Proximity preference in M&A transactions

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Abstract

This paper shows that acquirers have a strong and consistent preference for spatially close target companies. We measure proximity preference against benchmark portfolios of hypothetical targets for each deal, using data from US domestic mergers and acquisitions transactions. With increasing distance between acquirer and target transaction success diminishes significantly in the whole sample. However, deals that take place within 500 kilometers around acquirers' headquarters perform about one percentage point worse than deals at a medium distance. This finding is consistent with proximity-related overconfidence and private benefits for the acquiring management.

JEL Classification: G34, G14, R12

I. Introduction

This paper shows that acquirers have a preference for geographically proximate target companies even in domestic transactions. We use a sample of US M&A-transactions between public firms from 1990 to 2004. More than 20 percent of these transactions take place within 100 km around the acquirers' headquarters. The problem with asserting a proximity preference in M&A transactions, however, is the fact that most economic activity is far from evenly distributed in space but clustered in a few areas. For example, a Silicon Valley-based software firm that buys another software firm close by may have few other choices because of the high degree of agglomeration of software firms. Therefore, we construct a hypothetical portfolio of potential targets for each deal and then compare the average distance to this portfolio with the distance to the actual target. The potential targets are similar to the actual one in terms of industry and size and have also been listed at a stock exchange. We find that acquiring firms pick targets that are about 18 percent or 270 km closer than the average potential target. This proximity preference is robust against different sample sizes, different minimum sizes for the potential portfolios, whether we include private firms, the use of travel time instead of physical distance, and control for various firm and transaction characteristics.

There are at least four non-mutually exclusive theoretical arguments that substantiate the propensity for firms to merge locally: (1) better realization of synergies, (2) better monitoring of near targets, (3) more and better information about firms in proximity and (4) local private benefits. The first three arguments all point to the same hypothesis that proximate deals should yield better results than transactions with targets farther away. This hypothesis is also analyzed by two parallel papers with similar approaches. Kedia et al. (2005) analyze the influence of distance on acquirer returns while Eun and Mukherjee (2006) focus on distance and state anti-takeover laws and their impact on the probability of choosing a target. For our whole sample, we arrive at roughly the same results as these authors: We find that the success of deals, measured by an event-study using the joint cumulative abnormal returns in a three-day window around announcement date, decreases significantly with increasing distance. The best 25% of the deals in our sample show a cumulative abnormal return (CAR)

within three days of announcement of 9.9%, a median distance between target and acquirer of 814 kilometers, and a median proximity preference of 230 kilometers. In contrast, the worst 25% of the deals are associated with a CAR of -9.9%, a median distance of 1,506 kilometers and a median proximity preference of only 64 kilometers. Distance matters for success.

In contrast to Kedia et al. (2005) and Eun and Mukherjee (2006) we find a non-monotic relationship between distance and success: The best deals are *not* those that take place in close proximity. A 10-percent moving average of the CARs reaches a first minimum with -0.65% at about 50 kilometers. The first maximum with an average CAR of more than +2.0% occurs only when the targets are about 500 kilometers away from the acquirers' headquarters. We estimate success of proximate deals with factor loadings from regressions with deals farther away and find that proximate deals yield about 1 percentage point less success than expected. We relate this to two arguments that yield the same predictions. There might be private benefits for the management when acquiring nearby companies, e.g., getting a higher local status, being away less from home or just enjoying a "quiet life" (Bertrand and Mullainathan 2003; Berger and Hannan 1998). Our findings are also in line with managers who are overoptimistic, i.e., they tend to believe that projects under their control are less risky than it is actually the case. Potential targets to which one can just drive to could evoke the illusion of control and thus lead to overconfident evaluations of the common future's prospects, much in line with Roll's (1986) 'hubris' hypothesis. Acquiring managers will get information about nearby targets via their local networks. Individuals tend to overweigh information that stands out and captures attention, and underweight abstract, statistical information. Our analysis is further backed by the fact that common explanatory variables for M&A success such as payment in cash or buying targets in the same industry do not yield significant coefficients for proximate deals – but do so for more distant ones. This is what we would expect when local deals are different from far ones in terms of incentives and decision processes. We conclude that examining proximate potential targets even more thoroughly might be a good advice to acquirers' boards.

The rest of the paper is organized as follows: We provide a literature review and discuss our hypotheses in section two. Section three contains a description of the data and the methodology used for this study. We establish a proximity preference for M&A transactions in section four. Empirical results on the impact of distance on joint abnormal returns comprise section five; section six concludes.

II. Literature overview and hypotheses

II.A Home bias

The international home bias in equity holdings is a long established fact (see Lewis 1999 for an overview). Informational advantages have been identified as main drivers (see e.g., Gehrig 1993; Dvorák 2005; Ahearne et al. 2004; Chan et al. 2005; Buch and Delong 2004). Rossi and Volpin (2004) and others find that M&A activity is higher between countries that are spatially close to each other. There is strong evidence for a home bias in several financial activities also on a domestic level, also attributed to informational advantages of being close: Individual investors prefer picking stocks of firms nearby (Grinblatt and Keloharju 2001a, b) and high-frequency stock trading returns of professional traders are positively correlated with proximity to the headquarters of firms (Hau 2001). Fund managers invest more in firms close by (Coval and Moskowitz 1999) and get higher returns when doing so (Coval and Moskowitz 2001). This correlation manifests an effect on the availability of firms to financial means. Loughran and Schultz (forthcoming) find that firms located in rural areas (i.e., far away from most of the investors) trade less, have higher trading costs, and wait longer before going public (Loughran and Schultz 2006). However, Berger et al. (2000) compare bank efficiency and do not find any disadvantages for domestic US banks operating in regions where they are not headquartered. They conclude that physical distance itself does not matter a great deal within banks. Mian (2006) shows that firms located farther away from a bank's headquarters have more difficulties in obtaining loans. Generally, these effects tend to be stronger for small or otherwise opaque firms than for large firms.

II.B Economic reasons for merging close

A couple of arguments underscore the notion of a proximity preference in mergers and acquisitions transactions. The first string of arguments deals with synergies, and transaction and transportation costs. Efficiency gains or synergies are among the most cited reasons for M&A transactions. Local synergies might occur in terms of transport costs between production sites, common inventories management, common use of buildings and utilisation of machinery and, more importantly, in allowing reorganisation of departments locally. The more operational interaction between the two firms the higher the savings; thus deals within an industry are more likely to profit from synergies. However, the realisation of any synergy potential is tremendously helped by being located closely to one another. In M&A transaction there is a high degree of uncertainty about new employees and the learning about the other party's informal structures and processes becomes necessary. Numerous site visits, senior executive meetings, management presentations and staff exchanges during the post-acquisition integration process and beyond are necessary to allow for face-to-face contacts (see Storper and Venables 2003). This is exemplified by a recent paper by Landier et al. (2006) who show that employees located farther away from the new headquarters are more likely to be dismissed after a merger.

