash, tangible assets, R&D as well as size relative to the acquiring conglomerate of which it becomes a part. Not only does the subsidiary's debt capacity itself determine its debt changes, because the acquirer's pre-merger leverage deviation, particular in financial leverage used to finance the acquisition, influence the subsidiary's leverage changes, too. If the new subsidiary is initially underleveraged the acquirer shifts a part of his excess debt onto it. This aspect of the acquired target company's spare debt capacity being available to carry a part of the excess debt of the acquirer complements the empirical observations of the acquirers post-merger leverage changes made by (Ghosh & Jain, 2000), (Harford, Klasa, & Walcott, 2009) and (Uysal, 2011).

Furthermore, the incentive to shift debt caused by differences in the acquirer's and new subsidiary's corporate tax rates holds only for underleveraged subsidiaries with spare debt capacity to exploit a comparative tax advantage of debt. Overleveraged targets cannot exploit the tax advantage as for them debt reduction to reduce the costs of excess leverage is more important (Graham & Harvey, 2001). Finally besides the tax rates the use of holdings by financial investors first is associated with an increase of 4.52% in the new subsidiary's debt-to-assets ratio in the M&A completion year with the increase being reversed in the third year post-merger. Financial investors acquirer underleveraged companies, because they can leverage these companies up with financial debt used to finance the acquisition shifted to them through the holding as trade credit. Controlling for the acquirer's pre-merger leverage deviation as well as for tax-related effects such as the use of holdings therefore matters economically for the analysis of the target company's convergence towards its target capital structure. This study of newly acquired subsidiaries' convergence towards a leverage target influenced by taxes complements the former studies of (Ghosh & Jain, 2000), (Harford, Klasa, & Walcott, 2009) and (Uysal, 2011) who analyzed acquirer's changes in leverage associated with mergers, the study of the previous chapter and (Huizinga, Laeven, & Nicodeme, 2008) who analyzed tax incentives to shift debt in established multinational conglomerates.

7. Summary

The five essays presented in the previous chapters show that the creation of value in M&As is improved by hiring bank as advisors with greater advisory experience in the target's industry and stronger advisory relationships with the serial bidder, by extending the acquisition sequence to exploit investment opportunities, and by exploiting tax-related advantages of debt through capital structure adjustments. The first project comprising three essays shows that in the market for corporate control investment banks as advisors of acquirers are supporting value creation through skillful advice how to structure the transaction and the negotiation process to minimize transaction and agency costs. The banks' target industry expertise with access to information mitigates the information asymmetry. The approximation of banks' advisory skills by their relative share of deals advised in an industry reveals the advantage of a competitive expertise for the bidder in terms of a higher equity gain. The same advantage of a relatively stronger advisory relationship with the bank, which has compared to other banks a competitive advantage in terms of better access to the bidder, on the creation of value is observed.

The first and second essay show that the repeated loop of bank advisor hiring, retention, acquisition sequence continuation and accumulation of expertise and client relationship is beneficial for serial bidders and banks. From these two studies it follows that the mechanisms of the M&A advisory and corporate control markets are welfare increasing with investment banks as M&A advisors being better than expected given the most often mixed results of previous analyses. The two studies are therefore among the few besides (Kale, Kini, & Ryan, 2003), (Golubov, Petmezas, & Travlos, 2012), (Sibilkov & McConnell, 2013), (Anand & Galetovic, 2006) and (Chemmanur & Fulghieri, 1994) that find positive economic effects.

The positive economic effects are also dependent on the modeling of selection in the panel of acquisition sequences and bank advisors. The endogeneity caused by more reputable banks being selected or selecting themselves into larger and more complex transactions that have smaller announcement returns than smaller and less complex transactions advised by non-bulge-bracket banks or unadvised deals has to be considered. The endogeneity encountered and modeled with panel selection models taken from the econometrics and labor economics literature inspired the development of the Three-step Heckit estimator for panel data presented in chapter 4. The estimator's application to the panel revealed the statistical difficulties arising in the annual estimation of the bivariate probit model with selection and the preference for a pooled estimation of the bivariate selection models in a large unbalanced panel. For future studies it is therefore advisable to use the pooled estimation with fixed effects of the bivariate probit model to calculate the inverse mills ratios. The inverse mills ratios are unique to each observation in each time period, even though the pooled bivariate selection models' regression coefficients used for their computation are constant over time. The inverse mills ratios calculated from the pooled and annual estimates of the bivariate probit model with selection are very similar. A possible extension of double selection is endogenous switching between more than two alternatives regimes, for instance between unadvised, non-bulge-bracket banks or bulge-bracket banks, to analyze the hypothesis of alternative returns if another advisor type had been chosen. Multitier endogenous switching is subject of current research.

The second study that comprises the two essays presented in chapters 5 and 6 shows that in M&As value can be created as well by exploiting comparative tax advantages of debt. The tax-based trade-off theory is quite significant regarding the economic effects of tax rate differences interacted with comparative advantages in size, tangible assets and profitability. Within the enlarged conglomerate debt is shifted where its tax-shield is maximized. Financial investors exploit these comparative tax advantages in acquisitions as much as corporate acquirers do to distribute the financial debt used to finance the acquisition evenly.

The comparative tax advantages can be exploited by the newly acquired subsidiary only if it is underleveraged compared to its benchmark, a regression based leverage target. The new subsidiary's leverage changes during and after the M&A and convergence towards its target are influenced by tax rate differences. The convergence towards the leverage target is slower, because tax rate differences create a wedge between the target estimated without tax effects and the observed capital structure that incorporate comparative tax advantages. The analysis of financial investors using holdings shows that debt shifting towards the underleveraged, and often loss-making, new subsidiary occurs during the M&A completion year and is quickly reversed in the post-merger years until the third year. The analysis of financial investors using holding companies however is challenging and requires further analysis.

Econometric appendix

E.1 Econometric appendix of chapter 2

The two-step Heckit estimator is suggested as the easiest to apply selection model by (Li & Prabhala, 2007) and has recently been used by (Golubov, Petmezas, & Travlos, 2012). The binary selection dummy ADVISED is used in the first step selection regressions shown in table 5 panel A. For the dependent variables GOODADVICE and COMPLETED the binary selection model corresponding to the selection concept of (Heckman, 1976; 1979) is the bivariate probit model with selection explained by (Greene, 2008a; 2008b) and formalized first by (van de Ven & van Praag, 1981). Its likelihood function for the panel is $L = \prod_{i=1}^{n_1} \prod_{t=1}^{t_1} \left(1 - \Phi\left(z_{it}'\delta\right)\right) \times \prod_{i=n_1+1}^{n_2} \prod_{t=t_1+1}^{t_2} \Phi_2\left(-x_{it}'\beta, z_{it}'\delta, -\rho_{UE}\right) \times \prod_{i=n_2+1}^{N} \prod_{t=t_2+1}^{T} \Phi_2\left(x_{it}'\beta, z_{it}'\delta, \rho_{U\mathrm{E}}\right)$ with correlation coefficient $\rho_{U\mathrm{E}}$ between probit selection equation $d_{it} = z_{it}'\delta + u_{it}$ and structural probit equation $y_{it} = x_{it}'\beta + \varepsilon_{it}$ with the bivariate normal cumulative probability function $\Phi_2\left(x_{it}'\beta, z_{it}'\delta, \rho_{U\mathrm{E}}\right)$ of bids $t = t_2 + 1, ..., T$ of serial acquirers $n = n_2 + 1, ..., N$ affected by selection. The probabilities modeled and estimated are:

$$P(d_{it} = 0) = \Phi(z_{it}'\delta)$$

$$P(d_{it} = 1 \cap y_{it} = 0) = \Phi_2(-x_{it}'\beta, z_{it}'\delta, -\rho_{UE})$$

$$P(d_{it} = 1 \cap y_{it} = 1) = \Phi_2(x_{it}'\beta, z_{it}'\delta, \rho_{UE})$$

The insertion of an inverse mills ratio into $y_{it} = x_{it}'\beta + \varepsilon_{it}$ to control for selection in the structural probit regressions of GOODADVICE and COMPLETED is inappropriate and works only if the structural dependent variable is continuous like the cumulative abnormal returns CAR or RESOLSPEED (Greene, 2008b). The biprobit model with selection requires maximum likelihood estimation (Greene, 2008a). To ensure commonality in the empirical analysis the (Heckman, 1976; 1979) selection models and the bivariate probit models with selection are estimated as pooled models without fixed effects and the maximum likelihood procedure similar to (Lee, 1978).

The (Heckman, 1976; 1979) selection models and its derivatives with binary selection indicator ADVISED are extended to cardinal selection models with Tobit-type selection indicator ADVISORCHOICE by viewing the selection model as one with a censored endogenous regressor similar to (Vella, 1998). The model is:

(1) $y_{it} = x_{it}'\beta + \theta d_{it} + \varepsilon_{it};\ i = 1,...,N, t = 1,...,T$

(2) $d_{it} = z_{it}'\delta + v_{it};\ i = 1,...,N$

The selection indicator d_{it} can be a dummy like ADVISED or a Tobit-type selection indicator like ADVISORCHOICE. Estimating (1) results in inconsistent estimates because of the correlation between d_{it} and ε_{it} caused by the nonzero covariance $\sigma_{\varepsilon v}$. The estimation of (1) with d_{it} as selection indicator similar to (Nijman & Verbeek, 1992) and (Verbeek & Nijman, 1992) is not possible as well, because ADVISED and ADVISORCHOICE are positively correlated with the explanatory variables IEDT and ARSD, causing multicollinearity between β and θ. The first procedure according to (Hausman, 1978) and (Heckman, 1978) to correct the correlation caused by selection is the projection of d_{it} on z_{it} to obtain residuals $\hat{v}_{it}$ that are inserted into (1) together with d_{it} to obtain $y_{it} = x_{it}'\beta + \theta d_{it} + \mu \hat{v}_{it} + c_i$ with c_i usually being a fixed effect. The generalized probit residuals of selection equation (2) if d_{it} is binary according to (Gourieroux, Monfort, Renault, & Trognon, 1987) and (Vella, 1998) are $d_{it} \times \frac{\sigma_{\varepsilon v}}{\sigma_v^2}\left[\frac{\phi\left(z_{it}'\hat{\delta}\right)}{\Phi\left(z_{it}'\hat{\delta}\right)}\right] + \left(1 - d_{it}\right) \times \frac{\sigma_{\varepsilon v}}{\sigma_v^2}\left[\frac{-\phi\left(z_{it}'\hat{\delta}\right)}{1 - \Phi\left(z_{it}'\hat{\delta}\right)}\right]$. This is nothing else than the inverse mills ratio for the complete sample of the Two-step Heckit estimator explained in detail and used by (Golubov, Petmezas, & Travlos, 2012). The (Heckman, 1976; 1979) selection correction is therefore a special case of the more general endogenous regressor model. Furthermore, the pooled Heckit estimator assumes strict exogeneity, the absence of fixed and random effects. Fixed effects estimation within the Two-step Heckit estimator for panel data is possible according to (Wooldridge, 1995), but cumbersome to implement with annual selection regressions and does not provide more insights than IV fixed effects panel regressions.

The second selection correction procedure according to (Hausman, 1978) and (Heckman, 1978) is the projection of d_{it} on z_{it} to obtain $\hat{d}_{it}$ with z_{it} serving as instruments. Then $\hat{d}_{it}$ replaces d_{it} in (1) to obtain $y_{it} = x_{it}'\beta + \theta \hat{d}_{it} + \varepsilon_{it}$. This procedure is more flexible, because d_{it} can also be a Tobit-type selection indicator like ADVISORCHOICE. The estimation of Tobit models to project d_{it} on z_{it} to obtain $\hat{d}_{it}$ is explained by (Amemiya, 1973; 1974) and (Tobin, 1958). The cardinal selection indicator ADVISORCHOICE is instrumented on the selection equations shown in table 5 panel B.

The instrumental variables (IV) procedure furthermore allows the correction for fixed effects, too. The (Breusch & Pagan, 1980) LM test and (Hausman, 1978) specification tests confirm the existence of fixed effects in the estimation of the cumulative abnormal returns. However, mean differencing to control for fixed effects does not work if the dependent variables are discrete like GOODADVICE and COMPLETED (Chamberlain, 1980; 1982; Wooldridge, 2002d). The (Mundlak, 1978) version of the linear fixed effects assumption of (Chamberlain, 1980) has the form $c_i = \overline{x}_i\gamma + a_i$ with $c_i \mid x_{it} \approx N\left(\overline{x}_i\gamma, \sigma_a^2\right)$ and $a_i \approx N\left(0, \sigma_a^2\right)$, assuming bidder specific and time constant means $\overline{x}_i$ of the explanatory variables x_{it}. The Chamberlain random effects probit panel estimator $y_{it} = \beta_0 + x_{it}'\beta + \overline{x}_i\gamma + \left(a_i + \varepsilon_{it}\right)$ with (Mundlak, 1978) fixed effects is a practical option for binary dependent variables GOODADVICE and COMPLETED (Chamberlain, 1980; Wooldridge, 2002d; 2002e). Adding the instrumented selection indicator ADVISORCHOICE the IV fixed effects probit panel regressions for GOODADVICE and COMPLETED have the form $y_{it} = \beta_0 + x_{it}'\beta + \theta\hat{d}_{it} + \overline{x}_i\gamma + \left(a_i + \varepsilon_{it}\right)$ and are estimated with maximum likelihood. The IV fixed effects GLS regressions of the CARs and RESOLSPEED use mean differencing (Wooldridge, 2002b; 2002a).

Finally the initial conditions problem of determining y_{i0} and c_i for short panels with binary dependent variables GOODADVICE and COMPLETED has to be solved (Heckman, 1981; Wooldridge, 2002d). For these dependent variables' probit panel regressions it matters whether the start of bidders' time series of takeover bids is exogenous or endogenously determined by an unobservable pre-sample process. Therefore, the panel begins as early as possible in 1979 to start bidders' acquisition sequence with their first available M&A. Data before 1979 is not available. The acquisition sequence is a stochastic process with attrition (Wooldridge, 2002e). The earliest available bid is defined as first bid of the acquisition sequence to fulfill the assumption of an exogenous start of the stochastic process as good as possible (Heckman, 1981).

E.2 Econometric appendix of chapter 3

The econometric models to analyze the extension of acquisition sequences and selection are taken from the econometrics and labor economics literature dealing with selection correction. The two-step Heckit estimator is the simplest selection model and used for instance by (Golubov, Petmezas, & Travlos, 2012) and recommended by (Li & Prabhala, 2007). The binary selection analysis with the dummy ADVISED is shown in table 5 with regression (2) serving as selection equation. For the dependent variables SUCCESSORBID and OLDADVISOR the bivariate probit model with selection explained by (Greene, 2008a; 2008b) and formalized by (van de Ven & van Praag, 1981) is comparable to the binary selection concept of (Heckman, 1976; 1979). The likelihood function for the panel with correlation coefficient ρ_{UE}, selection equation $d_{it} = z_{it}'\delta + u_{it}$, structural equation $y_{it} = x_{it}'\beta + \varepsilon_{it}$ and bivariate cumulative probability function $\Phi_2\left(x_{it}'\beta, z_{it}'\delta, \rho_{\mathrm{UE}}\right)$ of bids $t = t_2 + 1, \ldots, T$ of serial bidders $n = n_2 + 1, \ldots, N$ affected by selection is:

$$L=\prod_{i=1}^{n_1}\prod_{t=1}^{t_1}\left(1-\Phi\left(z_{it}'\delta\right)\right)\times\prod_{i=n_1+1}^{n_2}\prod_{t=t_1+1}^{t_2}\Phi_2\left(-x_{it}'\beta,z_{it}'\delta,-\rho_{\mathrm{U}E}\right)\times\prod_{i=n_2+1}^{N}\prod_{t=t_2+1}^{T}\Phi_2\left(x_{it}'\beta,z_{it}'\delta,\rho_{\mathrm{UE}}\right)$$

with probabilities

$$P\left(d_{it}=0\right)=\Phi\left(z_{it}'\delta\right)$$

$$P\left(d_{it}=1\cap y_{it}=0\right)=\Phi_2\left(-x_{it}'\beta,z_{it}'\delta,-\rho_{\mathrm{U}E}\right)$$

$$P\left(d_{it}=1\cap y_{it}=1\right)=\Phi_2\left(x_{it}'\beta,z_{it}'\delta,\rho_{\mathrm{U}E}\right)$$

The binary selection indicator ADVISED is extended to model ordered Tobit-type selection with the cardinal variable ADVISORCHOICE by considering it as a censored endogenous regressor similar to (Vella, 1998). The model is:

(1) $y_{it}=x_{it}'\beta+\theta d_{it}+\varepsilon_{it};\ i=1,...,N,t=1,...,T$

(2) $d_{it}=z_{it}'\delta+v_{it};\ i=1,...,N$

The selection indicator d_{it} is L1.ADVISORCHOICE. Estimating (1) with d_{it} as selection indicator similar to (Nijman & Verbeek, 1992) and (Verbeek & Nijman, 1992) is not possible, because of potential correlation between d_{it} and ε_{it} and of d_{it} with the explanatory variables IEDT and ARSD, causing multicollinearity between d_{it} and x_{it}. It is shown for illustrative purposes anyway.

The projection of d_{it} on z_{it} as instrumental variables to obtain $\hat{d}_{it}$ is the selection correction procedure suggested by (Hausman, 1978) and (Heckman, 1978). The estimate $\hat{d}_{it}$ of the lagged Tobit-type selection indicator L1.ADVISORCHOICE replaces d_{it} in (1) to obtain $y_{it} = x'_{it}\beta + \theta\hat{d}_{it} + \varepsilon_{it}$. The estimation of tobit models to obtain $\hat{d}_{it}$ instrumented on z_{it} is explained by (Amemiya, 1973; 1974) and (Tobin, 1958). ADVISORCHOICE is instrumented on selection regression (4) shown in table 5.

The instrumental variables (IV) procedure allows the inclusion of fixed effects. Mean differencing to control for fixed effects does not work, because the dependent variables OLDADVISOR and SUCCESSORBID are discrete (Chamberlain, 1980; 1982; Wooldridge, 2002d). The (Mundlak, 1978) version of the general linear fixed effects model of (Chamberlain, 1980) has the form $c_i = \overline{x}_i\gamma + a_i$ with $c_i \mid x_{it} \approx N\left(\overline{x}_i\gamma, \sigma_a^2\right)$ and $a_i \approx N\left(0, \sigma_a^2\right)$, which are acquirer specific and time constant averages $\overline{x}_i$ of the explanatory variables x_{it}. The Chamberlain random effects probit panel model $y_{it} = \beta_0 + x'_{it}\beta + \overline{x}_i\gamma + \left(a_i + \varepsilon_{it}\right)$ with (Mundlak, 1978) fixed effects is used to estimate the effects of banks' expertise on OLDADVISOR and SUCCESSORBID (Chamberlain, 1980; Wooldridge, 2002d; 2002e). The intercept β_0 is suppressed because of collinearity with the independent variables, causing non-convergence of the Newton-Raphson algorithm of likelihood estimation[31]. Adding the instrumented selection indicator L1.ADVISORCHOICE the IV fixed effects probit panel regressions of OLDADVISOR and SUCCESSORBID have the form $y_{it} = x'_{it}\beta + \theta\hat{d}_{it} + \overline{x}_i\gamma + \left(a_i + \varepsilon_{it}\right)$.

To model the simultaneity between the retention of a familiar bank advisor with OLDADVISOR, the deal being advised with ADVISED, and the probability of a successor deal with SUCCESSORBID seemingly unrelated regressions (SUR)

[31] Depending on the literature references the (Mundlak, 1978) fixed effects are sometimes stated with a constant and sometimes without. The analysis is controlled for correlation between the constant and the fixed effects. The constant is excluded if it is highly correlated with the fixed effects.

bivariate simultaneous equation models are used. The model estimates all four possible combinations of probabilities of OLDADVISOR and ADVISED or OLDADVISOR and SUCCESSORBID. According to (Maddala, 1983a) and (Heckman, 1978) the SUR bivariate simultaneous equation model of OLDADVISOR and ADVISED or SUCCESSORBID and OLDADVISOR has the form:

$$(3)\ y_{it}^{1} = x_{it}'\beta_{11} + x_{it}^{1\prime}\beta_{12} + \varepsilon_{it};\ i = 1,\ldots,N, t = 1,\ldots,T$$

$$(4)\ y_{it}^{2} = x_{it}'\beta_{21} + x_{it}^{2\prime}\beta_{22} + u_{it};\ i = 1,\ldots,N, t = 1,\ldots,T$$

The recursive bivariate simultaneous equation model of SUCCESSORBID and OLDAVISOR, with OLDADVISOR affecting SUCCESSORBID, has the form:

$$(5)\ y_{it}^{1} = x_{it}'\beta_{11} + x_{it}^{1\prime}\beta_{12} + \varepsilon_{it};\ i = 1,\ldots,N, t = 1,\ldots,T$$

$$(6)\ y_{it}^{2} = x_{it}'\beta_{21} + x_{it}^{2\prime}\beta_{22} + y_{it}^{1}\beta_{23} + u_{it};\ i = 1,\ldots,N, t = 1,\ldots,T$$

with the bivariate probabilities for both models of:

$$P\left(y_{it}^{1} = 1 \cap y_{it}^{2} = 1\right) = \Phi_2\left(y_{it}^{1}, y_{it}^{2}, \rho_{UE}\right)$$

$$P\left(y_{it}^{1} = 1 \cap y_{it}^{2} = 0\right) = \Phi_2\left(y_{it}^{1}, -y_{it}^{2}, -\rho_{UE}\right)$$

$$P\left(y_{it}^{1} = 0 \cap y_{it}^{2} = 1\right) = \Phi_2\left(-y_{it}^{1}, y_{it}^{2}, -\rho_{UE}\right)$$

$$P\left(y_{it}^{1} = 0 \cap y_{it}^{2} = 0\right) = \Phi_2\left(-y_{it}^{1}, -y_{it}^{2}, \rho_{UE}\right)$$

The likelihood function for the panel with the four probabilities is:

$$L = \prod_{i=1}^{n_1}\prod_{t=1}^{t_1}\Phi_2\left(y_{it}^1, y_{it}^2, \rho_{UE}\right)\times\prod_{i=n_1+1}^{n_2}\prod_{t=t_1+1}^{t_2}\Phi_2\left(y_{it}^1, -y_{it}^2, -\rho_{UE}\right)$$
$$\times\prod_{i=n_2+1}^{n_3}\prod_{t=t_2+1}^{t_3}\Phi_2\left(-y_{it}^1, y_{it}^2, -\rho_{UE}\right)\times\prod_{i=n_3+1}^{N}\prod_{t=t_3+1}^{T}\Phi_2\left(-y_{it}^1, -y_{it}^2, \rho_{UE}\right)$$

After estimating the likelihood function the joint probability $P\left(y_{it}^1 = 1 \cap y_{it}^2 = 1\right)$ is calculated for the simultaneous observation of OLDADVISOR and ADVISED (Table 7 panel C) as well as OLDADVISOR and SUCCESSORBID (Table 9).