A related argument emerges about monitoring. Monitoring actions and people located close by is easier; increasing distance leads to additional costs that Berger and Deyoung (2006, p. 1485) term 'agency costs of distance': Local managers at distant locations might find it easier to pursue their own goals instead of those of the organization. Böckerman and Lehto (2006) find evidence for the monitoring hypothesis as a driving factor of proximate mergers in Finnish data; as do Berger and Deyoung (2006) for monitoring within large banks; venture capital firms do invest predominantly in firms located close to them for this reason (Lerner 1995; Zook 2002; Sorenson and Stuart 2001). It might be easier to assess people in the same industry from a distance but it is also more necessary because of the higher level of integration. Thus, we cannot infer a distinction in the need for face-to-face contacts for diversifying and consolidating deals. In general, direct transport and other 'transaction costs' (especially the opportunity costs when traveling from one site to another), are considerably lower when the two firms are located close to each other. We would

expect more deals close by and better reactions from capital markets to these deals than to deals farther away.

The third argument revolves around the now well documented 'soft information' that is only available in close spatial proximity to a particular firm (see Liberti and Mian 2006). Malloy (2005) shows that analysts' forecasts are significantly better when located closer to firms' headquarters. More information about a firm occurs in local newspapers and other media. Investors are able to talk to managers, employees, as well as suppliers and clients of the firm. These sources provide (tacit) information which is not easily transferable over distance, e.g., mood, unquantifiable (or non-quantifiable) feelings about the future, etc. (Coval and Moskowitz 1999; Polanyi 1958; Storper and Venables 2004). Thus, when investing nearby, investors have a better understanding of a firm than when relying only on 'hard' information available over distance, e.g., annual statements or other written reports. Gathering information locally is more important when there is otherwise little information about the target firm: Since acquirers that are buying firms in the same industry arguably have greater knowledge about their industry anyway, one would expect a stronger proximity preference in diversifying deals.[1]

All these arguments outlined so far suggest that we should see more firms merging in proximity, which constitutes our first hypothesis. There is more information about the target available in the first place, potential synergies are easier to realize, the 'agency costs of distance' are smaller afterwards and eventually one can form a regional monopoly. All of these arguments come up with the same predictions: We hypothesize, secondly, that closer transactions are more successful than deals with firms located farther away.

II.C Behavioral aspects

Firms, or rather their managers, might have other reasons to acquire firms close by that could reduce rather than enhance the success of such a transaction. Private benefits for managers are more likely to be present when target and acquirer are close

[1] The latter is in contrast to a fourth but weaker argument in favor of proximate deals, the possible establishment of local monopolies. Assuming that both firms primarily produce and sell where they are headquartered, buying a nearby competitor could weaken local competition and increase profits. Since our sample contains only listed firms as acquirers and targets most of the acquiring firms are large – the probability that they sell predominantly where they are headquartered is rather small.

to each other. For instance, the local status of the acquiring CEO might increase and members of the CEO's local network might be given new jobs. Also closer targets come along with less traveling and less time spend away from home. This is in line with Bertrand's and Mullainathan's (2003) argument that CEOs prefer to work less hard and enjoy a 'quiet life'. Liu and Yermack (2007) report that CEOs buy large houses close to their firms' headquarters. Concerned about local status they might also refrain from restructuring newly acquired firms in close proximity sufficiently. In a recent paper, Landier et al. (2006) find that CEOs are more reluctant to dismiss people in plants closer to their headquarters. Another argument leads to the same predictions: Managers' overconfidence in their ability to perform a successful transaction (Malmendier and Tate 2006) might be triggered by proximate targets. Langer (1975) points out that individuals are most optimistic about outcomes that they assume to be under their control. Similarly, March and Shapira (1987) report that managers tend to believe projects under their control are less risky than is actually the case. Individuals tend to overweigh information that stands out and captures attention; vivid information such as scenarios and salient examples are regarded more than abstract statistical information (Kahneman and Tversky 1973; Clark and Rutter 1985). Odean (1998, p. 1894) states: 'In general then, we might expect people to overreact to less relevant, more attention-grabbing information […] while underreacting to important abstract information'. Local targets are highly visible and vivid information about them is available via local networks and own experience. An acquisition of a target that is known by name since long and is close enough to 'see and touch' could evoke the feeling of control more easily than a target that needs a day's trip to visit. Anecdotal evidence from talks with managers pursuing M&A transactions confirms this notion: Close targets are regarded as 'premier' and 'natural' choice when considering acquisitions. These strands of arguments lead to the third hypothesis; i.e., closer deals will perform worse than deals with more distant targets.

A fourth hypothesis evolves around the predictability of success in close transactions. When managers choose local targets for private benefits or proximity-induced overconfidence rather than for economic reasons we expect not only to see worse results in general but also diminishing explanatory power of predictor variables for the transaction's success. Standard variables are buying firms in the own industry (positive influence on success), paying with cash (positive) or paying with own shares (negative). Rappaport and Sirower (1999) state that confidence in the success of the

transaction is signaled by paying in cash instead of using own shares. For more distant targets, where arguments of local private benefits are not relevant, these variables should yield more explanatory power.

According to this line of reasoning deals with targets in close proximity should be less successful than deals with targets that are farther away. This is in contrast to the second hypothesis from above which states that closer deals should yield better results. The question of which effect will be stronger is essentially an empirical one and is subject of our analysis. Monitoring and the realization of synergies are related to the frequency and easiness of site visits; these should have a continuous impact on success over longer distances. In contrast, the distance in which superior soft information about the target is available – that would lead to superior results – is probably rather small. We have no strong prediction concerning the spatial distance to the acquirer in which managements' local private benefits and overconfidence would influence outcomes of M&A transactions. We conjecture that the threshold distance between acquirer and target sufficient to suppress overconfidence is related to some degree of 'familiarity' (Huberman 2001) with the firm and the ability to reach the target at short notice.

III. Methodology

III.A Methods

All strands of arguments above point towards a distinctive proximity preference in M&A transactions. To approach the first hypothesis, that there are more deals in proximity than far-off, we first look at the histogram of deal distances. Finding more deals in close proximity, however, is not sufficient to state a proximity preference: First, a small distance between acquirer and target could, e.g., just be a product of clustered economic activity of industries in space. Industry clustering appears to be an almost ubiquitous finding (see Ellison and Glaeser 1997, and Krugman 1991 for the US; Midelfart-Knarvik et al. 2000 for the EU). Second, a proximity preference or 'home bias' is usually established by comparing an observed portfolio against a sometimes adjusted market portfolio (Dahlquist et al. 2003; Coval and Moskowitz 1999). To analyze whether there is a proximity preference, the distance to the observed in-

vestments is compared to the average distance to all assets in the portfolio. For M&A transactions, however, there is no obvious market portfolio but only separate deals.

To create a benchmark we construct a portfolio of hypothetical target firms for every single acquirer. We then compare the distance between the headquarters of acquirer and target in the observed deal with the average distance between acquirer's headquarters and all possible targets' headquarters in the portfolio. When the actual acquisition takes place at a distance shorter than the average distance to all potential targets in the portfolio, there is a proximity preference in this deal. Obviously, the choice of the potential targets is of outmost importance here. We perform a variety of robustness checks by varying the potential targets eligible for the portfolios. We also compute distances between firms in different ways to control for traveling time instead of physical distance. The construction of the potential portfolios allows us to overcome clustering problems, since in that case most of the potential targets will also be in the cluster – just buying in short distance does not necessarily reflect a proximity preference. In addition to the portfolios and as a robustness check we perform a matched pair analysis in which we examine the impact of distance on the likelihood of being an actual target. For this, we identify exactly one other potential target for each deal. We then compare the distance to the actual target with the distance to the potential target as well as other control variables to care for differences between firms.

To test hypothesis two, the overall negative influence of increasing distance between acquirer and target on transaction success, we conduct an event study on the stock market reactions to the deals around announcement date. We compare the characteristics – especially the distance and the proximity preference measures – between the best and worst deciles of the deals in our sample. We further perform an analysis of the influence of distance on the cumulated abnormal returns around announcement date by means of a least squares regression. We control for other variables known to have an influence on success like the method of payment, firm characteristics and different measures of distance. As robustness checks, we run the same regressions for different samples as well as with industry and year fixed effects to control for industry-specific characteristics and possible effects of merger waves.

We test hypothesis three and four, the influence of proximity-induced overconfidence on success, by first plotting the rolling average success over distance. We test

whether short distances yield significantly lower returns than medium distances. We run the same regressions as before on different sub-samples to check whether the coefficients and explanatory power change with distance. We again control for firm and year fixed effects and run the same analysis for different samples. To estimate the possible losses that could be attributed to overconfidence or private benefits we run a regression only on deals farther away and use the resulting coefficients to estimate success for the deals closer by. We check for significance of the difference between estimated and observed returns for deals in close proximity.

In general we include firm and deal characteristics that could potentially influence success of transactions and choice of targets as control variables in our analyses. Following Kang and Stulz (1997) and Coval and Moskowitz (1999) we include target financial leverage LEV as the target's ratio of total liabilities to total assets, price-to-book ratio P/B as the ratio of the target's market price to its book value and the return on assets RoA as the ratio of net income to total assets. We also use the method of payment for control variables according to findings of Rappaport and Sirower (1999) and Andrade et al. (2001). Also we control for firm sizes of acquirer and target, respectively (Moeller et al. 2004) and whether the acquisition is consolidating or not, i.e., in the same industry on a four-digit SIC level (e.g., Berger and Ofek 1995).

III.B Data

Our primary data source is the Thomson ONE Banker Deals database which lists M&A transactions worldwide. Our sample consists of mergers and acquisitions with an effective transaction date from the beginning of 1990 until the first quarter of 2004 in cases where both acquirer and target are located in the US and are publicly listed at an US stock exchange. We exclude Alaska, Hawaii and Puerto Rico and count the District of Columbia as a state; however, robustness checks including the remote states did not alter the results qualitatively. Only those transactions are included in which more than 50% of all shares are acquired as well as the location of both, acquirer and target, are known. We also exclude financial industries (Standard Industrial Classification Code SIC 6000 to 6999) because the spatial choice of targets is heavily influenced by regulatory constraints. We match this dataset with Center for Research on Securities Prices (CRSP) data to add information on the market value of acquirer and target companies. Similar to Coval and Moskowitz 1999 we include firm

characteristics on leverage, price to book ratio and return on assets for the target company from S&P's Compustat database. We exclude all records with missing data and reduce the dataset to its common sample of 954 transactions. As a final step we identify other publicly listed companies that could have been alternative targets for each respective acquirer, in terms of same industry and similar size as the original target. We will explain details of the identification process later in this paper. This last restriction leads us to our basic sample of 545 transactions on which we will focus in the rest of this paper. We compute the target to acquirer distance (TAD) as the direct distances between headquarters of the acquirer and target with data from the US census bureau on the city level. We do not use the state of incorporation for measuring distances because firms choose their incorporation because of tax, bankruptcy or takeover law without necessarily having any physical presence in that state. (Most firms are incorporated either in their home state or in Delaware; see Bebchuk and Cohen 2003).

Table 1 reports the summary statistics for the main variables of our dataset including mean, median, standard deviation, and 25% and 75% percentiles. The upper half describes our main sample with 545 transactions whereas the lower part reports the broader 954 sample. The two sample sets do not differ much in their qualitative characteristics. The target to acquirer distance TAD is measured in kilometers and has an average of 1495 kilometers in the smaller sample. The market values of target (TgMV) and acquirer (AqMV) are reported in million US Dollars. With an average market capitalization of $521 million the targets are considerably smaller than the average acquirer with a mean of $17,844 million (small sample).

Traffic volume and density incline with the size of the regional economy. As proxy for regional economic activity we use the gross metropolitan product, GMP measured in billion US Dollars, of the area surrounding the respective companies; the variables are AqEco for the acquirer and TgEco for the target. Metropolitan and micropolitan statistical areas are defined by the U.S. Office of Management and Budget (OMB) and are taken from the Bureau of Economic Analysis (BEA) website. The respective GMPs stem from the 2006 report of The United States Conference of Mayors and are figures of 2001. For firms that are not located in one of those areas we take the county's gross domestic product as a proxy for local economic activity. Throughout our regression analyses we control for the local GMPs of acquirers and

targets, respectively, to proxy for travel distance. Additionally, we use the GMPs more directly to construct a travel-time related distance measure in chapter four.

Also, the industry compositions of the two samples are not very different. Table 2 lists our basic sample (n=545) at the top and our extended sample (n=954) at the bottom; next to the SIC code the name of the industry and the number of transactions within this industry are printed. 'Services-Prepackaged software' is the most active industry in our sample, followed by 'semiconductors and related devices', 'crude petroleum and natural gas' and 'computer integrated systems design'. The average distance between target and acquirer range from less than a thousand kilometers to more than two thousand kilometers. In the upper half we list also the average proximity preference per industry and the average portfolio size (the concepts will be explained in detail in chapter four). As there are noticeable differences between industries we control for industry effects based on Fama and French (1992) industries throughout the paper.

Our sample lasts from 1990 to the first quarter of 2004. Table 3 lists the distribution of transactions per year for both samples. Not surprisingly, most activity takes place in the merger wave starting in the mid-nineties and fading out in 2002. Average distances between target and acquirer (TAD) show no particular trend in both samples throughout the years. Also the proximity preference (avg. PP) does not follow a clear trend. Average portfolio sizes, however, tend to become larger over time: More firms similar to the target firms are listed on stock markets over the years. We control for year effects throughout our regression analyses.

IV. Proximity Preference

We first look at the actual distances between acquirer and target in our sample. Figure 1 displays the frequency of transactions at varying distances. The most stunning feature of this frequency distribution is the prevalence of transactions that take place within a 100 kilometer distance between acquirer and target; more than 20% of all acquirers choose targets within that radius. The greater the distance, the fewer transactions occur. The distance between the East and West coasts is a small but noticeable exception at roughly 4,000 km. The average distance between acquirer and target is 1,495 km; the median deal has a distance of 1082 km.