The lagged selection indicator L1.ADVISORCHOICE is used, because it also solves the initial conditions problem. The instrumentation of ADVISORCHOICE on the first bid is meant to serve as initial conditions estimate, whether the bank hired in the first deal is retained and influences the successor bid probability. The initial conditions problem of determining y_{i0} and c_i for panels is a concern, because the extension of acquisition sequences is a stochastic process with attrition (Heckman, 1981; Wooldridge, 2002e). For the estimation of acquisition sequence continuation it matters whether the beginning of bidders' sequence of takeovers is endogenously determined by a pre-sample process or exogenous. The panel begins in 1979 to start as early as possible with bidders' first available M&A. Data before 1979 is not available. The earliest first bid is assumed to fulfill the assumption of an exogenous sequence beginning as good as possible (Heckman, 1981).

E.3 Derivation of the limit of the bivariate inverse mills ratios for $\rho_{\mathrm{UE}} \to 0$

The proof is basically a simplification of the bivariate normal density function that converges to two univariate density functions whose integration gives two univariate normal cumulative distribution functions (Greene, 2008d). Given is the bivariate normal cumulative distribution function $\Phi_2\left(z_{it}'\gamma, x_{it}'\beta, \rho_{\mathrm{UE}}\right)$ = $\operatorname{Prob}\left(Y^1 < z_{it}'\gamma, Y^2 < x_{it}'\beta\right) = \int_{-\infty}^{z_{it}'\gamma}\int_{-\infty}^{x_{it}'\beta} \phi_2\left(\delta_1, \delta_2, \rho_{UE}\right) d\delta_1 d\delta_2$ with the bivariate normal probability density function

$$\phi_2\left(z_{it}'\gamma, x_{it}'\beta, \rho_{UE}\right) =$$

$$\frac{\exp\left[\dfrac{-1}{2\left(1-\rho_{UE}^2\right)}\left\{\left(\dfrac{x_{it}'\beta-\mu_{y^2}}{\sigma_\varepsilon}\right)^2 + \left(\dfrac{z_{it}'\gamma-\mu_{y^1}}{\sigma_u}\right)^2 - 2\rho_{UE}\left(\dfrac{x_{it}'\beta-\mu_{y^2}}{\sigma_\varepsilon}\right)\left(\dfrac{z_{it}'\gamma-\mu_{y^1}}{\sigma_u}\right)\right\}\right]}{2\pi\sigma_\varepsilon\sigma_u\sqrt{1-\rho_{UE}^2}}$$

(Greene, 2008c; 2008a). If the correlation $\rho_{UE} = \dfrac{\sigma_{\varepsilon u}}{\sigma_\varepsilon \sigma_u} = \sigma_{\varepsilon u} = 0$ the implication of Y^1 and Y^2 being statistically independent is derived from the simplified bivariate normal density function, because

$$\begin{aligned}
\phi_2\left(z_{it}'\gamma, x_{it}'\beta, \rho_{UE}\right) &= \frac{1}{2\pi\sigma_\varepsilon\sigma_u}\exp\left[\frac{-1}{2}\left\{\left(\frac{x_{it}'\beta-\mu_{y^2}}{\sigma_\varepsilon}\right)^2 + \left(\frac{z_{it}'\gamma-\mu_{y^1}}{\sigma_u}\right)^2\right\}\right] \\
&= \frac{1}{\sqrt{2\pi}\sigma_\varepsilon}\exp\left[\frac{-1}{2}\left(\frac{x_{it}'\beta-\mu_{y^2}}{\sigma_\varepsilon}\right)^2\right] \times \frac{1}{\sqrt{2\pi}\sigma_u}\exp\left[\frac{-1}{2}\left(\frac{z_{it}'\gamma-\mu_{y^1}}{\sigma_u}\right)^2\right] \\
&= \phi\left(x_{it}'\beta\right) \times \phi\left(z_{it}'\gamma\right)
\end{aligned}$$

The product of two univariate normal density functions is used to derive the limit of the cumulative distribution function:

$$\lim_{\rho_{UE}\to 0}\Phi_2\left(z_{it}'\gamma, x_{it}'\beta, \rho_{\mathrm{UE}}\right) = \lim_{\rho_{UE}\to 0}\int_{-\infty}^{z_{it}'\gamma}\int_{-\infty}^{x_{it}'\beta}\phi_2\left(\delta_1,\delta_2,\rho_{UE}\right)d\delta_1 d\delta_2$$

$$= \int_{-\infty}^{z_{it}'\gamma}\int_{-\infty}^{x_{it}'\beta}\phi\left(\delta_1\right)\times\phi\left(\delta_2\right)d\delta_1 d\delta_2 = \int_{-\infty}^{z_{it}'\gamma}\phi\left(\delta_1\right)d\delta_1\times\int_{-\infty}^{x_{it}'\beta}\phi\left(\delta_2\right)d\delta_2$$

$$= \Phi\left(z_{it}'\gamma\right)\times\Phi\left(x_{it}'\beta\right)$$

The bivariate inverse mills ratios converge to the univariate inverse mills ratios:

$$\lim_{\rho_{UE}\to 0}\lambda_{it}^1 = \lim_{\rho_{UE}\to 0}\frac{\phi\left(z_{it}'\gamma\right)\Phi\left(\frac{x_{it}'\beta-\rho_{\mathrm{UE}}z_{it}'\gamma}{\sqrt{1-\rho_{\mathrm{UE}}^{2}}}\right)}{\Phi_2\left(z_{it}'\gamma, x_{it}'\beta, \rho_{\mathrm{UE}}\right)} = \frac{\phi\left(z_{it}'\gamma_1\right)\Phi\left(x_{it}'\beta\right)}{\Phi\left(x_{it}'\beta\right)\Phi\left(z_{it}'\gamma_1\right)} = \frac{\phi\left(z_{it}'\gamma_1\right)}{\Phi\left(z_{it}'\gamma_1\right)} = \lambda_{it}^3$$

and for the second bivariate inverse mills ratio it follows:

$$\lim_{\rho_{UE}\to 0}\lambda_{it}^2 = \lim_{\rho_{UE}\to 0}\frac{\phi\left(x_{it}'\beta\right)\Phi\left(\frac{z_{it}'\gamma-\rho_{\mathrm{UE}}x_{it}'\beta}{\sqrt{1-\rho_{\mathrm{UE}}^{2}}}\right)}{\Phi_2\left(z_{it}'\gamma, x_{it}'\beta, \rho_{\mathrm{UE}}\right)} = \frac{\phi\left(x_{it}'\beta\right)\Phi\left(z_{it}'\gamma\right)}{\Phi\left(x_{it}'\beta\right)\Phi\left(z_{it}'\gamma\right)} = \frac{\phi\left(x_{it}'\beta\right)}{\Phi\left(x_{it}'\beta\right)} = \lambda_{it}^4$$

q.e.d.

E.4 Derivation of the correction terms if $\rho_{\mathrm{UE}} \neq 0$

$$E\left(v_{it} \mid u_{it} > -z_{it}'\gamma, \varepsilon_{it} > -x_{it}'\beta,\right) = E\left(v_{it} \mid -u_{it} < z_{it}'\gamma, -\varepsilon_{it} < x_{it}'\beta\right)$$
$$= -\rho_{\mathrm{UV}}\lambda_{it}^1 - \rho_{\mathrm{EV}}\lambda_{it}^2$$

where

$\lambda_{it}^1 = \frac{1}{\left(1-\rho_{UE}^2\right)}\left(P_1-\rho_{UE}P_2\right)$ and $P_1 = E\left(u_{it} \mid -u_{it} < z_{it}'\gamma, -\varepsilon_{it} < x_{it}'\beta\right)$ and

$P_2 = E\left(\varepsilon_{it} \mid -u_{it} < z_{it}'\gamma, -\varepsilon_{it} < x_{it}'\beta\right)$ so,

$$\lambda_{it}^{1}=\frac{1}{\left(1-\rho_{UE}^{2}\right)}\left[\begin{array}{c}\dfrac{-\phi\left(z_{it}'\gamma\right)\Phi\left(\dfrac{x_{it}'\beta-\rho_{\mathrm{UE}}z_{it}'\gamma}{\sqrt{1-\rho_{\mathrm{UE}}^{2}}}\right)-\rho_{\mathrm{UE}}\phi\left(x_{it}'\beta\right)\Phi\left(\dfrac{z_{it}'\gamma-\rho_{\mathrm{UE}}x_{it}'\beta}{\sqrt{1-\rho_{\mathrm{UE}}^{2}}}\right)}{\Phi_{2}\left(z_{it}'\gamma,x_{it}'\beta,\rho_{\mathrm{UE}}\right)}\\ +\dfrac{\rho_{\mathrm{UE}}\phi\left(x_{it}'\beta\right)\Phi\left(\dfrac{z_{it}'\gamma-\rho_{\mathrm{UE}}x_{it}'\beta}{\sqrt{1-\rho_{\mathrm{UE}}^{2}}}\right)+\rho_{\mathrm{UE}}\phi\left(z_{it}'\gamma\right)\Phi\left(\dfrac{x_{it}'\beta-\rho_{\mathrm{UE}}z_{it}'\gamma}{\sqrt{1-\rho_{\mathrm{UE}}^{2}}}\right)}{\Phi_{2}\left(z_{it}'\gamma,x_{it}'\beta,\rho_{\mathrm{UE}}\right)}\end{array}\right]$$

$$=\frac{1}{\left(1-\rho_{UE}^{2}\right)}\left[-\left(1-\rho_{UE}^{2}\right)\frac{\phi\left(z_{it}'\gamma\right)\Phi\left(\dfrac{x_{it}'\beta-\rho_{\mathrm{UE}}z_{it}'\gamma}{\sqrt{\left(1-\rho_{UE}^{2}\right)}}\right)}{\Phi_{2}\left(z_{it}'\gamma,x_{it}'\beta,\rho_{\mathrm{UE}}\right)}\right]=-\frac{\phi\left(z_{it}'\gamma\right)\Phi\left(\dfrac{x_{it}'\beta-\rho_{\mathrm{UE}}z_{it}'\gamma}{\sqrt{\left(1-\rho_{UE}^{2}\right)}}\right)}{\Phi_{2}\left(z_{it}'\gamma,x_{it}'\beta,\rho_{\mathrm{UE}}\right)}.$$

Similarly $\lambda_{it}^{2}=-\dfrac{\phi\left(x_{it}'\beta\right)\Phi\left(\dfrac{z_{it}'\gamma-\rho_{\mathrm{UE}}x_{it}'\beta}{\sqrt{1-\rho_{\mathrm{UE}}^{2}}}\right)}{\Phi_{2}\left(z_{it}'\gamma,x_{it}'\beta,\rho_{\mathrm{UE}}\right)}$. Thus $E\left(v_{it}\mid u_{it}>-z_{it}'\gamma,\varepsilon_{it}>-x_{it}'\beta,\right)=\rho_{\mathrm{UV}}\lambda_{it}^{1}+\rho_{\mathrm{EV}}\lambda_{it}^{2}$. The details are provided by (Maddala, 1983b; 1983c), (Rosenbaum, 1961) and (Arendt & Holm, 2006).

E.5 The gradient vector, Hessian matrix, variance-covariance matrix and Huber & White sandwich estimator of the bivariate probit model with selection for panel data

Beginning with the likelihood function

$$L=\prod_{i=1}^{n_1}\prod_{t=1}^{t_1}\left(1-\Phi\left(z_{it}'\gamma\right)\right)\times\prod_{i=n_1+1}^{n_2}\prod_{t=t_1+1}^{t_2}\Phi_2\left(-x_{it}'\beta,z_{it}'\gamma,-\rho_{\mathrm{UE}}\right)\times\prod_{i=n_2+1}^{N}\prod_{t=t_2+1}^{T}\Phi_2\left(x_{it}'\beta,z_{it}'\gamma,\rho_{\mathrm{UE}}\right)$$

Transforming it with the natural logarithm to

$$\ln L=\sum_{i=1}^{n_1}\sum_{t=1}^{t_1}\ln\left(1-\Phi\left(z_{it}'\gamma\right)\right)+\sum_{i=n_1+1}^{n_2}\sum_{t=t_1+1}^{t_2}\ln\Phi_2\left(-x_{it}'\beta,z_{it}'\gamma,-\rho_{\mathrm{UE}}\right)$$
$$+\sum_{i=n_2+1}^{N}\sum_{t=t_2+1}^{T}\ln\Phi_2\left(x_{it}'\beta,z_{it}'\gamma,\rho_{\mathrm{UE}}\right)$$

The notation is simplifying to $\Phi\left(z_{it}'\gamma\right)=\Phi\left(\gamma\right)$, $\Phi_2\left(-x_{it}'\beta,z_{it}'\gamma,-\rho_{\mathrm{UE}}\right)=\Phi_2\left(\beta,\gamma,-\rho\right)$, $\Phi_2\left(x_{it}'\beta,z_{it}'\gamma,\rho_{\mathrm{UE}}\right)=\Phi_2\left(\beta,\gamma,\rho\right)$. The first and second order derivatives of the univariate and bivariate normal cumulative distribution functions require integration of the single and double integrals of their probability density functions by the Leibniz rule, which is cumbersome (Zorich, 2002). Therefore, the derivatives are given in general form. The first and second order derivatives of the probability distribution functions with respect to $\theta=\left\{\beta,\gamma,\rho\right\}$ are denoted by $\frac{\partial\Phi\left(\gamma\right)}{\partial\gamma}=\Phi^{\gamma}\left(\gamma\right)$, $\frac{\partial^2\Phi\left(\gamma\right)}{\partial\gamma\partial\gamma}=\Phi^{\gamma\gamma}\left(\gamma\right)$, $\frac{\partial\Phi_2\left(\beta,\gamma,-\rho\right)}{\partial\gamma}=\Phi_2^{\gamma}\left(\beta,\gamma,-\rho\right)$, $\frac{\partial^2\Phi_2\left(\beta,\gamma,\rho\right)}{\partial\gamma\partial\beta}=\Phi_2^{\gamma\beta}\left(\beta,\gamma,\rho\right)$ and so on for all other first and second order derivatives. The log likelihood is

$$\ln L\left(\theta\right)=\sum_{i=1}^{n_1}\sum_{t=1}^{t_1}\ln\left(1-\Phi\left(\gamma\right)\right)+\sum_{i=n_1+1}^{n_2}\sum_{t=t_1+1}^{t_2}\ln\Phi_2\left(\beta,\gamma,-\rho\right)+\sum_{i=n_2+1}^{N}\sum_{t=t_2+1}^{T}\ln\Phi_2\left(\beta,\gamma,\rho\right)$$

The gradient vector of first derivatives is $G(\theta)=\dfrac{\partial \ln L(\theta)}{\partial \theta}=\begin{pmatrix} \dfrac{\partial \ln L(\theta)}{\partial \gamma} \\ \dfrac{\partial \ln L(\theta)}{\partial \beta} \\ \dfrac{\partial \ln L(\theta)}{\partial \rho} \end{pmatrix}$ with

elements

$$\frac{\partial \ln L(\theta)}{\partial \gamma}=\sum_{i=1}^{n_1}\sum_{t=1}^{t_1}\frac{-\Phi^{\gamma}(\gamma)}{1-\Phi(\gamma)}+\sum_{i=n_1+1}^{n_2}\sum_{t=t_1+1}^{t_2}\frac{\Phi_2^{\gamma}(\beta,\gamma,-\rho)}{\Phi_2(\beta,\gamma,-\rho)}+\sum_{i=n_2+1}^{N}\sum_{i=t_2+1}^{T}\frac{\Phi_2^{\gamma}(\beta,\gamma,\rho)}{\Phi_2(\beta,\gamma,\rho)},$$

$$\frac{\partial \ln L(\theta)}{\partial \beta}=\sum_{i=n_1+1}^{n_2}\sum_{t=t_1+1}^{t_2}\frac{\Phi_2^{\beta}(\beta,\gamma,-\rho)}{\Phi_2(\beta,\gamma,-\rho)}+\sum_{i=n_2+1}^{N}\sum_{i=t_2+1}^{T}\frac{\Phi_2^{\beta}(\beta,\gamma,\rho)}{\Phi_2(\beta,\gamma,\rho)}, \text{ and}$$

$$\frac{\partial \ln L(\theta)}{\partial \rho}=\sum_{i=n_1+1}^{n_2}\sum_{t=t_1+1}^{t_2}\frac{\Phi_2^{\rho}(\beta,\gamma,-\rho)}{\Phi_2(\beta,\gamma,-\rho)}+\sum_{i=n_2+1}^{N}\sum_{i=t_2+1}^{T}\frac{\Phi_2^{\rho}(\beta,\gamma,\rho)}{\Phi_2(\beta,\gamma,\rho)}$$

The variance-covariance matrix is the inverse of the information matrix $\left[\mathrm{I}(\theta)\right]^{-1}=\left(-E\left[H(\theta)\right]\right)^{-1}$. The Hessian matrix for $\theta=\{\beta,\gamma,\rho\}$ has the form:

$$H(\theta)=\begin{pmatrix} \dfrac{\partial^2 \ln L(\theta)}{\partial\gamma\partial\gamma} & \dfrac{\partial^2 \ln L(\theta)}{\partial\gamma\partial\beta} & \dfrac{\partial^2 \ln L(\theta)}{\partial\gamma\partial\rho} \\ \dfrac{\partial^2 \ln L(\theta)}{\partial\beta\partial\gamma} & \dfrac{\partial^2 \ln L(\theta)}{\partial\beta\partial\beta} & \dfrac{\partial^2 \ln L(\theta)}{\partial\beta\partial\rho} \\ \dfrac{\partial^2 \ln L(\theta)}{\partial\rho\partial\gamma} & \dfrac{\partial^2 \ln L(\theta)}{\partial\rho\partial\beta} & \dfrac{\partial^2 \ln L(\theta)}{\partial\rho\partial\rho} \end{pmatrix}$$ with the elements in the first row

being

$$\frac{\partial^2 \ln L(\theta)}{\partial\gamma\partial\gamma} = \sum_{i=1}^{n_1}\sum_{t=1}^{t_1}\frac{-\Phi^{\gamma\gamma}(\gamma)}{1-\Phi(\gamma)} + \left(\frac{\Phi^{\gamma}(\gamma)}{1-\Phi(\gamma)}\right)^2 + \sum_{i=n_1+1}^{n_2}\sum_{t=t_1+1}^{t_2}\frac{\Phi_2^{\gamma\gamma}(\beta,\gamma,-\rho)}{\Phi_2(\beta,\gamma,-\rho)}$$
$$-\left(\frac{\Phi_2^{\gamma}(\beta,\gamma,-\rho)}{\Phi_2(\beta,\gamma,-\rho)}\right)^2 + \sum_{i=n_2+1}^{N}\sum_{i=t_2+1}^{T}\frac{\Phi_2^{\gamma\gamma}(\beta,\gamma,\rho)}{\Phi_2(\beta,\gamma,\rho)} - \left(\frac{\Phi_2^{\gamma}(\beta,\gamma,\rho)}{\Phi_2(\beta,\gamma,\rho)}\right)^2,$$

$$\frac{\partial^2 \ln L(\theta)}{\partial\gamma\partial\beta} = \sum_{i=n_1+1}^{n_2}\sum_{t=t_1+1}^{t_2}\frac{\Phi_2^{\gamma\beta}(\beta,\gamma,-\rho)}{\Phi_2(\beta,\gamma,-\rho)} - \frac{\Phi_2^{\gamma}(\beta,\gamma,-\rho)\times\Phi_2^{\beta}(\beta,\gamma,-\rho)}{\left(\Phi_2(\beta,\gamma,-\rho)\right)^2}$$
$$+\sum_{i=n_2+1}^{N}\sum_{i=t_2+1}^{T}\frac{\Phi_2^{\gamma\beta}(\beta,\gamma,\rho)}{\Phi_2(\beta,\gamma,\rho)} - \frac{\Phi_2^{\gamma}(\beta,\gamma,\rho)\times\Phi_2^{\beta}(\beta,\gamma,\rho)}{\left(\Phi_2(\beta,\gamma,\rho)\right)^2}, \text{ and}$$

$$\frac{\partial^2 \ln L(\theta)}{\partial\gamma\partial\rho} = \sum_{i=n_1+1}^{n_2}\sum_{t=t_1+1}^{t_2}\frac{\Phi_2^{\gamma\rho}(\beta,\gamma,-\rho)}{\Phi_2(\beta,\gamma,-\rho)} - \frac{\Phi_2^{\gamma}(\beta,\gamma,-\rho)\times\Phi_2^{\rho}(\beta,\gamma,-\rho)}{\left(\Phi_2(\beta,\gamma,-\rho)\right)^2}$$
$$+\sum_{i=n_2+1}^{N}\sum_{i=t_2+1}^{T}\frac{\Phi_2^{\gamma\rho}(\beta,\gamma,\rho)}{\Phi_2(\beta,\gamma,\rho)} - \frac{\Phi_2^{\gamma}(\beta,\gamma,\rho)\times\Phi_2^{\rho}(\beta,\gamma,\rho)}{\left(\Phi_2(\beta,\gamma,\rho)\right)^2}$$

The elements of the second row are

$$\frac{\partial^2 \ln L(\theta)}{\partial\beta\partial\gamma} = \sum_{i=n_1+1}^{n_2}\sum_{t=t_1+1}^{t_2}\frac{\Phi_2^{\beta\gamma}(\beta,\gamma,-\rho)}{\Phi_2(\beta,\gamma,-\rho)} - \frac{\Phi_2^{\beta}(\beta,\gamma,-\rho)\times\Phi_2^{\gamma}(\beta,\gamma,-\rho)}{\left(\Phi_2(\beta,\gamma,-\rho)\right)^2}$$
$$+\sum_{i=n_2+1}^{N}\sum_{i=t_2+1}^{T}\frac{\Phi_2^{\beta\gamma}(\beta,\gamma,\rho)}{\Phi_2(\beta,\gamma,\rho)} - \frac{\Phi_2^{\beta}(\beta,\gamma,\rho)\times\Phi_2^{\gamma}(\beta,\gamma,\rho)}{\left(\Phi_2(\beta,\gamma,\rho)\right)^2},$$

$$\frac{\partial^2 \ln L(\theta)}{\partial\beta\partial\beta} = \sum_{i=n_1+1}^{n_2}\sum_{t=t_1+1}^{t_2}\frac{\Phi_2^{\beta\beta}(\beta,\gamma,-\rho)}{\Phi_2(\beta,\gamma,-\rho)} - \left(\frac{\Phi_2^{\beta}(\beta,\gamma,-\rho)}{\Phi_2(\beta,\gamma,-\rho)}\right)^2$$
$$+\sum_{i=n_2+1}^{N}\sum_{i=t_2+1}^{T}\frac{\Phi_2^{\beta\beta}(\beta,\gamma,\rho)}{\Phi_2(\beta,\gamma,\rho)} - \left(\frac{\Phi_2^{\beta}(\beta,\gamma,\rho)}{\Phi_2(\beta,\gamma,\rho)}\right)^2, \text{ and}$$

$$\frac{\partial^2 \ln L(\theta)}{\partial\beta\partial\rho} = \sum_{i=n_1+1}^{n_2}\sum_{t=t_1+1}^{t_2} \frac{\Phi_2^{\beta\rho}(\beta,\gamma,-\rho)}{\Phi_2(\beta,\gamma,-\rho)} - \frac{\Phi_2^{\beta}(\beta,\gamma,-\rho)\times\Phi_2^{\rho}(\beta,\gamma,-\rho)}{\left(\Phi_2(\beta,\gamma,-\rho)\right)^2}$$
$$+\sum_{i=n_2+1}^{N}\sum_{i=t_2+1}^{T} \frac{\Phi_2^{\beta\rho}(\beta,\gamma,\rho)}{\Phi_2(\beta,\gamma,\rho)} - \frac{\Phi_2^{\beta}(\beta,\gamma,\rho)\times\Phi_2^{\rho}(\beta,\gamma,\rho)}{\left(\Phi_2(\beta,\gamma,\rho)\right)^2}$$