The concentration of deals in proximity to the acquirer, however, does not necessarily indicate a proximity preference. Therefore, we construct portfolios of potential target firms for every acquirer in our sample. We then compare the distance between the headquarters of acquirer and target in the observed deal with the average distance between acquirer's headquarters and all possible targets' headquarters in the portfolio. In order to be eligible as a hypothetical target, firms have to conform to several requirements. We assume that acquirers seek firms in specific industries to complement their production portfolio and thus we base our peer companies on industry specification. While some large firms occasionally might buy 'a bargain' in any industry, this is not the standard practice. Therefore, a hypothetical target has to be active in the same industry as the observed target (at the 4-digit SIC level). We also run an analysis at the 3-digit SIC level and with the Fama and French (1992) industry classification of 48 different industries without having the results changing qualitatively. Only the 4-digit SIC level results are presented here. To be included in the hypothetical portfolio, firms have to be listed on a stock exchange at the time the transaction took place, assuming that all listed firms are actually able for sale. For a variety of reasons we only assign firms of similar size as the original target to the potential portfolio. Financing or budget constraints might hinder acquirers to go for much larger transactions; strategic reasons make up for a certain minimum size, and different integration strategy would be needed for firms of very different sizes. After accounting for the potential premium firms are considered eligible for a potential portfolio when they are valued in the range of +/- 20% around the price paid for the observed target. We include an average acquisition premium of 20% in our calculations to calculate the range of possible values, the average premium for our sample as in most of the literature. This algorithm leaves us with a portfolio of hypothetical targets that are quite similar to the chosen target in terms of industry, size and availability. Of course, M&A transactions are highly idiosyncratic. Acquirers may shop for bargains, trying to enter specific regional markets, or look for certain capabilities or other "fits" – in theses cases the correct hypothetical target portfolio may be smaller than suggested here. Nevertheless, it seems unlikely that these idiosyncrasies bear a systematic bias towards far or proximate targets.

We find at least one potential listed target for 545 transactions. One potential target results in a minimum portfolio size of two, since the actual target is included in the portfolio as well. We calculate the home bias variable PP_i of each deal i as the differ-

ence in kilometers between the average distance to all (n_i-1) hypothetical targets j of the portfolio i ($PTAD_{i,j}$) in the portfolio plus the distance to the actual target on the one side and the actual distance between acquirer and target (TAD_i) on the other:

$$PP_i = \frac{TAD_i + \sum_{j=1}^{n_i-1} PTAD_{i,j}}{n_i} - TAD_i$$

With these specifications, PP_i reveals information about the spatial proximity preference for every M&A transaction. A positive value for PP_i means that the actual target is closer to the acquirer than the average possible target, i.e., the acquirer displays a proximity preference. Negative values occur when the realized target is farther away from the buyer than the average hypothetical target. Summarizing all the deals, we would expect a mean value of zero when the choice of the buyer is spatially indifferent. Figure 2 shows the frequency distribution of the proximity preference variable PP_i for a portfolio size of at least 2 targets, i.e., 1 potential listed target and the actual target.

The frequency distribution is asymmetrical with a mean proximity preference of 267 kilometers: On average, acquirers choose targets that are 267 kilometers closer than the average distance to all potential targets in the portfolio. The median takes a value of 232 kilometers: half of the acquirers select a target that is at least 232 kilometers closer to them than the average distance to their hypothetical portfolio. We also split the sample into diversifying and consolidating deals. Diversifying deals show a stronger proximity preference; on average the value is 359 km (median 407 km) for diversifying as opposed to an average of 235 km (median 174 km) for consolidating deals. However, the difference is not statistically significant. Since the portfolio size as the reference against which the proximity preference is measured could influence our results we do the same calculations for several portfolio sizes as a robustness check. In Table 4 we report the hypothesis tests for the average proximity preference PP_i being greater than zero, the average transaction distance in these portfolios and the proximity preference in per cent of the average transaction distance.

All average proximity preferences are significantly greater than zero. Increasing the minimum portfolio size reduces the sample. It increases, however, the informative value since the distance of the actual deal is now measured against an average of

more potential targets. With increasing portfolio sizes the proximity preference measure gets stronger, up to more than 400 kilometers for portfolios of five potential targets and more. The mean target-to-acquirer distance (TAD) remains almost constant at around 1500 to 1600 kilometers. On average, targets are between 18 and 29 per cent closer to the acquirer than to the mean distance of the potential targets' portfolios. The proximity preference is not only statistically significant; it is also quite noticeable in terms of differences in spatial distance.

Potential portfolios yield a variety of benefits where pure deal distances could be misleading. Our approach is similar in spirit to gravity models that are able to explain trade flows between countries to a great extent (see Leamer and Levinsohn 1995 for an overview). In contrast to gravity models the portfolios capture the a priori attractiveness of a certain target region correctly when industries are spatially clustered within a country; they are thus better suited to measure proximity preference in M&A transactions. For example, an advertising firm from New York that buys another advertising firm in New York might not display a large – if any – proximity preference since most other available advertising firms in the portfolio are also New York-based.

We define location by a firm's headquarters because this is where the decision makers are located, which is of pre-eminent interest for us. Interviews with industry specialists and decision makers in large firms indicate that managers at the plant level usually do not have the final say in the decision of which firm to buy. Although listed, most of the targets in our sample are smaller firms that do not have large branches or several production units, so the problem of location measure is rather small for them. In contrast, many acquirers in this sample are large and their economic activity is not concentrated in one place. Here, searching for potential targets, integration and local synergies may occasionally take place on plant instead of headquarters' level. In this case measuring proximity preferences by the distance between target and acquirer headquarter locations conservatively *underestimates* any proximity preference.

Neither all potential targets are listed nor are all potential acquirers; most M&A transactions taking place between non-listed firms. As a robustness check we therefore construct a broader set of potential portfolios in which we also include non-listed acquirers and non-listed potential targets that have been a target in another

M&A transaction at around the same time the observed deal took place. Thus, we are able to include all the private firms that have been bought in M&A transactions and hence would have been available as possible targets for the acquirer in the observed deal. Practitioners state that a typical pro-active acquisition process lasts about six to twelve months, with the strategic decision taken typically less than a year before the process starts. Therefore we include a firm that has been a target in another deal in the hypothetical portfolio if it has been a target up to 18 months in advance to the observed deal, as it could have been potentially bought by the acquirer. Firms that have been targets up to 18 months after the observed deal took place are included, since we assume that these firms were already 'on the market' at the time of the deal. Again, we consider firms that have been a target in other transactions with known transaction volume to be about the same price when they have been sold in the range of +/- 20% around the price of the observed target. There are more than 11,000 deals for which we find at least one additional hypothetical target. The average proximity preference for these deals is 330 kilometers. For 1005 transactions we are able to construct portfolios with at least 29 hypothetical targets; these acquirers exhibit an average proximity bias of 453 kilometers. Again the proximity preference is significantly greater than zero in all cases. Acquirers' proximity preference for small portfolio sizes is higher when we include private deals, indicating that private deals are associated with smaller distances than deals of publicly listed companies. At 453 kilometers the average proximity preference of this group gets very similar to the one when we have only publicly traded firms in our sample with larger portfolio sizes (see. last row in table 4).

Ultimately, what people are interested in are not spatial distances per se but the costs (and time) to overcome them. These costs increase in distance and decrease in the size of the local economic activities surrounding target and acquirer, respectively: For instance large cities are better accessible in terms of the number and frequency of flights, connecting flights and highway connections. We control for local economic activity in addition to distance in our further analyses to proxy for the easiness of travel between two cities. But we also use the local economic activity more directly to construct a second proximity preference measure that includes the easiness of travel. For that we correct all distances between acquirer and (potential) targets to include the travel easiness between two cities. We measure all city pairs in relation to

the largest city with the arguably best travel connections according to the following formula:

$$CTAD = TAD\left[1-\lambda\frac{\frac{1}{2}\left(\ln\left(GMP_{Target}\right)+\ln\left(GMP_{Acquirer}\right)\right)}{\ln\left(GMP_{NewYork}\right)}\right]$$

CTAD is the corrected target to acquirer distance; TAD the physical target to acquirer distance; $\ln(GMP_i)$ the log of the local gross metropolitan product of target, acquirer and the largest US city, New York, respectively. The factor λ is a weight for the distance compression which could run from 0 to 1. With λ equal to zero the corrected distance would equal the physical distance. CTAD is increasing in the physical target acquirer distance and decreasing in the average logarithmic size of the two local economies relative to New York's local GMP. When the acquisition will take place within one city TAD and CTAD are zero. Transactions where target and acquirer are located in small areas will experience no or little distance compression, while distances between large cities are compressed up to the weighing factor λ. We choose λ to reflect the grade in which the physical distance is compressed due to travel connections. In order to clearly distinguish CTAD from the pure physical distance we set λ=.85 as our benchmark. Our corrected distance measure is similar to travel time but also reflects higher frequency of travel connections between larger cities.[2]

With this new benchmark the distances between acquirers and targets in the actual deals lead to an average corrected CTAD of only 576 kilometers, down from 1495 km physical distance; the corrected median is 431 kilometers, down from 1082 km. The reduction reflects the fact that, not surprisingly, most firms are located in large cities. In addition, the distances contained in the hypothetical portfolios are also recalculated the same way. The corrected mean proximity preference is now 99 kilometers, the median 78 kilometers. Again, the mean is significantly different from zero with a t-value of 4.83. The proximity preference is still more than 17% of the cor-

[2] An example illustrates our approach: New York City and Los Angeles are 4500 kilometers away from each other. Between the cities there are about a hundred non-stop flights (one way) per day with a travel time of roughly 6 hours. The GMP surrounding NYC and LA are 800 billion USD and 489 billion USD, respectively. On the other hand, Albuquerque, NM (GMP=24 billion) and Omaha, NE (GMP=27 billion) are only 1430 kilometers away from each other. Without any non-stop flights being available the average flight time between them is five and a half hours, with about 30 one-stop flights per day. With λ=.85 the corrected distance CTAD of NYC-LA is 816 kilometers and the CTAD of Albuquerque-Omaha is 840 kilometers, reflecting the similar travel time as well as the different frequency of travel connections.

rected average distance to the portfolios; this is very similar to the value of the uncorrected distances in table 4. As before, the proximity preference and the percentage figure increase when we exclude transactions with small hypothetical portfolios. Assigning smaller values to λ delivers intermediate results and does not change the proximity preference in percentage of distance in comparison to table 4, last column. The finding of a proximity preference measured with the help of the hypothetical portfolios thus remains robust when we calculate distances that are corrected by an 'easiness of travel' measure similar to travel time.

In rare cases the construction of the hypothetical portfolios might state a proximity preference when in fact there is none. Consider an industry with 90 percent of the potential targets located in San Francisco and 10 percent of the firms in the hypothetical portfolio located in Boston. If a San Francisco-based bidder only does one bid randomly, it is very likely to choose a local firm, and it will display a positive – but rather small – proximity preference. Now, if the bidder were to choose ten targets, then this would balance out because nine of them would have small positive preferences and one of them would have an exactly offsetting big negative preference. However, there will only be one transaction of this kind by one acquirer. If the sample of transactions is sufficiently large this bias should be normally distributed and cancel out over all transactions. When the number of observations is too small we might state proximity preference were it doesn't exist. To avoid this bias and to rule out other possible imperfections in the portfolio construction we perform a matched pair analysis as a robustness check. With only one other potential target to choose from the a priori chance of buying any target is 50 percent; this eliminates the probability that a stated proximity preference is due to a statistical artifact only. As peer company we chose the firm in the same industry on a four-digit SIC level which is closest in market capitalization to the original target and where Compustat information is available for both, target and hypothetical target. This leaves us with 744 companies, 372 actual targets (ACQ=1) and 372 matched hypothetical targets (ACQ=0). As we match the pairs based on size and industry we do not include these characteristics as explanatory variables. We then compare again the distances between the headquarters of the acquirer and the actual target on the one side and the acquirer and the hypothetical target on the other. We find a mean target acquirer distance in actual transactions of 1,596 km, and a median of 1,140 km. In contrast, the distribution of peer transactions has a mean potential target-to-acquirer distance of

1,845 km and a median of 1,513 km. These results confirm our findings from the hypothetical portfolio approach, i.e., there is a tendency to buy firms that are closer by. We estimate a conditional logistic regression where the dependent variable is the dummy ACQ that is one for every actual transaction and zero for a potential deal and implement controls for characteristics of both, target and hypothetical target. The model takes the form:

$$ACQ = \beta_1 Distance + \beta_j Controls + \varepsilon$$

The controls are the same as in Kang and Stulz (1997) and Coval and Moskowitz (1999): the target's financial leverage (as a ratio of total liabilities to total assets), the return-on-assets RoA and the price-to-book ratio P/B. Furthermore, we control for the economic activity around the target's and potential target's location by including the log of the respective gross product TgEco. Table 5 shows the results of the conditional logistic regression.

The results of this logistic regression show a significantly negative coefficient for the distance to the acquirer's headquarters. Even when we control for the target's and potential target's firm characteristics, distance to the acquirer has a negative impact on the propensity to choose a target. For an odds analysis we first scale the distance in thousands of kilometers and get a coefficient of β_1=-0.119. We then take the anti-log of the coefficient and obtain $e^{-0.119}$=0.8878. This means that for an increase of 1000 kilometers distance, the odds in favor of being chosen as target decreases to 0.8878 or about 11.22 percent. Also, the price-to-book ratio has a negative coefficient and is highly significant – a lower price-to-book ratio is associated with increasing probability of choosing a target. Other controls are not significant. These results confirm our findings from the hypothetical portfolios: Even after controlling for different (actual and potential) target characteristics and even after allowing for one peer target only, acquirers show a strong proximity preference.

We sum up our findings so far: Acquirers prefer to buy close-by targets over other potential targets. This shows up in the distribution of distances in actual deals where deal frequency is a declining function of distance to the target. By constructing portfolios of potential targets we are able to state a proximity preference: acquirers buy firms that are 17% to 29% closer to their headquarters than the average distance to potential portfolios. This is robust against a variety of checks: The variation of port-

folio size, portfolios that include private targets and acquirers, different measures of distance that correct for travel easiness, and a matched pair analysis controlling for (actual and potential) target characteristics. All of the previous tests leave the basic finding unchanged. Acquirers show a strong and noticeable preference for firms closer by.