The elements of the third row are

$$\frac{\partial^2 \ln L(\theta)}{\partial\rho\partial\gamma} = \sum_{i=n_1+1}^{n_2}\sum_{t=t_1+1}^{t_2} \frac{\Phi_2^{\rho\gamma}(\beta,\gamma,-\rho)}{\Phi_2(\beta,\gamma,-\rho)} - \frac{\Phi_2^{\rho}(\beta,\gamma,-\rho)\times\Phi_2^{\gamma}(\beta,\gamma,-\rho)}{\left(\Phi_2(\beta,\gamma,-\rho)\right)^2}$$
$$+\sum_{i=n_2+1}^{N}\sum_{i=t_2+1}^{T} \frac{\Phi_2^{\rho\gamma}(\beta,\gamma,\rho)}{\Phi_2(\beta,\gamma,\rho)} - \frac{\Phi_2^{\rho}(\beta,\gamma,\rho)\times\Phi_2^{\gamma}(\beta,\gamma,\rho)}{\left(\Phi_2(\beta,\gamma,\rho)\right)^2},$$

$$\frac{\partial^2 \ln L(\theta)}{\partial\rho\partial\beta} = \sum_{i=n_1+1}^{n_2}\sum_{t=t_1+1}^{t_2} \frac{\Phi_2^{\rho\beta}(\beta,\gamma,-\rho)}{\Phi_2(\beta,\gamma,-\rho)} - \frac{\Phi_2^{\rho}(\beta,\gamma,-\rho)\times\Phi_2^{\beta}(\beta,\gamma,-\rho)}{\left(\Phi_2(\beta,\gamma,-\rho)\right)^2}$$
$$+\sum_{i=n_2+1}^{N}\sum_{i=t_2+1}^{T} \frac{\Phi_2^{\rho\beta}(\beta,\gamma,\rho)}{\Phi_2(\beta,\gamma,\rho)} - \frac{\Phi_2^{\rho}(\beta,\gamma,\rho)\times\Phi_2^{\beta}(\beta,\gamma,\rho)}{\left(\Phi_2(\beta,\gamma,\rho)\right)^2}$$

, and

$$\frac{\partial^2 \ln L(\theta)}{\partial\rho\partial\rho} = \sum_{i=n_1+1}^{n_2}\sum_{t=t_1+1}^{t_2} \frac{\Phi_2^{\rho\rho}(\beta,\gamma,-\rho)}{\Phi_2(\beta,\gamma,-\rho)} - \left(\frac{\Phi_2^{\rho}(\beta,\gamma,-\rho)}{\Phi_2(\beta,\gamma,-\rho)}\right)^2$$
$$+\sum_{i=n_2+1}^{N}\sum_{i=t_2+1}^{T} \frac{\Phi_2^{\rho\rho}(\beta,\gamma,\rho)}{\Phi_2(\beta,\gamma,\rho)} - \left(\frac{\Phi_2^{\rho}(\beta,\gamma,\rho)}{\Phi_2(\beta,\gamma,\rho)}\right)^2$$

Taking expectations the Hessian becomes $E\left[H(\theta)\right] = \left[E\left(\frac{\partial^2 \ln L(\theta)}{\partial\theta\partial\theta}\right)\right]$. Instead of expectations the sample estimates $\hat{\theta} = \left\{\hat{\beta}, \hat{\gamma}, \hat{\rho}\right\}$ are used to derive the observed information matrix (OIM) $\mathrm{I}\left[\hat{\theta}\right] = -H\left(\hat{\theta}\right) = \left(-\frac{\partial^2 \ln L\left(\hat{\theta}\right)}{\partial\hat{\theta}\partial\hat{\theta}}\right)$ with the variance-covariance matrix as the inverse of the observed information matrix $\mathrm{I}\left[\hat{\theta}\right]^{-1} = -\left[H\left(\hat{\theta}\right)\right]^{-1} = \left(-\frac{\partial^2 \ln L\left(\hat{\theta}\right)}{\partial\hat{\theta}\partial\hat{\theta}}\right)^{-1}$. The OIM is more robust to potential heteroscedasticity than the expected Fisher information $\mathrm{I}\left[\theta\right]^{-1} = \left(-E\left[H\left(\theta\right)\right]\right)^{-1}$ according to (Efron & Hinkley, 1978). The elements on the diagonal are the variances of $\hat{\beta}$, $\hat{\gamma}$ and $\hat{\rho}$. The off-diagonal elements are the covariances of $\hat{\beta}$, $\hat{\gamma}$ and $\hat{\rho}$. The likelihood function L is estimated numerically with the hill-climbing Newton-Raphson algorithm that employs gradient $G\left(\theta\right)$ and Hessian matrix $H\left(\theta\right)$ for the step function $\hat{\theta}_m = \hat{\theta}_{m-1} - \left[\left(\frac{\partial^2 \ln L\left(\hat{\theta}\right)}{\partial\hat{\theta}_{m-1}\partial\hat{\theta}_{m-1}}\right)^{-1} \times \frac{\partial \ln L\left(\hat{\theta}\right)}{\partial\hat{\theta}_{m-1}}\right]$ for each step m until $\hat{\theta}$ is found that fulfills the first order condition $G\left(\hat{\theta}\right) = 0$ (Greene, 2008f). This algorithm is used in the empirical application to determine $\hat{\theta}_s = \left\{\hat{\beta}_s, \hat{\gamma}_s, \hat{\rho}_s\right\}$ for each year s and the pooled estimator $\hat{\theta} = \left\{\hat{\beta}, \hat{\gamma}, \hat{\rho}\right\}$ to calculate the inverse mills ratios.

The derivatives of the probability density functions exist, because the bivariate normal probability density function $\phi_2\left(\beta, \gamma, \rho\right)$ is continuous on the interval $\left[-\infty, \infty\right]$ and twice differentiable with its bivariate normal cumulative distribution function $\Phi_2\left(\beta, \gamma, \rho\right)$ being continuous on the interval $\left[0,1\right]$ and twice differentiable as well. The same holds for the univariate normal probability density functions $\phi\left(\gamma\right)$ and $\phi\left(\beta\right)$ and their cumulative distribution functions $\Phi\left(\gamma\right)$ and $\Phi\left(\beta\right)$. Therefore, a solution in the form of an estimator $\hat{\theta} = \left\{\hat{\beta}, \hat{\gamma}, \hat{\rho}\right\}$ and/or

$\hat{\theta}_t = \left\{\hat{\beta}_t, \hat{\gamma}_t, \hat{\rho}_t\right\}$ for each period t exists that fulfills the Cramer-Rao lower bound $\operatorname{var}(\theta) \geq \left(-E\left[H\left(\hat{\theta}\right)\right]\right)^{-1}$ for all other possible estimators $\theta \neq \hat{\theta}$ or $\theta_t \neq \hat{\theta}_t$, such that $\hat{\theta} = \left\{\hat{\beta}, \hat{\gamma}, \hat{\rho}\right\}$ and $\hat{\theta}_t = \left\{\hat{\beta}_t, \hat{\gamma}_t, \hat{\rho}_t\right\}$ are efficient (Greene, 2008e).

The Huber & White sandwich estimator of the variance-covariance matrix to obtain serial correlation and heteroscedasticity robust standard errors has the form $\operatorname{var}\left(\hat{\theta}\right) = \mathrm{I}\left[\hat{\theta}\right]^{-1} G\left(\hat{\theta}\right) G\left(\hat{\theta}\right)' \mathrm{I}\left[\hat{\theta}\right]^{-1} = -\left[H\left(\hat{\theta}\right)\right]^{-1} G\left(\hat{\theta}\right) G\left(\hat{\theta}\right)' \left(-\left[H\left(\hat{\theta}\right)\right]^{-1}\right)$,

which becomes with the above mentioned elements of the inverse of the observed information matrix and the gradient

$$\operatorname{var}\left(\hat{\theta}\right) = \begin{pmatrix} -\frac{\partial^2 \ln L\left(\hat{\theta}\right)}{\partial\hat{\gamma}\partial\hat{\gamma}} & -\frac{\partial^2 \ln L\left(\hat{\theta}\right)}{\partial\hat{\gamma}\partial\hat{\beta}} & -\frac{\partial^2 \ln L\left(\hat{\theta}\right)}{\partial\hat{\gamma}\partial\hat{\rho}} \\ -\frac{\partial^2 \ln L\left(\hat{\theta}\right)}{\partial\hat{\beta}\partial\hat{\gamma}} & -\frac{\partial^2 \ln L\left(\hat{\theta}\right)}{\partial\hat{\beta}\partial\hat{\beta}} & -\frac{\partial^2 \ln L\left(\hat{\theta}\right)}{\partial\hat{\beta}\partial\hat{\rho}} \\ -\frac{\partial^2 \ln L\left(\hat{\theta}\right)}{\partial\hat{\rho}\partial\hat{\gamma}} & -\frac{\partial^2 \ln L\left(\hat{\theta}\right)}{\partial\hat{\rho}\partial\hat{\beta}} & -\frac{\partial^2 \ln L\left(\hat{\theta}\right)}{\partial\hat{\rho}\partial\hat{\rho}} \end{pmatrix}^{-1} \begin{pmatrix} \frac{\partial \ln L\left(\hat{\theta}\right)}{\partial\hat{\gamma}} \\ \frac{\partial \ln L\left(\hat{\theta}\right)}{\partial\hat{\beta}} \\ \frac{\partial \ln L\left(\hat{\theta}\right)}{\partial\hat{\rho}} \end{pmatrix}$$

$$\times \begin{pmatrix} \frac{\partial \ln L\left(\hat{\theta}\right)}{\partial\hat{\gamma}} & \frac{\partial \ln L\left(\hat{\theta}\right)}{\partial\hat{\beta}} & \frac{\partial \ln L\left(\hat{\theta}\right)}{\partial\hat{\rho}} \end{pmatrix} \begin{pmatrix} -\frac{\partial^2 \ln L\left(\hat{\theta}\right)}{\partial\hat{\gamma}\partial\hat{\gamma}} & -\frac{\partial^2 \ln L\left(\hat{\theta}\right)}{\partial\hat{\gamma}\partial\hat{\beta}} & -\frac{\partial^2 \ln L\left(\hat{\theta}\right)}{\partial\hat{\gamma}\partial\hat{\rho}} \\ -\frac{\partial^2 \ln L\left(\hat{\theta}\right)}{\partial\hat{\beta}\partial\hat{\gamma}} & -\frac{\partial^2 \ln L\left(\hat{\theta}\right)}{\partial\hat{\beta}\partial\hat{\beta}} & -\frac{\partial^2 \ln L\left(\hat{\theta}\right)}{\partial\hat{\beta}\partial\hat{\rho}} \\ -\frac{\partial^2 \ln L\left(\hat{\theta}\right)}{\partial\hat{\rho}\partial\hat{\gamma}} & -\frac{\partial^2 \ln L\left(\hat{\theta}\right)}{\partial\hat{\rho}\partial\hat{\beta}} & -\frac{\partial^2 \ln L\left(\hat{\theta}\right)}{\partial\hat{\rho}\partial\hat{\rho}} \end{pmatrix}^{-1}$$

As long as the Hessian matrix is of full rank its inverse exists, and therefore the observed information matrix and the Huber & White sandwich estimator (Huber, 1967; White, 1980). In the empirical application the Huber & White sandwich estimator clustered by individuals i, in this case serial acquirers, is used in the estimation of the bivariate probit model with selection to determine the robust standard errors of $\hat{\theta} = \left\{ \hat{\beta}, \hat{\gamma}, \hat{\rho} \right\}$ and $\hat{\theta}_s = \left\{ \hat{\beta}_s, \hat{\gamma}_s, \hat{\rho}_s \right\}$.

E.6 The asymptotic variance of the pooled OLS estimator of the subsample affected by selection $\left(y_{it}^2 = 1 \right)$

Following the notation of (Wooldridge, 1995; 2002c) for each individual i let $\left\{ \left(w_{it}, y_{it}^3, y_{it}^2, y_{it}^1 \right) : t = 1,...,T \right\}$ be a random draw from a population, where for $\left(y_{it}^2 = 1 \cap y_{it}^1 = 1 \right)$ one defines $\hat{w}_{it} = \left(1, \alpha_{i(t_2+1)}, ..., \alpha_{i(T)}, \alpha_{it}, 0, ..., 0, \lambda_{it}^3, \lambda_{it}^4, 0, ..., 0 \right)$ with dimension $1 \times \left(1 + \left(T - t_2 \right) \times K_3 + K_3 + \left(T - t_2 \right) + \left(T - t_2 \right) \right)$ [32] and y_{it}^3 is a scalar. The pair $\left(w_{it}, y_{it}^3 \right)$ is observed only if the second step selection indicator $y_{it}^2 = 1$ is observed, such that $E\left(y_{it}^3 \mid w_{it}, y_{it}^2 = 1 \right) = w_{it} \times \theta^2$ [D.1] with

[32] $1 + \left(T - t_2 \right) \times K_3$ is the dimension of the general linear fixed effects operator without error terms (See Assumption 2b). K_3 are the elements of the regression coefficients $\delta_{1 \times K_3}$, plus the 2 coefficients of the inverse mills ratios. In this general representation $T - t_2$ time period t specific coefficients for each inverse mills ratio are assumed, if the bivariate probit model is estimated for each time period t separately with a coefficient for each period t specific inverse mills ratio. The zeros are placeholders for the missing period specific $r \neq t, r, t = t_2 + 1, ..., T$ coefficients of the inverse mills ratios. If the coefficients of the inverse mills ratios are constant over time only 2 coefficients are given.

$\theta^2 = \left\{\psi_{1\times(T-t_2)}, \delta_{1\times K_3}, \rho_{UV}, \rho_{EV}\right\}$ where θ^2 has dimension $1\times\left(1+\left(T-t_2\right)\times K_3 + K_3 + \left(T-t_2\right)+\left(T-t_2\right)\right)$. Writing D.1 in error form as $y_{it}^3 = w_{it}\times\theta^2 + v_{it}^*$, $E\left(v_{it}^* \mid w_{it}, y_{it}^2 = 1\right) = 0$, $t = t_2+1,...,T$ the pooled OLS estimator with fixed effects and inverse mills ratios for the selected subsample is $\hat{\theta}^2 = \dfrac{1}{N-n_2}\left(\sum_{i=n_2+1}^{N}\sum_{t=t_2+1}^{T} w_{it}' w_{it}\right)^{-1} \times \left(\sum_{i=n_2+1}^{N}\sum_{t=t_2+1}^{T} w_{it}' y_{it}^3\right)$. The asymptotic variance $\sqrt{N-n_2}\left(\hat{\theta}^2 - \theta_0^2\right)$ is obtained with some elements of w_{it}, namely the inverse mills ratios, estimated in the preliminary stage with the bivariate probit model, comparable to (Wooldridge, 1995), (Pagan, 1984) and (Newey, 1984).

With the inverse mills ratios $w_{it}\left(\theta\right)$ is a function of $\theta = \left\{\beta, \gamma, \rho_{UE}\right\}$, where θ is a $1\times\left(K_1 + K_2 + 1\right)$ vector of parameters estimated with the bivariate probit model. Let $\hat{\theta}$ be a $\sqrt{N}$-asymptotically normal estimator of θ_0 with representation $\sqrt{N}\left(\hat{\theta}-\theta_0\right) = \dfrac{1}{\sqrt{N}}\sum_{i=1}^{N} r_i\left(\theta\right) + o_p\left(1\right)$ [D.2] where $r_i\left(\theta\right) = -H\left(\theta\right)^{-1} s_i\left(\theta\right)$ is called the influence function representation of θ (Wooldridge, 2002c). $-H\left(\theta\right)^{-1}$ is the expected negative of the inverse Hessian matrix of the bivariate probit model, $E\left(-H\left[\theta\right]^{-1}\right)$, and $s_i\left(\theta\right)$ is the score, the transpose of gradient $G\left(\theta\right)$ (See econometric appendix E.5). Evaluated at $\theta = \left\{\beta, \gamma, \rho_{UE}\right\}$ $r_i\left(\theta\right)$ is a matrix of dimension $\left(T-t_2\right)\times\left(1+\left(T-t_2\right)\times K_1 + 1 + \left(T-t_2\right)\times K_2 + 1\right)$ if selection equations [1] and [2] include fixed effects as in assumptions 2e and 2f that are themselves of dimension $\left(T-t_2\right)\times K_1$ for 2e and $\left(T-t_2\right)\times K_2$ for 2f, plus the multiplied derivatives with respect to ρ_{UE} and stacked for $t = t_2+1,...,T$ time series observations for each individual i affected by selection. $r_i(\theta)$ is an $i.i.d$ sequence with $E(r_i(\theta))=0$, because in the maximum of the estimation of likelihood function $L(\theta)$ the gradient $G(\theta)=0$, and thus its score $s_i(\theta)=G'(\theta)$ as well.

A simplifying assumption similar to (Wooldridge, 1995) is that $E\left[\nabla_\theta w_{it}(\theta)' v_{it}^*\right]=0$ where $\nabla_\theta w_{it}(\theta)$ is the gradient of $w_{it}(\theta)$ of structural equations [4] or [5] on the selected subsample $y_{it}^2=1$. The gradient is

$$\nabla_\theta w_{it}(\theta)=\frac{\partial w_{it}(\theta)}{\partial\theta}=\begin{bmatrix}\dfrac{\partial w_{it}(\theta)}{\partial\beta}\\ \dfrac{\partial w_{it}(\theta)}{\partial\gamma}\\ \dfrac{\partial w_{it}(\theta)}{\partial\rho_{UE}}\end{bmatrix}=\begin{bmatrix}\rho_{UV}\dfrac{\partial\lambda_{it}^1(\theta)}{\partial\beta}+\rho_{EV}\dfrac{\partial\lambda_{it}^2(\theta)}{\partial\beta}\\ \rho_{UV}\dfrac{\partial\lambda_{it}^1(\theta)}{\partial\gamma}+\rho_{EV}\dfrac{\partial\lambda_{it}^2(\theta)}{\partial\gamma}\\ \rho_{UV}\dfrac{\partial\lambda_{it}^1(\theta)}{\partial\rho_{UE}}+\rho_{EV}\dfrac{\partial\lambda_{it}^2(\theta)}{\partial\rho_{UE}}\end{bmatrix}$$

The first order derivatives of the inverse mills ratios, with the simplified notation from econometric appendix E.3, are derived in their general form, because the inner and outer derivatives of the bivariate cumulative distribution function of two integrals shown in econometric appendix E.5 are cumbersome to derive by the Leibniz and chain rules (Zorich, 2002):

$$\frac{\partial\lambda_{it}^1(\theta)}{\partial\beta}=\frac{\phi(\gamma)\dfrac{\partial\Phi(\theta)}{\partial\beta}\Phi^2(\theta)-\phi(\gamma)\Phi(\theta)\dfrac{\partial\Phi^2(\theta)}{\partial\beta}}{\left(\Phi^2(\theta)\right)^2}$$

$$\frac{\partial\lambda_{it}^2(\theta)}{\partial\beta}=\frac{\left(\dfrac{\partial\phi(\beta)}{\partial\beta}\Phi(\theta)+\phi(\beta)\dfrac{\partial\Phi(\theta)}{\partial\beta}\right)\Phi^2(\theta)-\phi(\beta)\Phi(\theta)\dfrac{\partial\Phi^2(\theta)}{\partial\beta}}{\left(\Phi^2(\theta)\right)^2}$$

$$\frac{\partial \lambda_{it}^{1}(\theta)}{\partial \gamma}=\frac{\left(\frac{\partial \phi(\gamma)}{\partial \gamma}\Phi(\theta)+\phi(\gamma)\frac{\partial \Phi(\theta)}{\partial \gamma}\right)\Phi^{2}(\theta)-\phi(\gamma)\Phi(\theta)\frac{\partial \Phi^{2}(\theta)}{\partial \gamma}}{\left(\Phi^{2}(\theta)\right)^{2}}$$

$$\frac{\partial \lambda_{it}^{2}(\theta)}{\partial \gamma}=\frac{\phi(\beta)\frac{\partial \Phi(\theta)}{\partial \gamma}\Phi^{2}(\theta)-\phi(\beta)\Phi(\theta)\frac{\partial \Phi^{2}(\theta)}{\partial \gamma}}{\left(\Phi^{2}(\theta)\right)^{2}}$$

$$\frac{\partial \lambda_{it}^{1}(\theta)}{\partial \rho_{UE}}=\frac{\phi(\gamma)\frac{\partial \Phi(\theta)}{\partial \rho_{UE}}\Phi^{2}(\theta)-\phi(\gamma)\Phi(\theta)\frac{\partial \Phi^{2}(\theta)}{\partial \rho_{UE}}}{\left(\Phi^{2}(\theta)\right)^{2}}$$

$$\frac{\partial \lambda_{it}^{2}(\theta)}{\partial \rho_{UE}}=\frac{\phi(\beta)\frac{\partial \Phi(\theta)}{\partial \rho_{UE}}\Phi^{2}(\theta)-\phi(\beta)\Phi(\theta)\frac{\partial \Phi^{2}(\theta)}{\partial \rho_{UE}}}{\left(\Phi^{2}(\theta)\right)^{2}}$$

The first order derivatives of univariate inverse mills ratios $\lambda_{it}^{3}(\theta)$ and $\lambda_{it}^{4}(\theta)$ in the gradient similar to (Wooldridge, 1995) are

$$\frac{\partial \lambda_{it}^{3}(\gamma)}{\partial \beta}=0$$

$$\frac{\partial \lambda_{it}^{4}(\beta)}{\partial \beta}=\frac{\frac{\partial \phi(\beta)}{\partial \beta}\Phi(\beta)-\phi(\beta)\frac{\partial \Phi(\beta)}{\partial \beta}}{\left(\Phi(\beta)\right)^{2}}$$

$$\frac{\partial \lambda_{it}^{3}(\gamma)}{\partial \gamma}=\frac{\frac{\partial \phi(\gamma)}{\partial \gamma}\Phi(\gamma)-\phi(\gamma)\frac{\partial \Phi(\gamma)}{\partial \gamma}}{\left(\Phi(\gamma)\right)^{2}}$$

$$\frac{\partial \lambda_{it}^{4}(\beta)}{\partial \gamma} = 0$$

$$\frac{\partial \lambda_{it}^{3}(\gamma)}{\partial \rho_{UE}} = \frac{\partial \lambda_{it}^{3}(\beta)}{\partial \rho_{UE}} = 0$$

The gradient $\nabla_{\theta} w_{it}(\theta)$ with one of the univariate inverse mills ratios $\lambda_{it}^{3}(\gamma)$ or $\lambda_{it}^{4}(\beta)$ is similar to the gradient calculated by (Wooldridge, 1995). If selection is insignificant the coefficients ρ_{UV} and ρ_{EV} are 0, such that $\nabla_{\theta} w_{it}(\theta) = 0$ and the weighting matrix $D = 0$ [D.3]. With this assumption the estimation of the asymptotic variance becomes easier.

$\hat{\theta}^2$ denotes the OLS estimator of the selected subsample and $\hat{w}_{it} \equiv w_{it}(\hat{\theta})$ is used for w_{it}. According to (Wooldridge, 1995; 2002c) it can be shown that $\sqrt{N-n_2}\left(\hat{\theta}^2 - \theta_0^2\right) \rightarrow_d N\left(0, \mathrm{A}^{-1}\mathrm{B}\mathrm{A}^{-1}\right)$ where the sample estimates for A and B are $\hat{\mathrm{A}} = \frac{1}{N-n_2} \sum_{i=n_2+1}^{N} \sum_{t=t_2+1}^{T} \hat{w}_{it}' \hat{w}_{it}$ and $\hat{\mathrm{B}} = \mathrm{v\hat{a}r}(p_i) = \frac{1}{N-n_2} \sum_{i=n_2+1}^{N} \hat{p}_i \hat{p}_i'$ [D.5]. The vector p_i of dimension $\left(1 + (T-t_2) \times K_3 + K_3 + (T-t_2) + (T-t_2)\right) \times 1$ is defined as $\hat{p}_i = \hat{q}_i - \hat{D}\hat{r}_i$ where $\hat{r}_i$ is defined in [D.2], $\hat{D} = \frac{1}{N-n_2} \sum_{i=n_2+1}^{N} \sum_{t=t_2+1}^{T} w_{it}' \hat{\theta}^{2\prime} \nabla_{\theta} w_{it}(\hat{\theta})'$ [D.3], and $\hat{q}_i = \sum_{t=t_2+1}^{T} \hat{w}_{it}' v_{it}^{*}$ for $i = n_2 + 1, \ldots, N$ [D.4] (Wooldridge, 2002c). The gradient $\nabla_{\theta} w_{it}(\hat{\theta})$ is defined above. $\hat{r}_i = r_i(\hat{\theta})$ are estimates of r_i and v_{it}^{*} are the OLS residuals of structural equation [4] or [5]. The asymptotic variance $\hat{\theta}^2$ is estimated as $\mathrm{Av\hat{a}r}\left(\hat{\theta}^2\right) = \hat{\mathrm{A}}^{-1}\hat{\mathrm{B}}\hat{\mathrm{A}}^{-1} / N - n_2$. The asymptotic standard errors are the square roots of the diagonal elements of the matrix. The final asymptotic variance is

$$\begin{aligned}
\mathrm{Av\hat{a}r}\left(\hat{\theta}^2\right) &= \hat{\mathrm{A}}^{-1}\hat{\mathrm{B}}\hat{\mathrm{A}}^{-1}/N-n_2 \\
&= \frac{1}{N-n_2}\left(\hat{\mathrm{A}}^{-1}\times\left(\hat{q}_i-\hat{D}\hat{r}_i\right)\left(\hat{q}_i-\hat{D}\hat{r}_i\right)'\times\hat{\mathrm{A}}^{-1}\right) \\
&= \frac{1}{N-n_2}\left(\sum_{i=n_2+1}^{N}\sum_{t=t_2+1}^{T}\hat{w}_{it}'\hat{w}_{it}\right)^{-1} \\
&\qquad\times\left(\sum_{t=t_2+1}^{T}\hat{w}_{it}'v_{it}^{*}-\left(\sum_{i=n_2+1}^{N}\sum_{t=t_2+1}^{T}w_{it}'\hat{\theta}^{2\prime}\nabla_{\theta}w_{it}\left(\hat{\theta}\right)'\right)\times\left(-H\left(\hat{\theta}\right)^{-1}s_i\left(\hat{\theta}\right)\right)\right) \\
&\qquad\times\left(\sum_{t=t_2+1}^{T}\hat{w}_{it}'v_{it}^{*}-\left(\sum_{i=n_2+1}^{N}\sum_{t=t_2+1}^{T}w_{it}'\hat{\theta}^{2\prime}\nabla_{\theta}w_{it}\left(\hat{\theta}\right)'\right)\times\left(-H\left(\hat{\theta}\right)^{-1}s_i\left(\hat{\theta}\right)\right)\right)' \\
&\qquad\times\left(\sum_{i=n_2+1}^{N}\sum_{t=t_2+1}^{T}\hat{w}_{it}'\hat{w}_{it}\right)^{-1}
\end{aligned}$$

The general formula of the two-step asymptotic variance is given by (Wooldridge, 2002c). Together with the weighting matrix $D\left(\hat{\theta}\right)$ the influence function $r_i\left(\hat{\theta}\right)$ determine the influence of the first step bivariate estimation of the inverse mills ratios on the asymptotic variance of the pooled OLS estimator. The influence of first step estimation of $\hat{\theta}$ by $r_i\left(\hat{\theta}\right)$ is weighted by $y_{it}^3 = w_{it}'\hat{\theta}^2$ in $D\left(\hat{\theta}\right)$, the simplest weight for OLS (Wooldridge, 2002c). If the coefficients of the inverse mills ratios are close to 0, also $D\left(\hat{\theta}\right)$ is close to 0 as $\lim_{\rho_{UV},\rho_{EV}\to 0}\nabla_{\theta}w_{it}\left(\hat{\theta}\right)=0$, which gives the variance estimator of regular pooled OLS. If $\lim_{\rho_{UV},\rho_{EV}\to 0}D\left(\hat{\theta}\right)=0$, the estimate $\hat{\mathrm{B}}$ simplifies to

$$\lim_{\rho_{UV},\rho_{EV}\to 0}\hat{\mathrm{B}} = \lim_{\rho_{UV},\rho_{EV}\to 0}\hat{\mathrm{var}}\left(\hat{p}_i\right) = \lim_{\rho_{UV},\rho_{EV}\to 0}\frac{1}{N-n_2}\sum_{i=n_2+1}^{N}\hat{p}_i\hat{p}_i'$$

$$= \frac{1}{N-n_2}\sum_{i=n_2+1}^{N}\left(\hat{q}_i - 0\right)\left(\hat{q}_i - 0\right)'$$

$$= \frac{1}{N-n_2}\sum_{i=n_2+1}^{N}\left(\sum_{t=t_2+1}^{T}\hat{w}_{it}'v_{it}^*\right)\left(\sum_{t=t_2+1}^{T}\hat{w}_{it}'v_{it}^*\right)'$$

$$= \frac{1}{N-n_2}\sum_{i=n_2+1}^{N}\sum_{t=t_2+1}^{T}\hat{w}_{it}'v_{it}^*v_{it}'^*\hat{w}_{it}$$

This gives with the asymptotic variance of the regular pooled OLS estimator

$$\lim_{\rho_{UV},\rho_{EV}\to 0}\frac{\hat{\mathrm{A}}^{-1}\hat{\mathrm{B}}\hat{\mathrm{A}}^{-1}}{N-n_2} = \frac{1}{N-n_2}\left(\sum_{i=n_2+1}^{N}\sum_{t=t_2+1}^{T}\hat{w}_{it}'\hat{w}_{it}\right)^{-1}\times\left(\sum_{i=n_2+1}^{N}\sum_{t=t_2+1}^{T}\hat{w}_{it}'v_{it}^*v_{it}'^*\hat{w}_{it}\right)$$
$$\times\left(\sum_{i=n_2+1}^{N}\sum_{t=t_2+1}^{T}\hat{w}_{it}'\hat{w}_{it}\right)^{-1}$$

Statistical appendix

Table A: Descriptive statistics of the Top-25 advisors

The table includes the summary statistics of the Top-25 investment banks included in the annual SDC Top-50 M&A League Tables and SDC M&A sample A. The SDC Top-50 M&A League Tables from 1979 until 2006 include 395 different bank names with predecessors and subsidiaries. The investment banks are ranked by their total deal value of advised deals. The total deal value of the banks is computed including the total deal value of their predecessors and subsidiaries. The deal values are adjusted for inflation based on the 2006 CPI deflator of the US Federal Reserve Bank.

Number	Financial Advisor / Investment Bank	Rank of total Deal Value	Total Deal Value in the Sample ($mil)	Total Number of Advised Deals	Average Annual SDC M&A League Table Rank	Average Annual SDC M&A League Table Market Share
1	Goldman Sachs & Co	1	7,542,979.00	4,472	2.61	27.04
2	Morgan Stanley & Co	2	4,493,730.00	2,917	3.90	22.81
3	Merrill Lynch	3	3,819,854.00	2,244	4.38	18.67
4	JP Morgan	4	2,450,899.00	1,362	10.26	14.37
5	Lehman Brothers	5	2,333,491.00	1,670	8.56	11.98
6	Salomon Smith Barney	6	1,753,543.00	778	9.21	14.23
7	Bear Stearns & Co Inc	7	1,745,598.00	1,495	12.41	6.31
8	Credit Suisse First Boston	8	1,601,761.00	1,213	12.08	9.02
9	Morgan Stanley	9	1,394,294.00	628	4.42	21.23
10	First Boston Corp	10	1,325,868.00	1,680	4.80	17.34
11	Salomon Brothers	11	1,316,876.00	1,441	4.48	14.24
12	Lazard Freres & Co LLC	12	1,269,542.00	983	8.21	10.47
13	Donaldson Lufkin & Jenrette	13	1,121,381.00	1,694	15.47	4.65
14	Citigroup	14	981,919.40	497	3.79	20.95
15	Wasserstein Perella Group Inc	15	853,236.50	444	13.63	5.74
16	Banc of America Securities LLC	16	770,190.40	686	15.75	8.18
17	Lazard	17	659,317.10	398	13.76	9.53
18	Deutsche Bank AG	18	638,248.50	514	17.35	5.99
19	UBS Investment Bank	19	632,411.20	441	9.17	13.13
20	Dillon, Read & Co Inc	20	594,590.50	590	10.95	5.57
21	Drexel Burnham Lambert	21	594,360.80	903	11.32	9.12
22	Merrill Lynch Capital Markets	22	555,526.60	880	6.55	9.81
23	Shearson Lehman Hutton	23	518,539.70	701	7.26	12.46
24	Chase Manhattan Corp	24	497,187.60	194	18.08	5.85
25	Credit Suisse First Boston Int	25	470,537.30	350	18.73	4.95

Table A (cont.): Descriptive statistics of the Top-25 advisors

Number	Financial Advisor	Average advisor relationship strength ARSD (number of deals)	Average advisor relationship strength ARSV (deal volume)	Average relative industry experience IEDT (deals)	Average relative industry experience IEVT (volume in $)	Average absolute industry experience AIEDT (deals)	Average absolute industry experience AIEVT (volume in $)
1	Goldman Sachs & Co	0.0501	0.0510	0.1308	0.2467	7.8805	15,900,000,000.00
2	Morgan Stanley & Co	0.0600	0.0607	0.1089	0.1905	5.8497	11,300,000,000.00
3	Merrill Lynch	0.0542	0.0558	0.0908	0.1426	5.8906	10,300,000,000.00
4	JP Morgan	0.0383	0.0382	0.0742	0.1111	4.6516	7,320,000,000.00
5	Lehman Brothers	0.0463	0.0470	0.1088	0.1507	5.4716	6,410,000,000.00
6	Salomon Smith Barney	0.0585	0.0591	0.1042	0.1553	5.9650	8,630,000,000.00
7	Bear Stearns & Co Inc	0.0448	0.0453	0.0532	0.0704	2.8762	4,360,000,000.00
8	Credit Suisse First Boston	0.0542	0.0554	0.1528	0.2268	9.4264	10,500,000,000.00
9	Morgan Stanley	0.0555	0.0559	0.1297	0.2184	7.1525	12,800,000,000.00
10	First Boston Corp	0.0523	0.0536	0.0698	0.1063	2.9464	3,080,000,000.00
11	Salomon Brothers	0.0363	0.0359	0.0544	0.0890	2.5045	3,020,000,000.00
12	Lazard Freres & Co LLC	0.0367	0.0370	0.0480	0.0848	1.9420	3,000,000,000.00
13	Donaldson Lufkin & Jenrette	0.0418	0.0435	0.0444	0.0517	3.1585	2,670,000,000.00
14	Citigroup	0.0589	0.0593	0.1160	0.1736	6.6968	9,410,000,000.00
15	Wasserstein Perella Group Inc	0.0410	0.0410	0.0493	0.0799	2.1875	4,040,000,000.00
16	Banc of America Securities LLC	0.0350	0.0346	0.0219	0.0250	1.8312	1,320,000,000.00
17	Lazard	0.0453	0.0458	0.0561	0.0981	2.6341	4,820,000,000.00
18	Deutsche Bank AG	0.0384	0.0382	0.0519	0.0549	3.6535	2,300,000,000.00
19	UBS Investment Bank	0.0374	0.0374	0.0052	0.0099	0.3998	583,000,000.00
20	Dillon, Read & Co Inc	0.0307	0.0299	0.0305	0.0447	1.1599	1,070,000,000.00
21	Drexel Burnham Lambert	0.0508	0.0511	0.0354	0.0394	1.3649	993,000,000.00
22	Merrill Lynch Capital Markets	0.0171	0.0171	0.0415	0.0532	1.4621	1,210,000,000.00
23	Shearson Lehman Hutton	0.0283	0.0292	0.0509	0.0621	1.6086	1,510,000,000.00
24	Chase Manhattan Corp	0.0308	0.0311	0.0302	0.0318	2.0134	2,610,000,000.00
25	Credit Suisse First Boston Int	0.0073	0.0073	0.0106	0.0195	0.8636	1,280,000,000.00

Table B: Major bank mergers and name changes

The sample of 395 banks with 201 ultimate successors is taken from the SDC Top-50 M&A League Tables from 1979 to 2006. The adjustments for acquisitions, mergers, split-offs or name changes are first taken from the bank samples of (Chang, Shekhar, Tam, & Zhu, 2013), (Corwin & Schultz, 2005) and (Ljungqvist, Marston, & Wilhelm, 2006). Further information for banks in the league tables but missing in these samples are obtained from trade journals and business news papers (BusinessWeek, NewYork Times, WallStreet Journal, etc.) in LexisNexis, Factiva and the banks' websides and annual reports. The methodology to track name changes and bank mergers is similar to (Ljungqvist, Marston, & Wilhelm, 2006). The assumption concerning the effective date is that given the year only the effective date is the first of January of the respective year. The letters refer with b to the target or predecessor that is acquired, split-off or renamed to the successor marked with an a. A name change or split-off is indicated by a missing acquirer and a changed name of the successor.

Eff. Date	Target Name	Acquirer Name	Successor	Ultimate Successor 12/31/2006
1979	LaSalle National Bank (LNB) (1aab)	Algemene Bank Nederland (ABN) (1aaa)	ABN/LaSalle North America, Inc (1aa)	ABN AMRO Bank NV (1)
1991	AMRO Bank (1ab)	ABN/LaSalle North America, Inc (1aa)	ABN AMRO (1a)	ABN AMRO Bank NV (1)
03/01/1995	Barings Securities (1aab)	ING (1aaa)	ING Barings (1aa)	ABN AMRO Bank NV (1)
08/10/1997	Furman Selz LLC (1ab)	ING Barings (1aa)	ING Barings Furman Selz (1a)	ABN AMRO Bank NV (1)
04/03/2001	ING Baring - US Operations (1ab)	ABN-AMRO Holding N.V. (1aa)	ABN AMRO Holding N.V. (1a)	ABN AMRO Bank NV (1)
12/22/1988	First Boston Corp (2ab)	Credit Suisse (2aa)	Credit Suisse First Boston (2a)	Credit Suisse First Boston (2)
03/21/1997	Volpe Brown Whelan & Co (2b)	Credit Suisse First Boston (2a)	Credit Suisse First Boston (2a)	Credit Suisse First Boston (2)
11/12/1998	Barclays de Zoete Wedd Ltd (2b)	Credit Suisse First Boston (2a)	Credit Suisse First Boston (2a)	Credit Suisse First Boston (2)
03/11/2000	Donaldson Lufkin & Jenerette (2b)	Credit Suisse First Boston (2a)	Credit Suisse First Boston (2a)	Credit Suisse First Boston (2)
1987	First Boston Inc. (3abb)	Wasserstein Perella & Co (3aba)	Wasserstein Perella & Co (3ab)	Dresdner Kleinwort (3)
01/08/1995	Kleinwort Benson (3aab)	Dresdner Securities (USA) Inc (3aaa)	Dresdner Kleinwort Benson (3aa)	Dresdner Kleinwort (3)
05/01/2001	Wasserstein Perella & Co (3ab)	Dresdner Kleinwort Benson (3aa)	Dresdner Kleinwort Wasserstein (3a)	Dresdner Kleinwort (3)
01/06/2006	Dresdner Kleinwort Wasserstein (3a)		Dresdner Kleinwort (3)	Dresdner Kleinwort (3)
1981	Bache & Co (4aaab)	Prudential Financial (4aaa)	Prudential-Bache Securities (4aaa)	Prudential Volpe (4)
1989	Thomson McKinnon Securities (4aab)	Prudential-Bache Securities (4aaa)	Prudential-Bache Securities (4aa)	Prudential Volpe (4)
07/31/1999	Vector Securities Intl., Inc. (4ab)	Prudential-Bache Securities (4aa)	Prudential Securities Inc. (4a)	Prudential Volpe (4)
12/31/1999	Volpe Brown Whelan & Co (4b)	Prudential Securities Inc. (4a)	Prudential Volpe (4)	Prudential Volpe (4)
11/28/1997	Smith Barney Inc (5abab)	Salomon Brothers (5abaa)	Salomon Smith Barney (5aba)	Citigroup (5)
08/10/1998	Travelers (5b)	Citicorp (5a)	Citigroup (5)	Citigroup (5)
01/05/2000	Schroders-Worldwide Investment (5abb)	Salomon Smith Barney (5aba)	Salomon Smith Barney (5ab)	Citigroup (5)
01/10/2003	Salomon Smith Barney (5ab)	Citigoup Global Markets Inc (5aa)	Citi Smith Barney (5a)	Citigroup (5)
1986	Wertheim & Co (6bbab)	J Henry Schroder & Co Ltd (6bbaa)	Wertheim Schroder (6bba)	Schroders plc (6)
1994	Wertheim & Co (6bbb)	Wertheim Schroder (6bba)	Schroder Wertheim & Co (6bb)	Schroders plc (6)
1996	Schroder Wertheim & Co (6bb)	Schroder & Co Inc (6ba)	Schroder-Worldwide Investments (6b)	Schroders plc (6)
2000	Schroder-Worldwide Investments (6b)	Salomon Smith Barney (6ab)	Schroders plc (6)	Schroders plc (6)

Table B (cont): Major bank mergers and name changes

Eff. Date	Target Name	Acquirer Name	Successor	Ultimate Successor 12/31/2006
1983	Rotan Mosle Inc (7baab)	PaineWebber (7baaa)	PaineWebber (7baa)	UBS (7)
01/31/1995	Kidder Peabody & Co Inc (7bab)	PaineWebber (7baa)	Paine Webber Group Inc (7ba)	UBS (7)
07/03/1995	SG Warburg Securities (7abab)	Swiss Bank Corp (7abaa)	SBC Warburg (Swiss Bank Corp) (7aba)	UBS (7)
09/02/1997	Dillon Read & Co (7abb)	SBC Warburg (Swiss Bank Corp) (7aba)	SBC Warburg Dillon Read (Swiss Bank Corp) (7ab)	UBS (7)
08/28/1998	SBC Warburg Dillon Read (Swiss Bank Corp) (7ab)	Union Bank of Sitzerland (UBS) (7aa)	UBS Warburg (7a)	UBS (7)
06/12/2000	JC Bradford & Co (7bb)	Paine Webber Group Inc (7ba)	Paine Webber Group Inc (7b)	UBS (7)
11/03/2000	Paine Webber Group Inc (7b)	UBS Warburg (7a)	UBS (7)	UBS (7)
1988	Morgan Guaranty Trust Co of NY (8aabb)	JP Morgan & Co (8aaba)	JP Morgan & Co (8aab)	JP Morgan (8)
1991	Manufacturer's Hanover Trust Company (8aaaaabb)	Chemical Bank (8aaaaaba)	Chemical Bank (8aaaaab)	JP Morgan (8)
1996	F. Eberstadt (8aaabb)	Robert Fleming & Co. (8aaaba)	Robert Fleming & Co. (8aaab)	JP Morgan (8)
03/31/1996	Chase Manhatten (8aaaaab)	Chemical Bank (8aaaaaa)	Chase Manhatten (8aaaaa)	JP Morgan (8)
01/04/1998	First Chicago Bank (8abb)	Bank One Corp (8aba)	Bank One Corp (8ab)	JP Morgan (8)
12/10/1999	Hambrecht & Quist (8aaaab)	Chase Manhatten (8aaaaa)	Chase Manhatten (8aaaa)	JP Morgan (8)
04/01/2000	Robert Fleming & Co. (8aaab)	Chase Manhatten (8aaaa)	Chase Manhatten (8aaa)	JP Morgan (8)
12/31/2000	JP Morgan & Co (8aab)	Chase Manhatten (8aaa)	JP Morgan Chase & Co (8aa)	JP Morgan (8)
07/01/2004	Bank One Corp (8ab)	JP Morgan Chase & Co (8aa)	JP Morgan Chase & Co (8a)	JP Morgan (8)
11/05/2004	Cazenove (8ab)	JP Morgan Chase & Co (8aa)	JP Morgan Cazenove (8a)	JP Morgan (8)
1979	Loeb, Rhoades & Co. (9aaaaaabb)	Shearson Hayden Stone (9aaaaaaba)	Shearson Loeb Rhoades Inc (9aaaaaab)	Lehman Brothers (9)
1981	Shearson Loeb Rhoades Inc (9aaaaaab)	American Express (9aaaaaaa)	Shearson/American Express Inc (9aaaaaa)	Lehman Brothers (9)
1984	Lehman Brothers Kuhn Loeb (9aaaaab)	Shearson/American Express Inc (9aaaaaa)	Shearson Lehman/American Exp (9aaaaa)	Lehman Brothers (9)
1985	Financo (9aaaab)	Shearson Lehman/American Exp (9aaaaa)	Shearson Lehman/American Exp (9aaaa)	Lehman Brothers (9)
1988	EF Hutton & Co Inc (9aaab)	Shearson Lehman/American Exp (9aaaa)	Shearson Lehman Hutton (9aaa)	Lehman Brothers (9)
1989	Shearson Lehman Hutton (9aaa)		Financo (59)	Lehman Brothers (9)
1990	Shearson Lehman Hutton (9aaa)		Shearson Lehman Brothers (9aa)	Lehman Brothers (9)
1994	Shearson Lehman Brothers (9aa)		Lehman Brothers Holdings Inc (9a)	Lehman Brothers (9)
2003	Neuberger Berman Inc (9b)	Lehman Brothers Holdings Inc (9a)	Lehman Brothers Holdings Inc (9a)	Lehman Brothers (9)
1984	Becker Paribas Incorporated (10aaab)	Merrill Lynch & Co Inc (10aaaa)	Merrill Lynch & Co Inc (10aaa)	Merrill Lynch (10)
06/22/1998	Midland Walwyn Inc (10aab)	Merrill Lynch & Co Inc (10aaa)	Merrill Lynch (10aa)	Merrill Lynch (10)
05/06/2000	Herzog Heine Geduld (10ab)	Merrill Lynch & Co Inc (10aa)	Merrill Lynch (10aa)	Merrill Lynch (10)
10/23/2006	Petrie Parkman & Co Inc (10b)	Merrill Lynch & Co Inc (10a)	Merrill Lynch (10)	Merrill Lynch (10)