V. Success

The savings of transportation and integration costs, easier monitoring of the new subsidy as well as superior information availability about firms in near vicinity should be reflected in the reaction of capital markets around the time of the merger announcement. For our event study we use the same data set as before and complement it with daily share prices from the CRSP database. We conduct a short-term event study of the weighted total stock price reactions of acquirer and target within a three-day window [-1; +1] around the announcement date of the respective transactions. We weigh target and acquirer according to the respective market capitalizations two trading days before announcement date. The expected normal return is calculated by the CAPM with the daily beta taken from a period of [-250; -50] trading days against the value-weighted CRSP all share index, which is also used as benchmark index during the event.

V.A Univariate results

On average, targets gain about 24.8% during the three-day window, acquirers lose about 2.6%, and the average total abnormal return for target and acquirer combined is 0.1%. These figures roughly correspond to the results of Andrade et al. (2001) as well as those from others. We first compare the most successful 25% of the deals in terms of combined weighted abnormal return for buyer and target with the least successful 25% in table 6. The mean total abnormal return for the best performing 25 percent is 9.9%, compared to -9.9% for the worst 25 percent. The average distance of the best performing deals is 1,360 kilometers as opposed to an average 1,868 kilometers for the worst performing deals. That difference is even higher for the medians (814 km vs. 1,506 km). Clearly, the best performing deals have less distance between acquirer and target than the worst performing deals. However, it is not only

distance that matters. In that case we would conclude that it is indeed mainly post-transaction costs or the building of local monopolies which are responsible for better results. Also the proximity preference is higher in the group of the best performing deals, with an average proximity preference of 322 kilometers (median: 230 km, mean PP-to-TAD ratio: 23.8%) in contrast to a much smaller average proximity preference of 50 kilometers (median: 64 km, mean PP-to-TAD ratio: 2.7%) in the worst performing group. While the best performing deals have target firms that are 322 kilometers closer than the average possible target, acquirers in badly performing transactions choose target firms with about the average distance as their respective portfolios of possible targets. Firms do not only acquire distant firms when there are no other opportunities left: The mean number of potential targets in the portfolios for deals that take place at distances below the median distance of 1082 km is 6.1 firms (median 4 firms), virtually identical to the 6.0 firms (median 4) for deals above the median.

When comparing the best deals in which acquirer and target are in the same industry (Table 6, Column 3) with those where acquirer and target are in different industries (Column 5), the disparity in distance stands out. The best deals within one industry show an average distance of 1,432 kilometers (median 973 km), whereas in the best diversifying deals acquirers and targets are on average only 1086 km (median: 565 km) away from each other. This corresponds with a smaller average proximity preference of 310 kilometers in deals within a specific industry compared to 591 kilometers in diversifying deals. Hence, when crossing industry borders, the best performing deals display a lower distance between acquirer and target and as a result a larger proximity preference. These findings are not in line with the 'local monopoly' hypothesis which predicts that consolidating deals closer by would lead to better results. The findings are in line, however, with the information availability and especially monitoring arguments: Acquirers already possessing industry specific knowledge of the target's business do need less tacit information for assessment; distance is evidently less important in these cases.

V.B Regression on cumulative abnormal returns

To analyze whether the influence of distance on the success of M&A transactions is driven by factors correlated with the firm and/or the deal rather than with distance

itself we regress the cumulative abnormal return (*CAR*) on distance and control variables taken from the literature: the market value of target and acquirer, target leverage (*Lev*), price to book (*P/B*) ratio and return on assets (*RoA*) as well as a dummies for payment methods. The basic model is specified as follows:

$$\begin{aligned}\mathbf{CAR} = {} & \beta_1\mathbf{TAD} + \beta_2\mathbf{Cons} + \beta_3 \ln(\mathbf{TgMV}) + \beta_4 \ln(\mathbf{AqMV}) + \beta_5\mathbf{Lev} \\ & + \beta_6\mathbf{P/B} + \beta_7\mathbf{RoA} + \beta_8\mathbf{Payshares} + \beta_9\mathbf{Paycash} + \beta_{10} \ln(\mathbf{TgEco}) \\ & + \beta_{11} \ln(\mathbf{AqEco}) + \beta_0 + \varepsilon\end{aligned}$$

CAR refers to the joint value-weighed cumulative abnormal return of target and acquirer in percent; *TAD* is the distance between acquirer and target, *Cons* a dummy variable indicating whether the deal is intra-industry (consolidating; dummy=1) or inter-industry (diversifying; dummy=0); *ln(TgMV)* and *ln(AqMV)* represent the log of the respective market values. *PayShareOnly* is a dummy that is one when the deal is paid completely in shares of the acquirer; *PayCashOnly* is a dummy that is one when the deal is paid in cash only. *Ln(TgEco)* and *ln(AqEco)* are the sizes of the economic areas surrounding target and acquirer, respectively. To correct for heteroscedasticity we use White's consistent covariance matrix. We also report a fixed effects regression model to control for patterns resulting from industry and time effects. Column 1 in Table 7 shows the results for the basic sample.

We are most interested in the distance coefficient (*TAD*) which is significantly negative. The closer targets are located to acquirers' headquarters the greater the success of the deal measured by the abnormal returns around the time of announcement over the whole sample. As one unit of *TAD* is one kilometer, we infer that a decrease of 1,000 kilometers in distance leads to an increase of 0.6% in abnormal return on average. To check whether different industries influence our results we control for Fama and French (1992) industries in a second regression in column 2. Additionally, transaction behavior in merger waves might be different from that in calmer times; therefore we include also year dummies in that regression. The distance coefficient gets slightly smaller (now 0.5 percent for a thousand kilometers' change) but remains significantly negative. Note that also the changes in most coefficients due to including fixed effects are rather small. Since we have strong selection requirements for our sample – to have at least one listed potential target – these results could be subject to selection bias. Hence, we run the analysis for all public-to-public transactions (954 firms), without (column 3), and with industry and year fixed effects (col-

umn 4). The results do not change qualitatively. Also, our results are in line with the findings of Kedia et al. (2005) and Eun et al. (2005), both confirming a significantly negative impact of distance on success.

The control variables that the literature associates with success show the expected signs: Deals within an industry (variable *Cons*) are significantly more successful than diversifying deals; paying with acquirer shares only leads to significantly worse, and payment in cash only to significantly better results. When put simultaneously in the equation, the log of target's market value is negative but mostly insignificant whereas the log of acquirer's market value is negative and mostly significant. Including them into the equation separately yields significantly negative results throughout the different specifications. The two variables are moderately correlated with a coefficient of 0.54 in the smaller sample and 0.55 in the larger sample. The impact of target's leverage is significantly positive for most regressions, whereas the price to book ratio does not show any significance throughout the regressions. Return on assets has a negative impact but gets significant only in the large sample with industry and year fixed effects. The log size of the acquirer's surrounding economy, *log(AqEco)*, is never significant but interestingly, the economy around the target's headquarters has – mostly – a significant negative impact on the success of the transaction. On average, buying firms in smaller local economies yields better results.

V.C. Proximity-related private benefits and overconfidence

The preceding analysis shows that – over all – there is a significant negative effect of transaction distance on deal success. However, our theoretical assumptions imply that this should only be part of the story. If there were local synergies and local 'soft information' we should be able to find a better performance within close distance. On the other hand, if there are proximity-related private benefits we should expect to find close range transactions exhibiting poor performance. How far these potentially overlapping effects will reach we can not precisely infer. However, it seems plausible that soft information directly from the target will not be as far reaching as the private benefits of staying close or getting information from local networks. We start our analysis on how distance affects the abnormal return of the transaction by plotting the average abnormal return per distance deciles as a one-step-one-percentile moving average. Figure 3 displays the average *CARs* over *TAD* for the basic sample (545

transactions) and for the extended sample (954 transactions). The first dot of the black graph amounts to the average abnormal return of 0.02% within the first ten percent of distance, which contains all distances from zero to about 15 kilometers for the basic sample. The horizontal axis refers to the mid percentile – in the case of the first dot this is an interval of [-5; +5] around the 5th percentile's deal, resulting in a 10 percent window.

The overall picture of the two graphs confirms our findings of a negative impact of distance on success. Nevertheless, the graphs do not move monotonically but rather suggest a slope reversal around the first third of deals. While the last two thirds show a more or less steady decrease, the first third looks more like a 'U' shape: There is an area of lower average abnormal returns within close distance. The first distinct minimum around percentile 14 (basic sample) has an average abnormal return of -0.65% and is significantly different from the local maximum at percentile 29 with a value of 2.07%. In other words, transactions within a radius of 12 to 51 kilometers are performing worse on average than transactions within a radius of 236 to 495 kilometers. The difference is even more significant when we compare the minimum with the total maximum around percentile 37 with an average success of 2.7%.

We check whether outliers drive the pattern since extreme abnormal returns could influence the sample mean dramatically. We conduct the analysis excluding the 1; 5 and 10 percent tails of the respective *CAR* distributions for each decile. This leads to the same pattern and underscores the findings from above. Even when we cut off the 25 percent highest and lowest abnormal returns – leaving only 50 percent as the core of the *CAR* distribution – the above pattern remains qualitatively the same.

To test how this pattern comes out when we control for deal and firm characteristics we split our sample into two sub-samples and perform a regression analysis. As suggested in the moving averages we separate the first third from the rest, which corresponds to a cut-off distance of about 470 kilometers. Table 8 shows our regression models for the two sub-samples. The left side displays the model for all transactions within range of 470 kilometers; the right side displays all transactions farther than 470 kilometers away. Again, for robustness reasons, the regressions are reported without fixed effects as well as with year and industry fixed effects. The left side of table 8 shows the regression results for the close-range sample (<470km). As conjectured from figure 3, we see positive though insignificant betas for the target acquirer

distance, *TAD*. Except for the acquirer's size in the regression without industry fixed effects we do not find any stable significant coefficients in this sample, neither in the plain regression nor in the one including fixed effects. Also the overall significance of the regression for nearby transactions is very poor with an error probability of 13% for the plain model and 46% for the fixed effects model. The lack of significant betas, the error probabilities of the F test and the very low adjusted R-squared suggest that there is no explanation in this regression model. This is remarkable. None of the usual variables that are associated with M&A success, such as paying with own shares (usually a negative impact on success), paying in cash (positive impact) or the dummy for consolidating deals – i.e., deals within one industry – show any significance. These findings are in line with private incentives for the management of the acquiring firms and/or proximity-induced overconfidence within the first couple of hundred kilometers. There might still be positive influences from better (soft) information in proximate deals that are overridden by other effects. Given that the average success of deals in closer distance is worse than that of deals at medium distances, we conclude that the negative effects from private benefits are stronger than the positive effects stemming from better information availability. Obviously, these two effects cancel out the usual drivers for M&A success. To the best of our knowledge, this is the first time that the influence of proximity on standard explanatory variables in M&A success is reported.

Conversely, we find that most of the explanatory power in the full regression is based on the last two thirds of observations. On the right side of table 8 we report the regression results for transactions farther than 470 kilometers away, again without and with fixed effects. The coefficients basically confirm our results from the full sample regression in the chapter before. Except for return on assets we quantitatively and qualitatively get the same coefficients. However, the fit of the regression improves considerably: In the full sample fixed effects regression we had an adjusted R-squared of 12.3%. Now, excluding nearby transactions, we get an R-squared of 18.9%. The payment dummies *PaySharesOnly* and *PayCashOnly*, and the dummy *Cons* are significant with the expected signs, also the distance between target and acquirer is negative and significant. It seems that the 'usual' explanatory variables are significant only at medium to large distances. The significance of the coefficients and the overall regression is strong enough to emerge even in the full sample, even so none of the interrelations hold below 470 kilometers in our case. To ensure that the insig-

nificance of the first third's regression is not driven by small sample size, we split our full sample in three thirds. The second third yields an adjusted R-squared of R^2=0.15 and good overall significance F(prob)=0.00; the last third yields even stronger results with R^2=0.31 and F(prob)=0.00. The surprising non-explanation in the first third thus is not due to the small sample size.

To check whether our results are driven by a selection bias we run the same regressions on the bigger sample (n=954). For the two thirds of transactions farther away (>506km) all our findings remain qualitatively and quantitatively the same. In the close-range sample within the first 506 kilometers some coefficients and the whole regression do get significant: acquirer size (negative beta) and the consolidation dummy (positive beta) are significant at 5 percent levels. That suggests that part of the effects in the former sample might be driven by small sample size. However, the payment variables remain highly insignificant in the larger sample. Most interestingly, the coefficient for transaction distance *TAD* is positive, significant at the 10 percent level and ten times larger than in the small sample. There is a positive relation between distance and success in the large sample. These results are in line with fading effects of overconfidence as well as diminishing private benefits. As with the larger sample, we run the regressions on the sample from the matched pair analysis (n=372), again, finding the same results as in our basic sample: Within 470 kilometers we get insignificant regressions (yet, positive betas for *TAD*) and qualitatively the same coefficients. Beyond 470 kilometers we have a significantly negative beta for distance, qualitatively similar responding betas for the control variables and a considerably high fit with an adjusted R-squared of about 0.23.

As a further robustness check we conduct the above analysis dividing our basic sample at the 1/5 and 2/5 percentiles. That leads to cut off distances of 70 and 680 kilometers, respectively. As expected, the parts with medium to high distances remain qualitatively unchanged and, with lowering the kilometer cut off, move towards the regression results of the full sample. More interesting are the smaller subsamples. Again, both show highly insignificant coefficients and overall regressions. The coefficient for *TAD* is negative (but insignificant) within 70 kilometers, and positive (but insignificant) within 680 kilometers, confirming the general trend depictured in figure 3 (not reported).

Since we are interested in the transactions' joint successes we take the joint cumulative abnormal returns of acquirer and target together. We are also interested, however, whether there are different patterns in acquirer and target success over distance. Therefore, we repeat the analysis above separately for acquirer and target CARs. Since acquirers in our sample are 20-30 times larger than the targets we expect them to drive the joint results to a large extent. As it turns out in the separate *CAR* regressions, the distance-related pattern discussed above is indeed entirely due to acquirers' returns. For the targets, neither in the full sample nor in the sub-samples (≤470km and >470km) any significant distance-related patterns show up. This further backs our notion that the drop in success for proximate deals is indeed due to acquirers' behavior. We do consistently find a strong force within close range that reduces average transaction's success. This drop in M&A-profitability is in line with proximity-induced overconfidence as well as private benefits on the acquirers' side. The effect is gradually disappearing and seems to be gone at about 500 kilometers.