Table B (cont): Major bank mergers and name changes

Eff. Date	Target Name	Acquirer Name	Successor	Ultimate Successor 12/31/2006
1986	First National Bank of Atlanta (11aaab)	Wachovia Corp (11aaaa)	Wachovia Corp (11aaa)	Wachovia (11)
1998	CoreStates Financial Corporation (11abaab)	First Union Corp (11abaaa)	First Union Corp (11abaa)	Wachovia (11)
09/01/1998	Principal Financial Securities (11abbb)	Everen Capital Corp (11abba)	Everen Capital Corp (11abb)	Wachovia (11)
02/02/1998	Wheat First Butcher Singer (11abab)	First Union Corp (11abaa)	First Union Corp (11aba)	Wachovia (11)
01/04/1999	Interstate/Johnson Lane Inc (11aab)	Wachovia Corp (11aaa)	Wachovia Corp (11aa)	Wachovia (11)
01/10/1999	Everen Capital Corp (11abb)	First Union Corp (11aba)	First Union Corp (11ab)	Wachovia (11)
04/09/2001	First Union Corp (11ab)	Wachovia Corp (11aa)	Wachovia Corp (11a)	Wachovia (11)
2003	Bache & Co (11aab)	Wachovia Capital Markets (11aaa)	Wachovia Securities Inc (11aa)	Wachovia (11)
2003	Prudential Securities (11ab)	Wachovia Securities Inc (11aa)	Wachovia Securities Inc (11a)	Wachovia (11)
1989	Morgan Grenfell (12aab)	Deutsche Bank (12aaa)	Deutsche Morgan Grenfell (12aa)	Deutsche Bank AG (12)
1996	James D. Wolfensohn Inc. (12abab)	Bankers Trust New York Corp (12abaa)	Bankers Trust New York Corp (12aba)	Deutsche Bank AG (12)
09/02/1997	Alex Brown, Inc (12abb)	Bankers Trust New York Corp (12aba)	BT Alex Brown Inc (12ab)	Deutsche Bank AG (12)
06/04/1999	BT Alex Brown Inc (12ab)	Deutsche Morgan Grenfell (12aa)	Deutsche Bank Allex Brown (12a)	Deutsche Bank AG (12)
1988	Wood Gundy Inc (13aab)	Canadian Imperial Bank of Commerce (13aaa)	CIBC Wood Gundy Securities (13aa)	CIBC World Markets (13)
11/03/1997	Oppenheimer & Co Inc (13ba)	CIBC Wood Gundy Securities (13aa)	CIBC Oppenheimer (13a)	CIBC World Markets (13)
1983	Seafirst Corporation/Seattle First National Bank (14aaaaab)	Bank of America (14aaaaaa)	Bank of America (14aaaaa)	Bank of America (14)
1992	Securities Pacific (14aaaab)	Bank of America (14aaaaa)	Bank of America (14aaaa)	Bank of America (14)
1994	Continental Bank (14aaab)	Bank of America (14aaaa)	Bank of America (14aaa)	Bank of America (14)
10/01/1997	Robertson Stephens & Co (14aaab)	Bank of America (14aaa)	BancAmerica Roberston Stephens (14abbb)	Bank of America (14)
10/01/1997	Montgomery Securities (14abb)	NationsBank Corp (14aba)	Nationsbank Montgomery Securities Inc (14ab)	Bank of America (14)
09/30/1998	Nationsbank Montgomery Securities Inc (14ab)	Bank of America (14aa)	Bank of America Securities (14a)	Bank of America (14)
2004	Fleet/Bank Boston (14ab)	Bank of America (14aa)	Bank of America (14a)	Bank of America (14)
02/02/1998	Quick & Reilly Group, Inc (14bab)	Fleet Financial Group Inc (14baa)	Fleet Financial Group Inc (14ba)	Fleet/Bank Boston (14b)
09/01/1998	BancAmerica Robertson Stephens (14abbb)	Bank Boston Corp (14abba)	BankBoston Robert Stephens (14abb)	Fleet/Bank Boston (14b)
10/01/1999	BankBoston Robert Stephens (14abb)	Fleet Financial Group Inc (14aba)	Fleet/Bank Boston (14ab)	Fleet/Bank Boston (14b)

Table B (cont): Major bank mergers and name changes

Eff. Date	Target Name	Acquirer Name	Successor	Ultimate Successor 12/31/2006
09/21/1998	Nationsbank Montgomery Securities Inc (14ab)	Thomas Weisel Partners LLC (14aba)	Thomas Weisel Partners LLC (14ab)	Thomas Weisel Partners LLC (15)
05/31/1997	Dean Wittter Reynolds Inc (16ab)	Morgan Stanley Group, Inc (16aa)	Morgan Stanley Dean Witter (16a)	Morgan Stanley (16)
1998	Barr Devlin Associates (17ab)	SG Americas Securities LLC (17aa)	SG Barr Devlin (17a)	Societe General (17)
1998	Hambros Bank (17ab)	SG Americas Securities LLC (17aa)	SG Hambros Bank Ltd. (17a)	Societe General (17)
06/30/1998	Cowen & Co. (17ab)	SG Americas Securities LLC (17aa)	SG Cowen Securities Corp (17a)	Societe General (17)
				Goldman Sachs (18)
				Bear Sterns (19)
				AG Edwards & Sons Inc (20)
				Drexel Burnham Lambert (21)
				LaSalle Partners (22)
				Lazard (23)
				Goldsmith Agio Helms & Co. (24)
05/01/1998	Piper Jaffary Companies (25baab)	US Bancorp Pipper Jaffary (25baaa)	US Bancorp Pipper Jaffary (25baa)	US Bancorp (25)
01/04/1999	Libra Investments, Inc (25bab)	US Bancorp Pipper Jaffary (25baa)	US Bancorp Pipper Jaffary (25ba)	US Bancorp (25)
09/01/1999	John Nuveen Co (25bb)	US Bancorp Pipper Jaffary (25ba)	US Bancorp (25)	US Bancorp (25)
2003	US Bancorp Pipper Jaffary (26b)		Piper Jaffray (26a)	Piper Jaffray (26)
			LF Rotschild Unterberg Towbin (27a)	LF Rothschild & Co (27)
1990	LF Rotschild Unterberg Towbin (27a)		Unterberg Harris (28aa)	CE Unterberg Towbin (28)
1997	Unterberg Harris (28a)		CE Unterberg Towbin (28)	CE Unterberg Towbin (28)
01/02/1998	Equitable Securities Corp (29ab)	SunTrust Banks Inc (29aa)	SunTrust Equitable Securities (29a)	SunTrust Robinson-Humphrey (29)
07/27/2001	Robinson-Humphrey (29b)	SunTrust Equitable Securities (29a)	SunTrust Robinson-Humphrey (29)	SunTrust Robinson-Humphrey (29)
				Houlihan Lokey Howard & Zukin (30)
				Houlihan Valuation Advisors (31)
				Houlihan Smith & Co (32)
				Stephens Inc (33)
				Greenhill (34)
03/21/2001	Quaterdeck Investment (35aab)	Jefferies (35aaa)	Jefferies (35aa)	Jefferies (35)
2003	Broadview Associates (35ab)	Jefferies (35aa)	Jefferies (35a)	Jefferies (35)
2005	Randall & Dewey Inc. (35b)	Jefferies (35a)	Jefferies (35)	Jefferies (35)
				Blackstone (36)
				Evercore Partners (37)

Table B (cont): Major bank mergers and name changes

Eff. Date	Target Name	Acquirer Name	Successor	Ultimate Successor 12/31/2006
1996	Dominion Securities Pitfield (38ab)	Royal Bank of Canada (38aa)	RBC Dominion Securities (38a)	RBC Capital Markets (38)
01/02/1998	Rauscher Pierce Refsnes (38abab)	Dain Bosworth Inc (38abaa)	Dain Rauscher Corp (38aba)	RBC Capital Markets (38)
04/06/1998	Wessels Arnold & Henderson LLC	Dain Rauscher Corp (38aba)	Dain Rauscher Wessels (38ab)	RBC Capital Markets (38)
09/14/2000	Branch Cabell & Co Inc (38abb)	Tucker Anthony Sutro (38aba)	Tucker Anthony Sutro (38ab)	RBC Capital Markets (38)
01/10/2001	Dain Rauscher Wessels (38ab)	Royal Bank of Canada (38aa)	RBC Dain Rauscher Corp (38a)	RBC Capital Markets (38)
08/01/2001	Tucker Anthony Sutro (38ab)	Royal Bank of Canada (38aa)	RBC Dain Rauscher Corp (38a)	RBC Capital Markets (38)
				Daniels & Associates Inc (39)
05/11/1998	Roney & Co (40bab)	First Chicago NBD Corp (40baa)	First Chicago NBD Corp (40ba)	Raymond James (40)
10/02/1998	First Chicago NBD Corp (40bb)	BANC ONE Corp (40ba)	Roney Capital Markets (Banc One) (40b)	Raymond James (40)
06/14/1999	Roney Capital Markets (Banc One) (40b)	Raymond James Financials, Inc (40a)	Raymond James (40)	Raymond James (40)
11/20/1997	Hampshire Securities Corp (41bb)	Gruntal & Co Inc (41ba)	Gruntal & Co Inc (41b)	Ryan Beck & Co (41)
04/29/2002	GMS Group (from Gruntal & Co) (41b)	Ryan Beck & Co (41a)	Ryan Beck & Co (41)	Ryan Beck & Co (41)
				KPMG (42)
				Peter J. Solomon Co Ltd (43)
				William Blair & Co (44)
1990	Deloitte Haskins & Sells (45bb)	Coopers & Lybrand (45ba)	Coopers & Lybrand (45b)	PricewaterhouseCoopers (45)
1998	Coopers & Lybrand (45b)	Pricewaterhouse (45a)	PricewaterhouseCoopers (45)	PricewaterhouseCoopers (45)
1989	Arthur & Young (46aab)	Ernst & Ernst (46aaa)	Ernst & Young (46aa)	Ernst & Young (46)
1995	Kenneth Leventhal & Co. (46ab)	Ernst & Young (46aa)	Ernst & Young (46a)	Ernst & Young (46)
2002	Arthur & Anderson (46b)	Ernst & Young (46a)	Ernst & Young (46)	Ernst & Young (46)
				Needham & Co Inc (47)
				Simmons & Co International (48)
11/10/1999	Paribas SA (49b)	BNP SA (49a)	BNP Paribas SA (49)	BNP Paribas SA (49)
				Baird Patrick & Co Inc (50)
1993	Society Corporation of Cleveland (51ab)	KeyCorp (51aa)	KeyCorp (51a)	KeyCorp (51)
09/08/1998	Essex Capital Markets, Inc (51bb)	McDonals & Co Investments, Inc (51ba)	McDonals & Co Investments, Inc (51b)	KeyCorp (51)
10/26/1998	McDonals & Co Investments, Inc (51b)	KeyCorp (51a)	KeyCorp (51)	KeyCorp (51)
1995	Gleacher & Co (52b)	NatWest (52a)	NatWest (52)	NatWest (52)
				Hoare Govett Ltd (53)
				Nomura Securities (54)

Table B (cont): Major bank mergers and name changes

Eff. Date	Target Name	Acquirer Name	Successor	Ultimate Successor 12/31/2006
05/02/1997	Equity Securities Trading Co. (55ab)	Southwest Securities Group Inc. (55aa)	Southwest Securities Group Inc. (55a)	Southwest Securities Group Inc. (55)
07/31/1997	First of Michigan Capital Corp (56aab)	Fahnestock Viner Holdings Inc (56aaa)	Fahnestock & Co (56aa)	Fahnestock & Co (56)
09/18/2001	Josephthal Lyon & Ross (56ab)	Fahnestock & Co (56aa)	Fahnestock & Co (56a)	Fahnestock & Co (56)
11/12/2001	Grand Charter Group Inc (56b)	Fahnestock & Co (56a)	Fahnestock & Co (56)	Fahnestock & Co (56)
10/31/2000	Soundview Technology Group (57b)	Wit Capital Group Inc (57a)	Wit Soundview Group Inc (57)	Wit Soundview Group Inc (57)
1999	First Marathon Securities Ltd (58ab)	National Bank Financial Inc (58aa)	National Bank Financial Inc (58a)	National Bank Financial Inc (a unit of National Bank of Canada) (58)
06/19/2002	Putnam Lovell Group Inc (58b)	National Bank Financial Inc (58a)	National Bank Financial Inc (58)	National Bank Financial Inc (a unit of National Bank of Canada) (58)
				Financo (59)
				Brooks, Harvey & Co. (60)
				AE Ames & Co Inc (61)
				AGM Partners LLC (62)
				AIB Capital Markets (63)
				Alpine Securities (64)
				American Appraisal Assoc., Inc (65)
				Anestis (66)
				Apollo Advisors (67)
2005	Harris Trust & Savings Bank (68b)	BMO Financial Group (68a)	BMO Financial Group (68)	BMO Financial Group (68)
1986	James Capel & Co (69ab)	HSBC (69aa)	HSBC (69a)	HSBC (69)
1995	Samuel Montagu & Co Ltd (69b)	HSBC (69a)	HSBC (69)	HSBC (69)
1989	Touche Ross & Company (70b)	Deloitte & Touche (70a)	Deloitte & Touche (70a)	Deloitte & Touche (70)
1990	Scharff & Jones Inc (71b)	Morgan Keegan Inc (71a)	Morgan Keegan Inc (71a)	Morgan Keegan Inc (71)
				Rothschild (72)
				Ardshield (73)
				Argosy Group (74)
				BCC Investments (75)
				Bacon, Whipple (76)
				Beacon Financial Services LP (77)
				Berenson Minella (78)
				Berkery, Noyes & Co. (79)
				Berkshire Capital (80)

Table B (cont): Major bank mergers and name changes

Eff. Date	Target Name	Acquirer Name	Successor	Ultimate Successor 12/31/2006
				Black River Capital LLC (81)
				Boettcher (82)
				Breckenridge (83)
				Brown Brothers Harriman & Co (84)
				Burns Fry and Timmins (85)
				Calyon (86)
				Canaccord Capital Corp (87)
				Carl Marks & Co. Inc. (88)
				Carlyle Group LP (89)
				Carolina Securities (90)
				Carr Securities (91)
				Cates Consulting Analysts (92)
				Chicago Corp (93)
				Chicago Dearborn (94)
				Chilmark Partners (95)
				Cleary Gull Reiland McDevitt (96)
				Cohen & Steers Capital Advisor (97)
				Conning & Co (98)
				Corporate Capital (99)
				Credit Lyonnais Investissement (100)
				Cronus Partners (101)
				Daniels & Associates Inc (102)
				Duff and Phelps (103)
				EM Warburg Pincus & Co Inc (104)
2006	Eastdil Realty Inc (105ab)	Secured Capital Corp. (105aa)	Eastdil Equities (105a)	Eastdil Equities (105)
				Eppler Guerin & Turner Inc (106)
				EuroPartners Securities (107)
				Euroforce Enterprises (108)
				First Manhattan Co (109)
				First Southwest (110)

Table B (cont): Major bank mergers and name changes

Eff. Date	Target Name	Acquirer Name	Successor	Ultimate Successor 12/31/2006
				Fuji Corporate Advisory Co Ltd (111)
				GKH Partners LP (112)
				GMP Securities Ltd. (113)
				Genuity Capital Markets (114)
				Gibbons, Green, Van Amerongen (115)
				Girard Bank (116)
				Global Leisure Partners LLP (117)
				Golembe Associates (118)
				Golenberg (119)
				Grant Samuel & Associates Pty (120)
				Grant Thornton (121)
				Gruss & Co. (122)
				Hallwood Group Inc (123)
				Hellman & Friedman LLC (124)
				Henry Ansbacher Holding PLC (125)
				Hicks & Haas (126)
				Hill Samuel & Co Ltd (127)
				Insurance Capital (128)
				Invemed Associates Inc (129)
				JJB Hilliard WL Lyons Inc (130)
2005	Parker-Hunter Inc (131b)	Janney Montgomery Scott Inc (131a)	Janney Montgomery Scott Inc (131)	Janney Montgomery Scott Inc (131)
				John J. Ryan (132)
				Keefe Bruyette & Woods Inc (133)
				Keefe Managers Inc (134)
				Keilin & Bloom (135)
				Kelso & Co (136)
				Kramer Capital Partners (137)
				Ladenburg Thalmann & Co (138)
				Laidlaw-Coggeshall (139)
				Legg (140)
				Levin Group L.P. (141)
				Lewis & Company (142)
				Lion Advisors (143)

Table B (cont): Major bank mergers and name changes

Eff. Date	Target Name	Acquirer Name	Successor	Ultimate Successor 12/31/2006
				Lipper and Co Inc. (144)
				Lodestar Group (145)
				Long Term Credit Bank of Japan (146)
				M. P. Brown & Co., Inc. (147)
				MTS Health Partners LP (148)
				MacDonald, Krieger, Bowyer & B (149)
				Macquarie Bank (150)
				Fox-Pitt Kelton (151)
				Madison Capital Advisors (152)
				Maryland National Bank (153)
				McKay (154)
				MeesPierson NV (155)
				Metals and Securities (156)
				Mexico Finance Group Ltd. (157)
				Miller Tabak Hirsch (158)
				Morgan Joseph & Co Inc (159)
				Morgan Lewis Githens & Ahn (160)
				Morgan Schiff (161)
				New Harbor Inc (162)
				Nikko Securities Co Ltd (163)
				Northington Capital Markets (164)
				Ocean Capital Corp (165)
				Orion Securities (166)
				Peers (167)
				Perseus Group LLC (168)
				Prescott Ball & Turben Inc (169)
				Printon Kane & Co (170)
				Quadrangle Group LLC (171)
				RCG/Hagler, Bailly, Inc. (172)
				Relational Advisors LLC (173)
				Resource Holding Ltd. (174)
				Rhone Group LLC (175)
				Robert W Baird & Co Inc (176)

Table B (cont): Major bank mergers and name changes

Eff. Date	Target Name	Acquirer Name	Successor	Ultimate Successor 12/31/2006
				Rohatyn Associates LLC (177)
				S. B. Lewis (178)
				SEB Enskilda (179)
				Sagent Advisors Inc (180)
				Sandler O'Neill Partners (181)
1987	McLeod Young Weir Intl (182bb)	Scotia Capital Inc (182ab)	Scotia Capital Inc (182b)	Bank of Nova Scotia (182)
1995	Scotia Capital Inc (182b)	Bank of Nova Scotia (182a)	Bank of Nova Scotia (182)	Bank of Nova Scotia (182)
				Scully Brothers & Foss (183)
				Shapiro & Co (184)
				Simmons & Co International (185)
				Sonnenblick-Goldman Corp (186)
				Standard Research Consultants (187)
				Stephen W Brenner Assoc (188)
				Stephens Financial Group (189)
				Sterling Payot Company (190)
				Sullivan & Cromwell (191)
04/01/2001	Sakura Bank Ltd (192ab)	Sumitomo Bank Ltd (192aa)	Sumitomo Mitsui Banking Corporation (192a)	Sumitomo Mitsui Banking Corporation (192)
				TD Securities Inc (193)
				Tarrish (194)
				Tillinghast (195)
				Touchstone Securities Ltd (196)
				Veronis Suhler (197)
				Waller Capital (198)
				Walter M. Sharp (199)
				William Sword (200)
				Williams Securities Group (201)

Table C: Description of variables

This table includes the descriptions and formulas of the variables used in chapters 2 to 4. Continuous variables are winsorized at 1% and 99%. LOGME and RDS are adjusted for inflation to 2006 dollars.

Variable	Definition	Source
Panel A: Definitions of dependent variables		
CAR_(-2, 2)_BETA1_vw	CAR from -2 to +2 trading days around the acouncement date (t=0) with beta=1, alpha=0, using the CRSP value weighted index as market return proxy, winsorized (Atkas, Bodt, & Cousin, 2007).	CRSP, SDC
GOODADVICE	GOODADVICE is a dummy (0/1) whether the deal has a nonnegative CAR(-2, 2) and is completed or is withdrawn if it has a negative CAR(-2, 2), and 0 otherwise.	CRSP, SDC
RESOLSPEED	RESOLSPEED is the time in days from 0 to 730 from the announcement to the completion or withdrawal date (Hunter & Jagtiani, 2003).	SDC
COMPLETED	COMPLETED is a dummy (0/1) whether the M&A is completed, and 0 if withdrawn (Rau, 2000).	SDC
SUCCESSORBID	Dummy (0/1) whether the bid or acquisition succeeds a previous one.	SDC
OLDADVISOR	Dummy (0/1) if the chosen bank advised the bidder in the last three years.	SDC
AADVISOR	Dummy (0/1) if the bank is selected as advisor in the bid-bank match y^2_{it}=1	SDC
ADVISORCHOICE	Ordered variable of no advisor (1), a non-bulge-bracket bank (2) or a bulge-bracket bank (3) as the bidder's choice of his lead financial advisor with the highest market share.	SDC
ADVISED	Dummy (0/1) if the deal is advised on the acquirer's side (Servaes & Zenner, 1996) .	SDC
Panel B: Definitions of the bank variables		
IEDA, IEDT, IEVA, IEVT	The variables of banks' industry expertise are adopted and modified from (Chang, Shekhar, Tam, & Zhu, 2013) for each (Fama & French, 1997) industry every year and theoretically based on (Anand & Galetovic, 2006) and (Chemmanur & Fulghieri, 1994). "IEDT" and "IEDA" are bank's industry expertise IE by the number of deals (D) in the acquirer's (A) or target's (T) industry. "IEVT" and "IEVA" are the bank's industry expertise IE by the dollar volume (V) of deals in the acquirer's (A) or target's (T) industry. The formulas for the industry expertise IE at time t of bank i in industry k are $IED_{t,i,k}$=[(advised_deals$_{t-1,i,k}$/advised_industry_deals$_{t-1,k}$)+(advised_deals$_{t-2,i,k}$/advised_industry_deals$_{t-2,k}$)+(advised_deals$_{t-3,i,k}$/advised_industry_deals$_{t-3,k}$)]/3 and $IEV_{t,i,k}$=[(advised_volume$_{t-1,i,k}$/advised_industry_volume$_{t-1,k}$)+(advised_volume$_{t-2,i,k}$/advised_industry_volume$_{t-2,k}$)+(advised_volume$_{t-3,i,k}$/advised_industry_volume$_{t-3,k}$)]/3.	SDC
ARSD, ARSV	This variable is adapted from (Sibilkov & McCornell, 2013) and (Forte, Iannotta, & Navone, 2010) and theoretically based on (Anand & Galetovic, 2006) and (Chemmanur & Fulghieri, 1994). It measures the advisory relationship strength ARS of the bidder and bank over the last 3 years. "ARSD" and "ARSV" are the advisory relationship strength ARS by the bidder's number of deals (D) or deal dollar value (V) advised by the bank. The formula of ARS at time t of bank i for bidder j are $ARSD_{t,i,j}$=[(advised_deals$_{t-1,i,j}$/advised_bidder_deals$_{t-1,j}$)+(advised_deals$_{t-2,i,j}$/advised_bidder_deals$_{t-2,j}$)+(advised_deals$_{t-3,i,j}$/advised_bidder_deals$_{t-3,j}$)]/3 and $ARSV_{t,i,j}$=[(advised_volume$_{t-1,i,j}$/advised_bidder_volume$_{t-1,j}$)+(advised_volume$_{t-2,i,j}$/advised_bidder_volume$_{t-2,j}$)+(advised_volume$_{t-3,i,j}$/advised_bidder_volume$_{t-3,j}$)]/3.	SDC

Table C (cont.): Description of variables

Panel B (cont.): Definitions of bank variables

Variable	Definition	Source
MS	The adjusted bank's market share in the SDC Top-50 M&A League Tables.	SDC
RELREP	The relative reputation is the bidder advisor's market share MS divided by the target advisor's market share MS, and just the bidder advisor's MS if the target is unadvised (Kale, Kini, & Ryan, 2003)	SDC
PASTBIDDERCAR	PASTBIDDERCAR is the winsorized CAR(-2, 2) value weighted, using the Beta-1 model, of the bidder's previous bid independent of its advisory status.	CRSP, SDC
PASTBANKCAR	PASTBANKCAR is the winsorized CAR (-2, 2) value weighted, using the Beta-1 model, of the bank's previously advised deal. It is the past CAR $(-2, 2)_{i-1}$ multiplied with the dummy if the CAR $(-2, 2)_{i-1}$ is available.	CRSP, SDC
PASTBBCAR	PASTBBCAR is the winsorized CAR(-2, 2) value weighted, using the Beta-1 model, if the advising bank advised the bidder in a previous M&A, the bidder-bank pairing. It is the bidder's CAR in a previously unadvised deal if the current bid is unadvised (Rau, 2000, Hunter & Jagtiani, 2003).	CRSP, SDC
PASTCOMPLETED	PASTCOMPLETED is the dummy (0/1) of the deal previously advised by the same bank. It is PASTCOMPLETED of the last unadvised deal if the current bid is unadvised.	SDC
PASTGOODADVICE	PASTGOODADVICE is a dummy (0/1) whether the previous deal advised by the same bank had a nonnegative CAR$(-2, 2)_{i-1}$ and was completed, or the deal was withdrawn and had a negative CAR$(-2, 2)_{i-1}$. If unadvised it is the past unadvised deal's GOODADVICE dummy.	SDC
PASTRESOLSPEED	PASTRESOLSPEED is the resolution speed if the bank advised the acquirer in a previous deal. It is the resolution speed of the last unadvised deal if the current bid is unadvised.	SDC

Table C (cont.): Description of variables

Panel C: Definitions of acquirer variables		
Variable	Definition	Source
SCOPE	Dummy (0/1) if the acquirer was advised in a debt or equity issue in the three years preceeding the M&A announcement year (Golubov, Petmezas, & Travlos, 2012).	SDC
DEALS3YEARS	Number of the bidder's M&As in the preceeding 3 years (Servaes & Zenner, 1996).	SDC
LOGME	Log of the market value of equity of the bidder at the end of the fiscal year before the bid. The formula is ln(Shares outstanding$_{t-1}$ x Price per Share$_{t-1}$ x 1,000,000 x CPI factor) (Moeller, Schlingemann, & Stulz, 2004, 2005; Bao & Edmans, 2011; Masulis, Wang, & Xie, 2007).	Compustat
LNIS	LNIS is the natural logarithm of the number of companies in the bidder's primary (Fama & French, 1997) industry in the year before the bid or acquisitions (Maksimovic & Phillips, 2001, 2002).	Compustat
TobinsQ	Tobin's Q in year t-1 before the M&A of the bidder as [(Book Value of Assets$_{t-1}$+Market Value of Equity$_{t-1}$-Book Value of Equity$_{t-1}$)/Book Value of Assets$_{t-1}$] (Andrade & Stafford, 2004).	Compustat
ITobinsQ	ITobinQ is the mean industry Tobin's Q, defined as the average of the industry's companies' Tobin's Q excluding the bidder's Tobin's Q in the year before the M&A. The industries are defined according to (Fama & French, 1997).	Compustat
ATobinsQ	ATobinsQ is the abnormal Tobin's Q, TobinsQ$_{t-1}$-ITobinsQ$_{t-1}$	Compustat
ROA	Return on assets is defined as [EBIT$_{t-1}$/Book Value of Assets$_{t-1}$] (Heron & Lie, 2002).	Compustat
IROA	IROA is the industry return on assets, defined as the average of the industry's companies' ROA excluding the bidder's ROA in the year before the M&A. The industries are defined according to (Fama & French, 1997).	Compustat
AROA	AROA is the abnormal ROA, defined as the ROA$_{t-1}$-IROA$_{t-1}$	Compustat
LEVERAGE	Leverage at year t-1 before the deal is defined as [(Long-term Debt$_{t-1}$+Debt in Current Liabilities$_{t-1}$)/Book Value of Assets$_{t-1}$] (Masulis, Wang, & Xie, 2007; Harford, 2005).	Compustat
ILEVERAGE	ILEVERAGE is the mean industry leverage, defined as the average of the industry's companies' leverage excluding the bidder's leverage in the year before the M&A. The industries are defined according to (Fama & French, 1997).	Compustat
ALEVERAGE	ALEVERAGE is the abnormal leverage, LEVERAGE$_{t-1}$-ILEVERAGE$_{t-1}$	Compustat

Table C (cont.): Description of variables

Panel D: Definitions of Transaction Variables		
Variable	Definition	Source
DIVERS	Dummy (0/1) if the target and the acquirer have different primary 2-digit SIC codes (Servaes & Zenner, 1996).	SDC
MAJORITY	Dummy (0/1) if the bidder seeks a majority ownership share of more than 50% and owns less than 50% before the deal.	SDC
PUBLIC	Dummy (0/1) is the target is a public company (Chang, 1998).	SDC
RDS	Relative Deal Size (RDS) is the transaction value divided by the bidder's market value of equity. It is defined as [log((Transaction Value x CPI factor/(Shares outstanding$_{t-1}$ x Price per Share$_{t-1}$ x 1,000,000 x CPI factor))] (Fuller, Netter, & Stegemoller, 2002; Moeller, Schlingemann, & Stulz, 2004, 2005).	SDC, Compustat
TADVISORTIER	Discrete choice variable of the target's advisor's tier (unadvised (0), non-bulge-bracket (1), bulge-bracket (2)) (Kale, Kini, & Ryan, 2003).	SDC
MULTIPLE	Multiple Bidders is defined as the number of bidders (Boone & Mulherin, 2008).	SDC
HOSTILE	Dummy (0/1) if the target resists the takeover (Schwert, 2000).	SDC
ANTITAKEOVER	Dummy (0/1) if the target has anti-takeover measures (Comment & Schwert, 1995).	SDC
FAMILY	Dummy (0/1) if a family owns more than 20% of the target (Kale, Kini, & Ryan, 2003).	SDC
LITIGATION	Dummy (0/1) if the target has a pending litigation / legal issues (Kale, Kini, & Ryan, 2003).	SDC
REGULATORY	Dummy (0/1) if the M&A requieres regulatory approval, e.g. from an anti-monopoly commission (Kale, Kini, & Ryan, 2003).	SDC
CROSSBORDER	Dummy (0/1) if the bidder is from a country other than the USA (Francis, Hasan, & Sun, 2008; Moeller & Schlingemann, 2005).	SDC
DIVERSIFICATION	DIVERSIFICATION is the logarithm of the number of SIC codes of the target (Servaes & Zenner, 1996).	SDC
TOEHOLD	TOEHOLD is the percentage of the target owned by the bidder prior the bid/acquisition (Kale, Kini, & Ryan, 2003).	SDC
HIGHTECH	Dummy (0/1) if the target or the bidder or both are high-tech firms (Loughran & Ritter, 2004).	SDC
STOCK	Dummy (0/1) if the payment is stock (Martin, 1996).	SDC
CASH	Dummy (0/1) if the payment is cash (Martin, 1996).	SDC
MIXED	Dummy (0/1) if the payment is cash and stock (Martin, 1996).	SDC
OTHER	Dummy (0/1) if the payment is another one than stock or cash, e.g. convertibles (Martin, 1996).	SDC
FIRST	Dummy (0/1) if the bid is the first one in the acquisition sequence (Fuller, Netter, & Stegemoller, 2002).	SDC
SIXTH	Dummy (0/1) if the bid is the sixths or later one in the sequence (Fuller, Netter, & Stegemoller, 2002).	SDC

Table D: Annual regressions of the bivariate probit model with selection using IEDT and ARSD

Table D shows the annual regressions of the bivariate probit model with selection. The years 1979 to 1981 are analyzed together because of nonconvergence of individual years caused by to few bid-bank matches among all observations. The variables are summarized in table 2 and described in table C in the statistical appendix. The standard errors are corrected for potential heteroscedasticity with the Huber & White sandwich estimator (Huber, 1967; White, 1980).

	1979-1981		1982		1983		1984		1985	
VARIABLES	AADVISOR	ADVISED	AADVISOR	ADVISED	AADVISOR	ADVISED	AADVISOR	ADVISED	AADVISOR	ADVISED
IEDT	1.4447***		1.6865***		2.1880***		3.0243***		2.6762***	
	(4.044)		(6.483)		(7.491)		(11.268)		(12.401)	
ARSD	1.7619		-8.6664***		3.4072***		5.2786***		3.9370***	
	(1.454)		(-19.765)		(2.803)		(7.336)		(5.366)	
PASTBBCAR	-30.8157**		-357.8541***		9.1257		7.1664*		2.4218	
	(-2.006)		(-32.947)		(0.269)		(1.747)		(0.369)	
RDS	0.0394	0.3075**	0.0021	0.2178	0.0149	0.5892***	-0.0077	0.4047***	0.0132	0.3749**
	(1.454)	(2.386)	(0.217)	(1.380)	(0.731)	(4.103)	(-0.332)	(3.531)	(0.635)	(2.517)
TADVISORTIER		0.7155***		0.8987***		0.7252***		0.6115***		0.5619***
		(5.840)		(7.408)		(7.204)		(6.620)		(5.508)
SCOPE		-0.6830**		-0.0711		-0.1188		0.1375		0.3145
		(-2.182)		(-0.290)		(-0.602)		(0.698)		(1.525)
DEALS3YEARS		-1.2973***		-0.3685***		-0.1324**		-0.0648		-0.0523
		(-3.662)		(-3.112)		(-2.522)		(-1.407)		(-1.091)
LOGME		0.3497***		0.0893		0.1883***		0.1287***		0.0193
		(4.753)		(1.528)		(3.598)		(3.116)		(0.300)
ATobinsQ		-0.0902		-0.0045		0.0496		0.1457*		0.2472
		(-0.616)		(-0.026)		(0.704)		(1.741)		(1.503)
AROA		-0.5536		0.6885		-0.9672		2.0656**		0.0745
		(-0.429)		(0.567)		(-1.133)		(2.472)		(0.063)
ALEVERAGE		-0.8020		-0.8757		0.4559		-0.8889*		-0.4744
		(-0.985)		(-1.099)		(0.764)		(-1.733)		(-0.678)
Constant	-2.3789***	-7.4115***	-2.5666***	-3.5940**	-2.6455***	-6.1592***	-2.7132***	-4.5442***	-2.6966***	-1.0321
	(-47.907)	(-4.394)	(-72.904)	(-2.283)	(-55.036)	(-4.134)	(-62.703)	(-4.282)	(-44.153)	(-0.680)
Transaction variables	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
N	43,444	43,444	69,144	69,144	91,800	91,800	100,860	100,860	44,844	44,844
Number of acquirers	255	255	314	314	407	407	479	479	243	243
Chi²-statistic	.	.	1,403.07	1,403.07	95.94	95.94	331.97	331.97	241.04	241.04
p-value	.	.	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Chi²-statistic of exogeneity	2.8079	2.8079	0.6454	0.6454	0.0612	0.0612	0.0684	0.0684	0.2211	0.2211
p-value of exogeneity	0.0938	0.0938	0.4218	0.4218	0.8046	0.8046	0.7937	0.7937	0.6382	0.6382

Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table D (cont.): Annual regressions of the bivariate probit model with selection using IEDT and ARSD

	1986		1987		1988		1989		1990	
VARIABLES	AADVISOR	ADVISED	AADVISOR	ADVISED	AADVISOR	ADVISED	AADVISOR	ADVISED	AADVISOR	ADVISED
IEDT	3.3358***		3.0012***		3.5660***		4.1102***		3.8523***	
	(13.412)		(10.237)		(12.478)		(13.579)		(10.245)	
ARSD	2.5261***		5.5880***		4.2118***		4.1671***		4.6108***	
	(4.354)		(9.995)		(5.566)		(6.389)		(7.058)	
PASTBBCAR	8.9850		-0.8874		2.4072		-7.8826		-6.5781	
	(1.624)		(-0.060)		(0.231)		(-0.805)		(-0.642)	
RDS	0.0161	0.0995	0.0147	0.2559*	0.0214	0.4691***	0.0021	0.5408***	0.0408**	0.5937***
	(1.178)	(0.925)	(0.859)	(1.840)	(1.140)	(3.992)	(0.113)	(5.459)	(2.193)	(4.345)
TADVISORTIER		0.4994***		0.5342***		0.3679***		0.4817***		0.5617***
		(6.270)		(6.088)		(4.614)		(6.066)		(6.678)
SCOPE		0.2125		0.1473		0.3398**		0.4364***		0.3124*
		(1.406)		(0.912)		(2.133)		(2.768)		(1.672)
DEALS3YEARS		-0.0839		-0.0589		-0.1097**		-0.0783*		-0.1048*
		(-1.571)		(-1.278)		(-2.380)		(-1.809)		(-1.937)
LOGME		0.0031		0.0473		0.0960**		0.1064***		0.1550***
		(0.064)		(0.890)		(2.550)		(3.000)		(4.051)
ATobinsQ		-0.1616		-0.1047*		-0.0274		0.0512		-0.0963
		(-1.533)		(-1.801)		(-0.317)		(0.836)		(-1.595)
AROA		0.2488		0.8731		-0.6152		0.5313		0.0071
		(0.344)		(1.391)		(-0.900)		(0.960)		(0.015)
ALEVERAGE		-0.3586		-0.1466		-0.5282		-0.7002**		-0.4942
		(-0.679)		(-0.312)		(-1.408)		(-2.041)		(-1.137)
Constant	-2.7291***	-1.2262	-2.8289***	-2.8527**	-2.8413***	-3.7979***	-2.8302***	-4.3498***	-2.7715***	-5.1917***
	(-68.351)	(-0.923)	(-58.611)	(-2.129)	(-51.646)	(-4.052)	(-68.472)	(-4.464)	(-54.557)	(-5.319)
Transaction variables	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
N	100,590	100,590	116,644	116,644	142,506	142,506	202,665	202,665	165,376	165,376
Number of acquirers	372	372	374	374	426	426	555	555	525	525
Chi²-statistic	215.73	215.73	242.24	242.24	231.46	231.46	292.70	292.70	206.10	206.10
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Chi²-statistic of exogeneity	3.5668	3.5668	0.1416	0.1416	0.3348	0.3348	0.3930	0.3930	1.1581	1.1581
p-value of exogeneity	0.0589	0.0589	0.7067	0.7067	0.5628	0.5628	0.5307	0.5307	0.2819	0.2819

Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table D (cont.): Annual regressions of the bivariate probit model with selection using IEDT and ARSD

	1991		1992		1993		1994		1995	
VARIABLES	AADVISOR	ADVISED	AADVISOR	ADVISED	AADVISOR	ADVISED	AADVISOR	ADVISED	AADVISOR	ADVISED
IEDT	3.8055***		4.1673***		4.5489***		4.2306***		4.2619***	
	(9.287)		(13.209)		(12.503)		(17.657)		(15.477)	
ARSD	5.0330***		5.4528***		4.2053***		3.5182***		3.2091***	
	(5.552)		(11.824)		(7.189)		(6.797)		(3.798)	
PASTBBCAR	1.3275		-5.0999		18.7147***		-6.0256		-2.9139	
	(0.151)		(-0.684)		(4.936)		(-0.978)		(-0.847)	
RDS	0.0456*	0.4552***	0.0339	0.6153***	0.0507	0.4991***	0.0306	0.7043***	0.0398**	0.6908***
	(1.919)	(3.540)	(0.839)	(4.750)	(1.037)	(4.343)	(1.441)	(6.301)	(2.491)	(5.944)
TADVISORTIER		0.6792***		0.4711***		0.6718***		0.6095***		0.5433***
		(7.554)		(6.245)		(5.125)		(9.020)		(8.383)
SCOPE		0.6219***		0.2434*		0.2324		0.1793*		0.2018*
		(3.603)		(1.780)		(1.517)		(1.700)		(1.838)
DEALS3YEARS		-0.0293		-0.0974**		-0.0879**		-0.0764***		-0.1112***
		(-0.658)		(-2.394)		(-2.547)		(-3.485)		(-5.977)
LOGME		0.0897**		0.1689***		0.1439***		0.1369***		0.1231***
		(2.517)		(5.115)		(3.884)		(5.295)		(4.533)
ATobinsQ		-0.1146		0.0625*		-0.0167		0.0067		0.0434
		(-1.305)		(1.851)		(-0.425)		(0.183)		(1.254)
AROA		0.9611		0.3615		-0.1522		0.3028		-0.3594
		(1.455)		(0.885)		(-0.434)		(0.962)		(-1.366)
ALEVERAGE		-0.0982		-0.7157*		-0.1101		-0.4577		-0.5053**
		(-0.199)		(-1.870)		(-0.401)		(-1.606)		(-1.981)
Constant	-2.8608***	-3.9498***	-2.8674***	-5.3898***	-2.9822***	-4.9127***	-2.8220***	-5.5379***	-2.8682***	-4.4093***
	(-45.784)	(-4.279)	(-53.306)	(-6.041)	(-19.350)	(-6.927)	(-98.399)	(-8.107)	(-112.153)	(-6.362)
Transaction variables	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
N	192,253	192,253	261,515	261,515	345,349	345,349	552,000	552,000	564,642	564,642
Number of acquirers	584	584	726	726	854	854	1,106	1,106	1,204	1,204
Chi²-statistic	122.27	122.27	388.02	388.02	406.10	406.10	416.60	416.60	251.96	251.96
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Chi²-statistic of exogeneity	0.6709	0.6709	0.1119	0.1119	0.7009	0.7009	3.3752	3.3752	1.0193	1.0193
p-value of exogeneity	0.4127	0.4127	0.7380	0.7380	0.4025	0.4025	0.0662	0.0662	0.3127	0.3127

Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table D (cont.): Annual regressions of the bivariate probit model with selection using IEDT and ARSD

	1996		1997		1998		1999		2000	
VARIABLES	AADVISOR	ADVISED	AADVISOR	ADVISED	AADVISOR	ADVISED	AADVISOR	ADVISED	AADVISOR	ADVISED
IEDT	4.3948***		5.1823***		6.4770***		6.8948***		6.6388***	
	(19.754)		(21.408)		(33.191)		(37.616)		(34.088)	
ARSD	4.1390***		3.3238***		4.1422***		4.6887***		4.7157***	
	(5.144)		(4.696)		(7.276)		(11.766)		(10.569)	
PASTBBCAR	7.4532*		2.2408		3.4342		-2.8797		7.6682***	
	(1.869)		(0.875)		(1.173)		(-1.091)		(2.974)	
RDS	0.0458***	0.6633***	0.0254***	0.7668***	0.0378***	0.6097***	0.0369***	0.5920***	0.0178	0.5705***
	(4.026)	(6.770)	(2.769)	(7.593)	(3.015)	(5.884)	(3.347)	(7.132)	(1.089)	(5.717)
TADVISORTIER		0.6562***		0.7405***		0.6231***		0.6333***		0.6366***
		(10.697)		(13.560)		(12.433)		(12.078)		(12.811)
SCOPE		0.0658		0.1689**		0.0519		0.1722*		0.1641*
		(0.724)		(2.117)		(0.688)		(1.957)		(1.938)
DEALS3YEARS		-0.0569***		-0.0755***		-0.0456***		-0.0729***		-0.0525***
		(-3.511)		(-4.723)		(-3.712)		(-4.578)		(-4.890)
LOGME		0.1231***		0.1133***		0.0869***		0.0408*		0.0676***
		(5.199)		(4.789)		(4.063)		(1.740)		(3.404)
ATobinsQ		0.0034		0.0427**		0.0030		0.0062		-0.0067
		(0.155)		(2.328)		(0.124)		(0.382)		(-0.636)
AROA		0.9774***		-0.1556		0.0310		0.2872		-0.2574
		(3.284)		(-0.547)		(0.135)		(1.444)		(-1.198)
ALEVERAGE		-0.3869*		-0.4087*		-0.2930		0.1495		0.1700
		(-1.705)		(-1.824)		(-1.505)		(0.711)		(0.740)
Constant	-2.9050***	-4.6072***	-2.9318***	-4.5406***	-2.9707***	-3.9368***	-2.9980***	-3.3556***	-2.9131***	-3.5605***
	(-150.219)	(-7.066)	(-150.405)	(-7.308)	(-144.296)	(-7.067)	(-131.973)	(-5.367)	(-111.922)	(-5.705)
Transaction variables	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
N	698,139	698,139	1,029,784	1,029,784	936,819	936,819	738,045	738,045	610,242	610,242
Number of acquirers	1,336	1,336	1,611	1,611	1,594	1,594	1,414	1,414	1,356	1,356
Chi²-statistic	431.29	431.29	476.34	476.34	1,126.38	1,126.38	1,680.25	1,680.25	1,566.64	1,566.64
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Chi²-statistic of exogeneity	0.2432	0.2432	0.2754	0.2754	0.0340	0.0340	0.1829	0.1829	0.2690	0.2690
p-value of exogeneity	0.6219	0.6219	0.5997	0.5997	0.8536	0.8536	0.6689	0.6689	0.6040	0.6040

Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table D (cont.): Annual regressions of the bivariate probit model with selection using IEDT and ARSD

	2001		2002		2003		2004		2005		2006	
VARIABLES	AADVISOR	ADVISED	AADVISOR	ADVISED	AADVISOR	ADVISED	AADVISOR	ADVISED	AADVISOR	ADVISED	AADVISOR	ADVISED
IEDT	6.1924***		6.0628***		7.2414***		8.5160***		8.6164***		7.2668***	
	(18.525)		(14.366)		(17.171)		(34.873)		(24.898)		(29.583)	
ARSD	5.0061***		4.1744***		6.3973***		7.0353***		6.5865***		6.1364***	
	(9.116)		(4.441)		(5.535)		(12.025)		(11.128)		(12.598)	
PASTBBCAR	-0.5294		2.4296		11.2497***		0.5208		0.3798		0.8173	
	(-0.228)		(0.564)		(2.959)		(0.148)		(0.079)		(0.121)	
RDS	0.0169	0.5558***	0.0154	0.7527***	0.0672***	0.6153***	0.0355	0.8454***	0.0110	0.8229***	0.0744***	0.9451***
	(1.253)	(5.132)	(0.977)	(5.276)	(3.760)	(4.580)	(1.481)	(4.401)	(0.433)	(4.322)	(3.593)	(2.931)
TADVISORTIER		0.5842***		0.5862***		0.5318***		0.5457***		0.6759***		0.6724***
		(10.654)		(9.522)		(8.515)		(8.841)		(11.103)		(10.067)
SCOPE		0.2816***		0.0613		0.0475		0.0396		0.1549		0.1366
		(2.802)		(0.569)		(0.505)		(0.418)		(1.607)		(1.488)
DEALS3YEARS		-0.0305*		-0.0608***		-0.0363**		-0.0814***		-0.0914***		-0.0808***
		(-1.857)		(-3.168)		(-2.118)		(-4.223)		(-4.346)		(-4.294)
LOGME		0.0195		0.0755***		0.0654**		0.0793***		0.0910***		0.0559*
		(0.802)		(2.943)		(2.478)		(2.812)		(3.100)		(1.766)
ATobinsQ		0.0349*		-0.0089		0.0091		0.0204		-0.0136		0.0280
		(1.756)		(-0.315)		(0.206)		(0.652)		(-0.466)		(0.947)
AROA		0.2740		0.3386*		0.1080		0.1339		-0.0691		-0.2268
		(1.314)		(1.655)		(0.458)		(0.430)		(-0.209)		(-0.599)
ALEVERAGE		-0.1872		-0.0907		0.2641		-0.2708		-0.3993		-0.2703
		(-0.713)		(-0.353)		(0.951)		(-1.063)		(-1.461)		(-1.127)
Constant	-2.8814***	-2.5578***	-2.8620***	-4.1825***	-2.9211***	-3.3815***	-2.9194***	-4.2225***	-2.9269***	-4.3688***	-2.8848***	-3.2234***
	(-114.297)	(-3.602)	(-96.084)	(-5.502)	(-74.916)	(-4.820)	(-89.892)	(-5.479)	(-101.828)	(-5.521)	(-88.794)	(-4.256)
Transaction variables	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
N	435,552	435,552	388,360	388,360	377,556	377,556	466,032	466,032	551,928	551,928	523,692	523,692
Number of acquirers	1,087	1,087	1,030	1,030	1,002	1,002	1,049	1,049	1,087	1,087	1,112	1,112
Chi²-statistic	482.83	482.83	258.11	258.11	344.38	344.38	1,385.80	1,385.80	742.45	742.45	1,126.54	1,126.54
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Chi²-statistic of exogeneity	0.1548	0.1548	0.2348	0.2348	0.1957	0.1957	3.0161	3.0161	8.2214	8.2214	2.8095	2.8095
p-value of exogeneity	0.6940	0.6940	0.6280	0.6280	0.6583	0.6583	0.0824	0.0824	0.0041	0.0041	0.0937	0.0937

Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table E: Annual regressions of the bivariate probit model with selection using IEVT and ARSV

Table E shows the annual regressions of the bivariate probit model with selection. The years 1979 to 1981 are analyzed together because of nonconvergence of individual years caused by to few bid-bank matches among all observations. The variables are summarized in table 2 and described in table C in the statistical appendix. The standard errors are corrected for potential heteroscedasticity with the Huber & White sandwich estimator (Huber, 1967; White, 1980).

	1979-1981		1982		1983		1984		1985	
VARIABLES	AADVISOR	ADVISED	AADVISOR	ADVISED	AADVISOR	ADVISED	AADVISOR	ADVISED	AADVISOR	ADVISED
IEVT	1.2154***		1.4372***		1.5614***		1.9800***		1.8041***	
	(3.484)		(5.872)		(7.183)		(11.443)		(9.515)	
ARSV	1.7058		-9.7610***		3.3607***		5.2120***		3.9179***	
	(1.407)		(-20.002)		(2.609)		(6.537)		(5.395)	
PASTBBCAR	-30.8472**		-382.7502***		11.1927		7.6219*		2.0327	
	(-2.009)		(-38.505)		(0.338)		(1.735)		(0.308)	
RDS	0.0414	0.3075**	0.0050	0.2178	0.0194	0.5892***	-0.0108	0.4047***	-0.0030	0.3749**
	(1.559)	(2.386)	(0.527)	(1.380)	(0.938)	(4.103)	(-0.412)	(3.531)	(-0.145)	(2.517)
TADVISORTIER		0.7155***		0.8987***		0.7252***		0.6115***		0.5619***
		(5.840)		(7.408)		(7.204)		(6.620)		(5.508)
SCOPE		-0.6830**		-0.0711		-0.1188		0.1375		0.3145
		(-2.182)		(-0.290)		(-0.602)		(0.698)		(1.525)
DEALS3YEARS		-1.2973***		-0.3685***		-0.1324**		-0.0648		-0.0523
		(-3.662)		(-3.112)		(-2.522)		(-1.407)		(-1.091)
LOGME		0.3497***		0.0893		0.1883***		0.1287***		0.0193
		(4.753)		(1.528)		(3.598)		(3.116)		(0.300)
ATobinsQ		-0.0902		-0.0045		0.0496		0.1457*		0.2472
		(-0.616)		(-0.026)		(0.704)		(1.741)		(1.503)
AROA		-0.5536		0.6885		-0.9672		2.0656**		0.0745
		(-0.429)		(0.567)		(-1.133)		(2.472)		(0.063)
ALEVERAGE		-0.8019		-0.8757		0.4559		-0.8889*		-0.4744
		(-0.985)		(-1.099)		(0.764)		(-1.733)		(-0.677)
Constant	-2.3768***	-7.4115***	-2.5667***	-3.5940**	-2.6311***	-6.1592***	-2.6716***	-4.5442***	-2.6651***	-1.0322
	(-47.544)	(-4.394)	(-75.742)	(-2.283)	(-55.793)	(-4.134)	(-67.748)	(-4.282)	(-43.916)	(-0.680)
Transaction variables	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
N	43,444	43,444	69,144	69,144	91,800	91,800	100,860	100,860	44,844	44,844
Number of acquirers	255	255	314	314	407	407	479	479	243	243
Chi²-statistic	.	.	1,620.39	1,620.39	89.85	89.85	285.46	285.46	159.01	159.01
p-value	.	.	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Chi²-statistic of exogeneity	2.9958	2.9958	0.6638	0.6638	0.0194	0.0194	0.0086	0.0086	0.4605	0.4605
p-value of exogeneity	0.0835	0.0835	0.4152	0.4152	0.8892	0.8892	0.9261	0.9261	0.4974	0.4974

Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table E (cont.): Annual regressions of the bivariate probit model with selection using IEVT and ARSV

	1986		1987		1988		1989		1990	
VARIABLES	AADVISOR	ADVISED	AADVISOR	ADVISED	AADVISOR	ADVISED	AADVISOR	ADVISED	AADVISOR	ADVISED
IEVT	2.3345***		2.3212***		2.1765***		2.5832***		1.9408***	
	(16.638)		(10.999)		(9.763)		(14.323)		(10.557)	
ARSV	2.6541***		5.4896***		4.0040***		4.2581***		4.8771***	
	(4.339)		(10.455)		(4.563)		(6.630)		(6.436)	
PASTBBCAR	9.3806*		-1.4090		2.7545		-8.5374		-6.4069	
	(1.714)		(-0.094)		(0.256)		(-0.880)		(-0.632)	
RDS	0.0113	0.0995	0.0180	0.2559*	0.0241	0.4691***	0.0074	0.5408***	0.0401**	0.5937***
	(0.805)	(0.925)	(1.204)	(1.840)	(1.320)	(3.992)	(0.406)	(5.459)	(2.038)	(4.345)
TADVISORTIER		0.4994***		0.5342***		0.3679***		0.4817***		0.5617***
		(6.270)		(6.088)		(4.614)		(6.066)		(6.678)
SCOPE		0.2125		0.1473		0.3398**		0.4364***		0.3124*
		(1.406)		(0.912)		(2.133)		(2.768)		(1.672)
DEALS3YEARS		-0.0839		-0.0588		-0.1097**		-0.0783*		-0.1048*
		(-1.571)		(-1.278)		(-2.380)		(-1.809)		(-1.937)
LOGME		0.0031		0.0473		0.0960**		0.1064***		0.1550***
		(0.063)		(0.890)		(2.550)		(3.000)		(4.051)
ATobinsQ		-0.1617		-0.1047*		-0.0275		0.0512		-0.0963
		(-1.534)		(-1.801)		(-0.317)		(0.836)		(-1.595)
AROA		0.2488		0.8731		-0.6151		0.5313		0.0071
		(0.344)		(1.391)		(-0.900)		(0.960)		(0.015)
ALEVERAGE		-0.3587		-0.1465		-0.5282		-0.7002**		-0.4942
		(-0.679)		(-0.312)		(-1.408)		(-2.041)		(-1.137)
Constant	-2.7050***	-1.2259	-2.8344***	-2.8527**	-2.8155***	-3.7980***	-2.8167***	-4.3498***	-2.7320***	-5.1917***
	(-69.083)	(-0.923)	(-58.954)	(-2.129)	(-54.281)	(-4.052)	(-68.009)	(-4.463)	(-55.070)	(-5.319)
Transaction variables	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
N	100,590	100,590	116,644	116,644	142,506	142,506	202,665	202,665	165,376	165,376
Number of acquirers	372	372	374	374	426	426	555	555	525	525
Chi²-statistic	309.38	309.38	284.74	284.74	131.13	131.13	312.14	312.14	184.58	184.58
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Chi²-statistic of exogeneity	3.9084	3.9084	0.3839	0.3839	0.0062	0.0062	0.0499	0.0499	1.0713	1.0713
p-value of exogeneity	0.0480	0.0480	0.5355	0.5355	0.9370	0.9370	0.8232	0.8232	0.3007	0.3007

Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table E (cont.): Annual regressions of the bivariate probit model with selection using IEVT and ARSV

	1991		1992		1993		1994		1995	
VARIABLES	AADVISOR	ADVISED	AADVISOR	ADVISED	AADVISOR	ADVISED	AADVISOR	ADVISED	AADVISOR	ADVISED
IEVT	2.0187***		2.2497***		2.6091***		2.4796***		2.5837***	
	(8.328)		(10.328)		(12.453)		(16.865)		(17.193)	
ARSV	5.1639***		5.2333***		3.9839***		3.5343***		3.4162***	
	(6.085)		(9.646)		(6.714)		(6.444)		(4.271)	
PASTBBCAR	2.1963		-5.0816		19.1179***		-5.9822		-2.5912	
	(0.250)		(-0.662)		(5.184)		(-1.026)		(-0.733)	
RDS	0.0483**	0.4552***	0.0371	0.6153***	0.0463	0.4991***	0.0491**	0.7043***	0.0491***	0.6908***
	(2.026)	(3.540)	(0.907)	(4.750)	(0.946)	(4.343)	(2.284)	(6.301)	(3.301)	(5.944)
TADVISORTIER		0.6792***		0.4711***		0.6718***		0.6095***		0.5433***
		(7.554)		(6.245)		(5.125)		(9.020)		(8.383)
SCOPE		0.6219***		0.2434*		0.2324		0.1793*		0.2018*
		(3.603)		(1.780)		(1.517)		(1.700)		(1.838)
DEALS3YEARS		-0.0293		-0.0974**		-0.0879**		-0.0764***		-0.1112***
		(-0.658)		(-2.394)		(-2.547)		(-3.485)		(-5.977)
LOGME		0.0897**		0.1689***		0.1439***		0.1369***		0.1231***
		(2.517)		(5.115)		(3.884)		(5.295)		(4.533)
ATobinsQ		-0.1146		0.0625*		-0.0167		0.0067		0.0434
		(-1.305)		(1.851)		(-0.425)		(0.183)		(1.254)
AROA		0.9611		0.3615		-0.1522		0.3028		-0.3594
		(1.455)		(0.885)		(-0.434)		(0.962)		(-1.366)
ALEVERAGE		-0.0982		-0.7157*		-0.1101		-0.4577		-0.5053**
		(-0.199)		(-1.870)		(-0.401)		(-1.606)		(-1.981)
Constant	-2.8331***	-3.9499***	-2.8486***	-5.3898***	-2.9609***	-4.9128***	-2.8225***	-5.5379***	-2.8694***	-4.4093***
	(-47.943)	(-4.279)	(-54.311)	(-6.041)	(-19.817)	(-6.927)	(-98.524)	(-8.107)	(-117.403)	(-6.362)
Transaction variables	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
N	192,253	192,253	261,515	261,515	345,349	345,349	552,000	552,000	564,642	564,642
Number of acquirers	584	584	726	726	854	854	1,106	1,106	1,204	1,204
Chi²-statistic	120.07	120.07	248.13	248.13	479.41	479.41	392.04	392.04	307.75	307.75
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Chi²-statistic of exogeneity	0.6693	0.6693	0.2490	0.2490	0.8257	0.8257	1.9987	1.9987	0.0352	0.0352
p-value of exogeneity	0.4133	0.4133	0.6178	0.6178	0.3635	0.3635	0.1574	0.1574	0.8513	0.8513

Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table E (cont.): Annual regressions of the bivariate probit model with selection using IEVT and ARSV

	1996		1997		1998		1999		2000	
VARIABLES	AADVISOR	ADVISED	AADVISOR	ADVISED	AADVISOR	ADVISED	AADVISOR	ADVISED	AADVISOR	ADVISED
IEVT	2.6727***		3.3437***		3.4805***		3.4854***		3.1468***	
	(20.295)		(29.974)		(31.437)		(31.286)		(30.746)	
ARSV	4.2999***		3.5311***		4.3546***		4.6865***		4.7327***	
	(6.111)		(5.918)		(8.475)		(12.607)		(10.603)	
PASTBBCAR	7.7355*		2.1435		3.9442		-1.9013		8.3206***	
	(1.928)		(0.812)		(1.345)		(-0.724)		(3.264)	
RDS	0.0533***	0.6633***	0.0295***	0.7668***	0.0421***	0.6097***	0.0402***	0.5920***	0.0332**	0.5705***
	(4.708)	(6.770)	(3.138)	(7.593)	(3.543)	(5.884)	(3.770)	(7.132)	(2.263)	(5.717)
TADVISORTIER		0.6562***		0.7405***		0.6231***		0.6333***		0.6366***
		(10.697)		(13.560)		(12.433)		(12.078)		(12.811)
SCOPE		0.0658		0.1689**		0.0519		0.1722*		0.1641*
		(0.724)		(2.117)		(0.688)		(1.957)		(1.938)
DEALS3YEARS		-0.0569***		-0.0755***		-0.0456***		-0.0729***		-0.0525***
		(-3.511)		(-4.723)		(-3.712)		(-4.578)		(-4.890)
LOGME		0.1231***		0.1133***		0.0869***		0.0408*		0.0676***
		(5.199)		(4.789)		(4.063)		(1.740)		(3.404)
ATobinsQ		0.0034		0.0427**		0.0030		0.0062		-0.0067
		(0.155)		(2.328)		(0.124)		(0.382)		(-0.636)
AROA		0.9774***		-0.1556		0.0310		0.2872		-0.2574
		(3.284)		(-0.547)		(0.135)		(1.444)		(-1.198)
ALEVERAGE		-0.3869*		-0.4087*		-0.2930		0.1495		0.1700
		(-1.705)		(-1.824)		(-1.505)		(0.711)		(0.740)
Constant	-2.8988***	-4.6072***	-2.9389***	-4.5406***	-2.9431***	-3.9368***	-2.9465***	-3.3556***	-2.8779***	-3.5604***
	(-143.863)	(-7.066)	(-161.107)	(-7.308)	(-148.814)	(-7.067)	(-138.201)	(-5.367)	(-116.959)	(-5.705)
Transaction variables	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
N	698,139	698,139	1,029,784	1,029,784	936,819	936,819	738,045	738,045	610,242	610,242
Number of acquirers	1,336	1,336	1,611	1,611	1,594	1,594	1,414	1,414	1,356	1,356
Chi²-statistic	495.15	495.15	911.81	911.81	1,010.02	1,010.02	1,287.98	1,287.98	1,226.71	1,226.71
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Chi²-statistic of exogeneity	0.0215	0.0215	0.0127	0.0127	0.2384	0.2384	0.0560	0.0560	0.0527	0.0527
p-value of exogeneity	0.8835	0.8835	0.9101	0.9101	0.6254	0.6254	0.8129	0.8129	0.8183	0.8183

Robust z-statistics in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table E (cont.): Annual regressions of the bivariate probit model with selection using IEVT and ARSV

	2001		2002		2003		2004		2005		2006	
VARIABLES	AADVISOR	ADVISED	AADVISOR	ADVISED	AADVISOR	ADVISED	AADVISOR	ADVISED	AADVISOR	ADVISED	AADVISOR	ADVISED
IEVT	2.6662***		2.6005***		2.9079***		3.0204***		3.5282***		3.0170***	
	(23.504)		(21.720)		(24.003)		(25.702)		(29.062)		(25.696)	
ARSV	4.8596***		4.3229***		6.9158***		7.4151***		6.9560***		6.2553***	
	(8.729)		(4.671)		(6.758)		(12.258)		(14.011)		(11.024)	
PASTBBCAR	-0.3628		2.6015		12.5698***		0.0649		0.4407		-0.5900	
	(-0.151)		(0.593)		(3.259)		(0.018)		(0.087)		(-0.091)	
RDS	0.0411***	0.5558***	0.0312*	0.7527***	0.0728***	0.6153***	0.0433*	0.8454***	0.0516**	0.8229***	0.0868***	0.9451***
	(3.454)	(5.132)	(1.951)	(5.276)	(4.117)	(4.580)	(1.885)	(4.401)	(2.175)	(4.322)	(4.751)	(2.931)
TADVISORTIER		0.5842***		0.5862***		0.5318***		0.5457***		0.6759***		0.6724***
		(10.654)		(9.522)		(8.515)		(8.841)		(11.103)		(10.068)
SCOPE		0.2816***		0.0613		0.0475		0.0396		0.1550		0.1366
		(2.802)		(0.569)		(0.505)		(0.418)		(1.607)		(1.488)
DEALS3YEARS		-0.0305*		-0.0608***		-0.0363**		-0.0814***		-0.0914***		-0.0808***
		(-1.857)		(-3.168)		(-2.118)		(-4.223)		(-4.346)		(-4.294)
LOGME		0.0195		0.0755***		0.0654**		0.0793***		0.0910***		0.0559*
		(0.802)		(2.943)		(2.478)		(2.812)		(3.100)		(1.766)
ATobinsQ		0.0349*		-0.0089		0.0091		0.0204		-0.0136		0.0280
		(1.755)		(-0.315)		(0.205)		(0.652)		(-0.466)		(0.947)
AROA		0.2740		0.3386*		0.1080		0.1339		-0.0692		-0.2269
		(1.314)		(1.655)		(0.458)		(0.430)		(-0.209)		(-0.599)
ALEVERAGE		-0.1872		-0.0907		0.2641		-0.2708		-0.3993		-0.2703
		(-0.713)		(-0.353)		(0.951)		(-1.063)		(-1.461)		(-1.127)
Constant	-2.8667***	-2.5578***	-2.8321***	-4.1825***	-2.9012***	-3.3815***	-2.8623***	-4.2225***	-2.9278***	-4.3690***	-2.8779***	-3.2234***
	(-125.452)	(-3.602)	(-112.156)	(-5.502)	(-88.333)	(-4.820)	(-97.595)	(-5.478)	(-107.899)	(-5.521)	(-93.328)	(-4.256)
Transaction variables	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
N	435,552	435,552	388,360	388,360	377,556	377,556	466,032	466,032	551,928	551,928	523,692	523,692
Number of acquirers	1,087	1,087	1,030	1,030	1,002	1,002	1,049	1,049	1,087	1,087	1,112	1,112
Chi²-statistic	715.11	715.11	553.49	553.49	705.22	705.22	891.77	891.77	1,111.60	1,111.60	766.33	766.33
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Chi²-statistic of exogeneity	2.0404	2.0404	0.9361	0.9361	0.7846	0.7846	1.0338	1.0338	1.2172	1.2172	0.1842	0.1842
p-value of exogeneity	0.1532	0.1532	0.3333	0.3333	0.3757	0.3757	0.3093	0.3093	0.2699	0.2699	0.6678	0.6678

Robust z-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table F: Definitions, references and sources of variables

All financial statement variables are deflated to 1983 dollars using the annual CPI deflator of the US Bureau of Labor Statistics, stated in $1,000 and winsorized at the 1% and 99% percentiles. The debt-to-asset ratios are bounded between 0 and 1 to avoid outliers (D'Mello & Farhat, 2008; Frank & Goyal, 2009). The statutory corporate tax rates are from KPMG, the Institute of Fiscal Studies (IFS) and the World Tax Database of the University of Michigan's Office of Tax Policy Research.

Panel A: Dependent variables		Source
LEVERAGE_T	Target total debt / total assets (Huizinga, Laeven, & Nicodeme, 2008)	Amadeus & Orbis
ADJLEVERAGE_T	Target (total debt - accounts payable(creditors) - cash) / (total assets - accounts receivable(debtors) - cash) (Huizinga, Laeven, & Nicodeme, 2008)	Amadeus & Orbis
FINLEVERAGE_T	Target (long-term + current financial debt (loans)) / total assets (Frank & Goyal, 2009)	Amadeus & Orbis
Panel B: Target variables		
SIZE_T	Natural logarithm of total assets [ln(TASSETS_T)] (Frank & Goyal, 2009)	Amadeus & Orbis
TAR_T	Tangible assets/total assets (Titman & Wessels, 1988)	
CASH_T	Total cash/total assets (Wald, 1999)	Amadeus & Orbis
ROA_T	EBIT / total assets (Hovakimian, Oppler, & Titman, 2001)	
RnD_T	R&D expenses/total assets or 0 if missing (Uysal, 2011)	
MLEVERAGE_T	Median industry total debt / total assets in every (Fama & French, 1997) industry (Frank & Goyal, 2009)	Amadeus & Orbis
MADJLEVERAGE_T	Median industry (total debt - accounts payable - cash) / (total assets - accounts receivable - cash) in every (Fama & French, 1997) industry (Huizinga, Laeven, & Nicodeme, 2008)	Amadeus & Orbis
MFINLEVERAGE_T	Mean industry (long-term + current financial debt(loans)) / total assets in every (Fama & French, 1997) industry (Frank & Goyal, 2009)	Amadeus & Orbis
ASSET_GROWTH_T	$SIZE\_T_t$-$SIZE\_T_{t-1}$ (Frank & Goyal, 2009)	Amadeus &
INDEPENDENT	Dummy (0/1) if the target is an independent company (Erel, Jang, & Weisbach, 2012)	Zephyr
PRIVATE_T	Dummy (0/1) if the target is a private company (Harford, Klasa, & Walcott, 2009)	Zephyr
INFLATION_T	Inflation calculated from the annual consumer price index (Djankov, McLiesh, & Shleifer, 2007)	World Bank
AFTER_MERGER	Dummy (0/1) that is 0 for the years before the M&A completion year and 1 for it and afterwards (Erel, Jang, & Weisbach, 2012)	Zephyr
Panel C: Acquirer variables		
SIZE_A	Natural logarithm of total assets [ln(TASSETS_A)] (Frank & Goyal, 2009)	Amadeus & Orbis
TAR_A	Tangible assets / total assets (Titman & Wessels, 1988)	
CASH_A	Total cash / total assets (Wald, 1999)	Amadeus & Orbis
ROA_A	EBIT / total assets (Hovakimian, Oppler, & Titman, 2001)	
ALEVERAGE_A	Abnormal leverage as LEVERAGE_A - MLEVERAGE_A (D'Mello & Farhat, 2008)	Amadeus & Orbis
ASSETRATIO_T_A	SIZE_T / SIZE_A	Amadeus &

Table F (cont.): Definitions of Variables

Panel D: Tax variables		Source
STR_T	Statutory corporate tax rate in the target's country (Graham, 1996; 2000)	
STR_A	Statutory corporate tax rate in the acquirer's country (Graham, 1996; 2000)	KPMG, IFS, U Michigan
TAXDIFF_T_A	STR_T - STR_A	
TAX_INCENTIVE_T_A	(STR_T x TASSETS_T - STR_A x TASSETS_A) / (TASSETS_A + TASSETS_T) (Huizinga, Laeven, & Nicodeme, 2008)	Amadeus & Orbis
TAX_TANGIBLES_T_A	(STR_T x TAR_T - STR_A x TAR_A) / (TASSETS_T + TASSETS_A)	Amadeus & Orbis
TAX_ PROFITABILITY_T_A	(STR_T x EBIT_T - STR_A x EBIT_A) / (TASSETS_T + TASSETS_A)	Amadeus & Orbis
Panel E: Post-Merger variables		
TOTAL_ TANGIBLES_post	(TAR_T + TAR_A) / (TASSETS_T + TASSETS_A), 0 before the M&A completion year	Amadeus & Orbis
GROWTH_ COLLATERAL_T	ASSET_GROWTH_T x TOTAL_TANGIBLES_post	Amadeus & Orbis
UNRESTLOSS_T	Dummy (0/1) if the target's country allows unrestricted loss compensation against taxes of previously accumulated losses of acquired companies. It is 0 before the M&A completion year (KPMG Taxation of Cross-Border M&A reports 2012)	KPMG
NOLC_T	Net operating loss carry forward as accumulated negative EBIT before the M&A completion year (Frank & Goyal, 2009)	Amadeus & Orbis
LOSSFORWARD_T	UNRESTLOSS_T x NOLC_T	Amadeus
NOGROUPTAX_T	Dummy (0/1) if the target's country does not have group taxation (IBFD European Tax Handbook)	IBFD
FININV_RATIO_A	(TASSETS_T / TASSET_A) x FINANCIALINV_A	Amadeus & Orbis
FINANCEFIRM_A	Dummy (0/1) if the three digit SIC core code is 600 to 699 (Andrade & Kaplan, 1998)	Amadeus & Orbis
HOLDING_A	Dummy (0/1) if the acquirer is a holding company with "Hold", "Holding" or "Invest" in his name (Mintz & Weichenrieder, 2010; Hebous, Ruf, & Weichenrieder, 2011)	Zephyr
FINANCIALINV_A	Dummy (0/1) if the acquirer's SIC core code is 670 to 680 and HOLDING_A=1	Amadeus & Orbis

Table G: Definitions, sources and references of variables

The table describes the variables used in the analyses, their sources and references. Panel A shows the leverage variables. Panel B shows the capital structure variables. Panel C includes the control variables. Panel D includes the tax variables. All continuous variables are winsorized at 1% and 99%. F1 refers to period t=1 and L1 to t=-1 around t=0, the M&A completion year, with F as "future" and L as "lagged".

Panel A: Leverage variables		Source
LEVERAGE_T	Target total debt / total assets (Huizinga, Laeven, & Nicodeme, 2008)	Amadeus & Orbis
FINLEVERAGE_T	Target (long-term + current financial debt (loans)) / total assets (Frank & Goyal, 2009)	Amadeus & Orbis
ADJLEVERAGE_T	Target (total debt - accounts payable(creditors) - cash) / (total assets - accounts receivable(debtors) - cash) (Huizinga, Laeven, & Nicodeme, 2008)	Amadeus & Orbis
LEVERAGE_T_L1_F1	LEVERAGE_$T_{t=1}$-LEVERAGE_$T_{t=-1}$ (Harford, Klasa, & Walcott, 2009)	Amadeus & Orbis
FINLEVERAGE_T_L1_F1	FINLEVERAGE_$T_{t=1}$- FINLEVERAGE_$T_{t=-1}$ (Harford, Klasa, & Walcott, 2009)	Amadeus & Orbis
ADJLEVERAGE_T_L1_F1	ADJLEVERAGE_$T_{t=1}$- ADJLEVERAGE_$T_{t=-1}$ (Harford, Klasa, & Walcott, 2009)	Amadeus & Orbis
MLEVERAGE_T	Median industry LEVERAGE in every (Fama & French, 1997) industry (Frank & Goyal, 2009)	Amadeus & Orbis
MFINLEVERAGE_T	Mean industry FINLEVERAGE in every (Fama & French, 1997) industry (Frank & Goyal, 2009)	Amadeus & Orbis
MADJLEVERAGE_T	Median industry ADJLEVERAGE in every (Fama & French, 1997) industry	Amadeus & Orbis
LEVERAGE_T_target	Target LEVERAGE estimated with adapted regressions from table H (Kayhan & Titman, 2007; Graham & Harvey, 2001)	Amadeus & Orbis
FINLEVERAGE_T_target	Target FINLEVERAGE estimated with adapted regressions from table H (Kayhan & Titman, 2007; Graham & Harvey, 2001)	Amadeus & Orbis
ADJLEVERAGE_T_target	Target ADJLEVERAGE estimated with adapted regressions from table H (Kayhan & Titman, 2007; Graham & Harvey, 2001)	Amadeus & Orbis
ALEVERAGE_T	LEVERAGE_T-LEVERAGE_T_target (D'Mello & Farhat, 2008)	Amadeus & Orbis
AFINLEVERAGE_T	FINLEVERAGE_T-FINLEVERAGE_T_target (D'Mello & Farhat, 2008)	Amadeus & Orbis
AADJLEVERAGE_T	ADJLEVERAGE_T-ADJLEVERAGE_T_target (D'Mello & Farhat, 2008)	Amadeus & Orbis
LEVERAGE_T_ target_L1_F1	LEVERAGE_T_$target_{t=1}$-LEVERAGE_T_$target_{t=-1}$ (Harford, Klasa, & Walcott, 2009)	Amadeus & Orbis
FINLEVERAGE_T_ target_L1_F1	FINLEVERAGE_T_$target_{t=1}$-FINLEVERAGE_T_$target_{t=-1}$ (Harford, Klasa, & Walcott, 2009)	Amadeus & Orbis
ADJLEVERAGE_T_ target_L1_F1	ADJLEVERAGE_T_$target_{t=1}$-ADJLEVERAGE_T_$target_{t=-1}$ (Harford, Klasa, & Walcott, 2009)	Amadeus & Orbis

Table G (cont.): Definitions, sources and references of variables

Panel B: Capital structure variables		Source
SIZE_T	Natural logarithm of total assets [ln(TASSETS_T)] (Frank & Goyal, 2009)	
TAR_T	Tangible assets/total assets (Titman & Wessels, 1988)	
CASH_T	Total cash/total assets (Wald, 1999)	
ROA_T	EBIT / total assets (Hovakimian, Oppler, & Titman, 2001)	Amadeus & Orbis
RnD_T	R&D expenses/total assets or 0 if missing (Uysal, 2011)	
RISK_T	Standard deviation of [ROA_t - ROA_{t-1}] (Wald, 1999)	
ASSET_GROWTH_T	SIZE_T_t-SIZE_T_{t-1}	
EQUITYRATIO_T_A	Target's total equity / Acquirer's total equity	
Panel C: Control variables		
HOLDING_A	Dummy (0/1) if the acquirer is a holding company with "Hold", "Holding" or "Invest" in his name	Zephyr
FINANCIALINV_A	Dummy (0/1) if the acquirer's SIC core code is 670 to 680 and HOLDING_A=1	Amadeus & Orbis
FININV_RATIO_A	(TASSETS_T/TASSET_A) x FINANCIALINV_A	Amadeus & Orbis
FINANCEFIRM_A	Dummy (0/1) if the three digit SIC core code is 600 to 699 (Andrade & Kaplan, 1998)	Amadeus & Orbis
INDEPENDENT	Dummy (0/1) if the target is an independent company (Erel, Jang, & Weisbach, 2012)	Zephyr
PRIVATE_T	Dummy (0/1) if the target is a private company (Harford, Klasa, & Walcott, 2009)	Amadeus & Orbis
INFLATION_T	Inflation calculated from the annual consumer price index (Djankov, McLiesh, & Shleifer, 2007)	WorldBank
DIFF_IND	Dummy (0/1) if the target and acquirer are from different industries (Erel, Jang, & Weisbach, 2012)	Zephyr
CROSSBORDER	Dummy (0/1) if the target and acqurier countries differ (Erel, Jang, & Weisbach, 2012)	Zephyr
Panel D: Tax variables		
STR_T, STR_A	Statutory corporate tax rate in the target's and acquirer's countries (Graham, 1996, 2000)	
STR_T_L1_F1	STR_$T_{t=1}$ - STR_$T_{t=-1}$	KPMG, IFS, U Michigan
STR_A_L1_F1	STR_$A_{t=1}$ - STR_$A_{t=-1}$	
TAXDIFF_T_A	STR_T - STR_A	
TAXDIFF_T_A_L1_F1	TAXDIFF_T_$A_{t=1}$ - TAXDIFF_T_$A_{t=-1}$	

Table H: Annual tobit regressions of the leverage target

The dependent variables are LEVERAGE, FINLEVERAGE, and ADJLEVERAGE regressed annually on private and public companies with complete consolidate (C1 or C2) or unconsolidated (U1 or U2) balance sheets from the merged Amadeus and Orbis databases. Companies with negative total debt, negative total assets, total debt exceeding total assets or missing variables are excluded. The tobit regressions are adapated from (Kayhan & Titman, 2007) to private and public companies. The market-to-book ratio as proxy for expected growth is replaces by future expected asset growth (Graham & Harvey, 2001). The standard errors are corrected for heteroscedasticity with the Huber & White sandwich estimator (Huber, 1967; White, 1980). The variables are described in table G.

LEVERAGE	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
SIZE	0.0214***	0.0193***	0.0270***	0.0221***	0.0245***	0.0275***	0.0282***	0.0302***	0.0317***	0.0307***	0.0293***	0.0298***	0.0129***
	(41.585)	(45.977)	(119.227)	(204.044)	(251.797)	(306.152)	(322.105)	(364.098)	(419.616)	(424.798)	(407.017)	(394.719)	(39.265)
F1.ROA	0.0843***	0.0986***	0.0940***	0.0970***	0.0774***	0.0617***	0.0423***	0.0371***	0.0497***	0.0866***	0.0762***	0.0637***	0.1604***
	(16.251)	(20.296)	(35.069)	(78.489)	(74.202)	(65.541)	(46.191)	(43.702)	(66.937)	(124.176)	(101.876)	(81.897)	(67.142)
TAR	-0.0480***	-0.1380***	-0.1524***	-0.0737***	-0.0491***	-0.0459***	-0.0298***	-0.0216***	-0.0004	0.0079***	0.0120***	0.0182***	0.1801***
	(-12.124)	(-38.887)	(-75.026)	(-84.160)	(-63.978)	(-67.490)	(-45.545)	(-34.954)	(-0.697)	(14.853)	(22.935)	(33.407)	(78.605)
RnD	-1.1236***	-1.8824***	-0.6109**	-0.1888	-0.1231	-0.2176	-0.2066	-0.2328**	-0.3084***	-0.1175**	-0.0411**	-0.0111***	0.0217
	(-2.833)	(-4.109)	(-1.966)	(-1.163)	(-1.026)	(-1.474)	(-1.561)	(-2.117)	(-3.869)	(-1.962)	(-1.967)	(-2.918)	(0.320)
F1.	-0.0361***	-0.0259***	-0.0118***	-0.0088***	-0.0121***	-0.0262***	-0.0049***	-0.0092***	0.0029***	-0.0218***	-0.0235***	-0.0100***	-0.0479***
ASSET_GROWTH	(-15.242)	(-12.791)	(-10.225)	(-14.167)	(-22.273)	(-54.690)	(-10.895)	(-21.461)	(7.789)	(-56.168)	(-58.811)	(-23.867)	(-24.527)
MLEVERAGE	0.6039***	0.5121***	0.6369***	0.7109***	0.7179***	0.7245***	0.6517***	0.6629***	0.6627***	0.6422***	0.6223***	0.6336***	0.6218***
	(48.862)	(44.001)	(88.854)	(205.238)	(232.145)	(266.513)	(286.383)	(322.566)	(364.867)	(385.014)	(377.934)	(366.899)	(112.200)
Constant	-0.0382***	0.0915***	-0.0878***	-0.1083***	-0.1484***	-0.1948***	-0.1523***	-0.1902***	-0.2251***	-0.2021***	-0.1770***	-0.1934***	-0.0592***
	(-4.241)	(10.230)	(-15.236)	(-39.814)	(-62.594)	(-93.303)	(-83.027)	(-112.634)	(-152.357)	(-147.733)	(-132.519)	(-139.119)	(-11.480)
N	81,221	106,962	324,191	1,619,462	2,127,836	2,641,255	2,897,542	3,267,292	3,873,086	4,263,648	4,354,917	4,007,372	224,541
FINLEVERAGE	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
SIZE	0.0728***	0.0544***	0.0536***	0.0426***	0.0420***	0.0459***	0.0483***	0.0504***	0.0489***	0.0495***	0.0484***	0.0481***	0.0292***
	(83.226)	(106.986)	(199.404)	(352.827)	(391.332)	(429.943)	(485.359)	(532.381)	(510.939)	(541.705)	(526.210)	(495.948)	(68.218)
F1.ROA	-0.0079	-0.0053	-0.0587***	-0.0837***	-0.0606***	-0.0348***	-0.0557***	-0.0541***	-0.0092***	0.0360***	0.0223***	-0.0095***	-0.0075*
	(-0.712)	(-0.753)	(-15.967)	(-53.542)	(-45.281)	(-27.001)	(-47.153)	(-48.880)	(-8.635)	(37.180)	(21.614)	(-8.916)	(-1.869)
TAR	0.1223***	0.2027***	0.2038***	0.2459***	0.2358***	0.2577***	0.2406***	0.2366***	0.2549***	0.2617***	0.2558***	0.2713***	0.4534***
	(17.702)	(46.050)	(82.996)	(230.888)	(251.114)	(289.378)	(292.836)	(299.514)	(313.448)	(361.704)	(356.037)	(362.537)	(153.805)
RnD	-1.4035*	-2.3100**	-1.3232***	-0.5447***	-0.4482***	-0.4078***	-0.9887***	-0.7994***	-0.6476***	-0.7050***	-0.4844***	-0.0227	-0.1179
	(-1.939)	(-2.224)	(-3.636)	(-3.191)	(-4.327)	(-3.266)	(-5.808)	(-4.316)	(-3.450)	(-5.871)	(-6.619)	(-1.133)	(-0.854)
F1.	0.0060	-0.0214***	0.0178***	-0.0035***	-0.0387***	-0.0351***	-0.0392***	-0.0267***	0.0198***	-0.0314***	-0.0494***	-0.0198***	-0.0142***
ASSET_GROWTH	(1.297)	(-7.599)	(11.873)	(-4.459)	(-55.943)	(-53.575)	(-67.679)	(-48.188)	(39.608)	(-59.731)	(-90.416)	(-35.376)	(-5.435)
MFINLEVERAGE	0.7622***	0.3729***	0.3246***	0.4898***	0.5193***	0.4245***	0.5141***	0.5871***	0.5773***	0.5732***	0.5329***	0.4974***	1.1281***
	(11.367)	(8.654)	(13.688)	(49.155)	(60.561)	(49.740)	(76.539)	(101.579)	(95.692)	(103.219)	(94.996)	(83.831)	(46.722)
Constant	-1.0827***	-0.7436***	-0.7175***	-0.5953***	-0.5838***	-0.6745***	-0.6555***	-0.6947***	-0.6966***	-0.6961***	-0.6804***	-0.6719***	-0.5097***
	(-89.829)	(-100.218)	(-172.828)	(-300.461)	(-335.676)	(-408.759)	(-430.495)	(-481.921)	(-474.196)	(-496.870)	(-487.465)	(-460.663)	(-82.776)
N	53,832	95,265	294,343	1,393,106	1,832,660	2,392,203	2,689,244	3,031,917	3,051,845	3,632,773	3,666,001	3,311,534	164,322

Robust t-statistics in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table H (cont.): Annual tobit regressions of the leverage target

ADJLEVERAGE	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
SIZE	0.0350***	0.0272***	0.0392***	0.0305***	0.0325***	0.0387***	0.0389***	0.0408***	0.0477***	0.0456***	0.0429***	0.0441***	0.0337***
	(47.377)	(45.725)	(118.938)	(189.041)	(222.186)	(282.880)	(290.453)	(319.934)	(387.627)	(393.319)	(370.313)	(358.660)	(58.768)
F1.ROA	0.0131	0.0221***	0.0642***	0.0534***	0.0132***	-0.0266***	-0.0715***	-0.0876***	-0.0531***	0.0048***	-0.0403***	-0.0591***	0.0933***
	(1.554)	(2.882)	(14.939)	(26.173)	(7.469)	(-16.498)	(-44.534)	(-57.711)	(-37.388)	(3.654)	(-28.531)	(-39.848)	(17.798)
TAR	0.1327***	-0.0399***	-0.0318***	0.0919***	0.1338***	0.1265***	0.1555***	0.1570***	0.1595***	0.1720***	0.1813***	0.1890***	0.4595***
	(24.518)	(-8.498)	(-11.598)	(77.082)	(126.498)	(134.246)	(170.147)	(180.696)	(193.670)	(222.811)	(238.886)	(238.009)	(127.713)
RnD	-12.9333	-4.0403**	-0.7557**	-0.8222***	-0.4862**	-0.6657**	-0.2440	-0.3225**	-0.5054***	-0.2345**	-0.0675*	-0.0151	-0.1863
	(.)	(-2.120)	(-2.188)	(-2.664)	(-2.232)	(-2.368)	(-1.318)	(-2.181)	(-3.240)	(-2.401)	(-1.692)	(-1.636)	(-1.536)
F1. ASSET_GROWTH	-0.0478***	-0.0193***	-0.0005	0.0090***	0.0119***	-0.0130***	0.0241***	0.0125***	0.0160***	0.0063***	-0.0164***	-0.0033***	-0.0385***
	(-12.962)	(-6.333)	(-0.279)	(9.099)	(13.413)	(-16.549)	(32.422)	(17.239)	(24.160)	(8.927)	(-22.572)	(-4.330)	(-9.719)
MADJLEVERAGE	0.6571***	0.4509***	0.6827***	0.7024***	0.6843***	0.6517***	0.5578***	0.5692***	0.5292***	0.5238***	0.4910***	0.4895***	0.5403***
	(49.033)	(34.459)	(69.315)	(144.318)	(158.316)	(190.514)	(183.209)	(200.444)	(200.788)	(214.983)	(210.168)	(199.849)	(54.037)
Constant	-0.3328***	-0.0573***	-0.3542***	-0.3187***	-0.3487***	-0.4061***	-0.3675***	-0.4035***	-0.4846***	-0.4595***	-0.4146***	-0.4337***	-0.4944***
	(-32.387)	(-5.878)	(-51.977)	(-96.943)	(-123.386)	(-168.459)	(-165.235)	(-191.304)	(-248.463)	(-253.574)	(-235.158)	(-235.032)	(-60.094)
N	76,608	98,314	296,171	1,519,787	1,998,846	2,489,966	2,726,993	3,077,357	3,407,199	3,746,444	3,838,457	3,526,065	201,548

Robust t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1

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