V.D Costs of private benefits and overconfidence

We would like to put a price tag on the losses in M&A transactions due to reaping of private benefits or due to proximity induced overconfidence, i.e., how much worse deals in close proximity perform in comparison to deals farther away. This serves also as a further robustness check for our findings. M&A transactions in general are associated with a high level of idiosyncrasy and, as shown above, deals that take place in close proximity to the acquirer come along with extraordinary high levels. We triangulate the estimated losses using a variety of methods; nevertheless we are fully aware that any estimated benchmark figures for these deals are debatable. We assume that the first maximum in average success in figure 3 at roughly 500 kilometers signals the fading out of the private benefits effect. As stated before, the unconditional difference between the first maximum and the first minimum – marked by deals up to 500 kilometers – adds up to an average of 2.72% joint cumulative abnormal return. Comparing that figure to the average abnormal return of our sample of 0.1% accentuates the importance of our findings. This is presumably the maximum unconditional loss that could be attributed to proximity-related private benefits and overconfidence in our sample.

As a second measure we use our regression model to *estimate* the success of the deals with targets in proximity. Following our findings from above we use the last two thirds of our sample to estimate the factor loadings for the regression; we then apply these factor loadings to the first third in our sample. Starting at a distance of 470 km deals in the last two thirds should not be influenced by, proximity-related private benefits or overconfidence. Thus, the procedure eliminates any influence of localized benefits in the regression analysis and should lead to higher estimates of success for the first third of the deals. The method, however, does not consider any influence of the hypothesized soft-information advantage – which would lead to even higher returns in very close distance. This advantage could be roughly associated with the downward sloping part of the 'u'-shaped average success path from zero to 50 kilometers in figure 3. However, we do not take this particular effect into account but note that our estimation produces rather conservative approximations for the loss attributable to proximity-related private benefits. The average actual return for the first third of deals in our sample is 0.59%. In contrast, the average estimated return for the first third is 1.60%. If our explanatory variables had the same impact on success in the first third as they do in the last two thirds, we would expect the success to be on average 1.01 percentage points higher – a disparity which is significant at the 10 percent level. This gap is even bigger if we weigh the returns with its respective market values. In doing so, the value-weighted difference amounts to 1.21 percentage points.

Thirdly, we assume very conservatively that there are no further benefits from buying more proximate targets than indicated by the level of success of the first maximum. Therefore, we estimate the success for the first third of deals with the same factor loadings as before, but assign a 470 km distance to them instead of their actual distance. Still the estimated success is 0.70% higher than the observed success. Although pinning down an exact number is difficult, there is a robust finding of a lower total success in M&A transactions within the first 500 kilometers. Conservatively estimated, the average loss with regard to the total cumulative abnormal return is in the range of one percentage point and thus highly relevant economically.

VI. Conclusion

The paper relates behavioral aspects of mergers and acquisitions transactions and the role of distance in financial decisions. Using data from domestic US transactions between public firms we show that acquirers have a strong and consistent preference for geographically proximate target companies. Several hypotheses explain the propensity for firms to merge locally, i.e., synergies in connection with reduction of integration costs, more readily available information and local private benefits for the acquirer's management. We measure proximity preference against benchmark portfolios of hypothetical transactions in which the potential targets consist of firms similar to the target. The preference is statistically and economically significant in terms of abnormal returns and does not wither away when we control for a variety of firm and deal characteristics. In general, investors' appreciation of transaction announcements decreases with increasing distance between target and acquirer: the farther away the target, the poorer the deal performance. The best deals are associated with a significantly higher proximity preference and shorter transaction distances than the worst deals. This relationship holds when we control for a variety of firm and deal characteristics.

Even though closer transactions should perform better due to better information, lower transaction and monitoring costs, the average success reaches a distinct local minimum for deals that take place in short range around the acquirer's headquarters. Our results diverge from other papers (Kedia et al. 2005; Eun and Mukherjee 2006) that find a monotonic negative relationship between distance and transaction success. Our findings are, however, in line with proximity-related private benefits, such as gaining a higher local status, as well as an 'illusion of control' for transactions with somewhat proximate targets, i.e., proximity-induced overconfidence. With increasing distance the effects fade out and vanish after roughly 500 kilometers. Even after controlling for target and acquirer characteristics, regional economic activity, time and industry effects the pattern remains stable. We show that the average deal in the first 500 kilometers performs about one percent worse than those at around 500 kilometers. Combining 'proximity preference' and 'proximity-related private benefits and overconfidence' we conclude that there are more nearby acquisitions than justified by

economic reasons. We advise acquirers' boards to examine propositions for acquiring nearby targets even more thoroughly.

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Appendix

Table 1: Descriptive statistics

This table reports the main variables for the small (n=545) and the large (n=954) sample. It contains the target to acquirer distance TAD, the market values for target and acquirer, the financial leverage, price-to-book ratio and return-on-assets of the target. Eco refers to the gross metropolitan product of the statistical area the target or acquirer resides in. The last two variables are dummies for the method of payment.

n=545					
	mean	*median*	*s.d.*	*Q 25*	*Q 75*
TAD	1494.81	1082.29	1407.14	256.80	2542.96
TgMV	521.48	117.15	1429.69	41.84	352.70
AqMV	17844.30	2135.95	52216.89	474.61	8268.23
Leverage	0.415	0.376	0.237	0.216	0.611
P/B	3.461	2.153	4.255	1.377	3.760
RoA	-8.580	1.520	30.357	-13.690	7.090
TgEco	179.683	124.700	189.923	62.425	210.800
AqEco	217.647	124.700	231.685	82.000	223.300
Cash only	33%				
Shares only	45%				
n=954					
	mean	*median*	*s.d.*	*Q 25*	*Q 75*
TAD	1460.97	1120.50	1352.34	286.45	2438.71
TgMV	662.65	118.22	1996.44	43.20	391.87
AqMV	16535.65	2069.09	52712.16	477.30	8256.45
Leverage	0.449	0.433	0.239	0.253	0.629
P/B	3.206	2.016	4.133	1.250	3.501
RoA	-5.160	2.755	26.748	-6.030	7.180
TgEco	195.072	124.700	211.363	55.500	218.400
AqEco	224.807	130.850	240.400	68.000	226.300
Cash only	35%				
Shares only	41%				

Table 2: Top 10 target industries

This table shows the top 10 target industries with the number of transactions, the average target to acquirer distance for the small and large sample. Additionally, we report the average proximity preference and the average portfolio size for the small sample at the top.

n=545					
SIC	*Name of Industry*	*n*	*avg. TAD*	*avg. PP*	*avg. P-size*
7372	Services-Prepackaged Software	99	1657.2	388.4	13.53
3674	Semiconductors & Related Devices	30	1022.3	492.6	6.57
1311	Crude Petroleum & Natural Gas	26	984.8	81.5	5.27
7373	Services-Computer Integrated Systems Design	25	1972.5	95.5	5.20
2834	Pharmaceutical Preparations	23	2006.1	116.8	9.00
3577	Computer Peripheral Equipment, NEC	21	1553.2	522.4	3.48
3841	Surgical & Medical Instruments & Apparatus	20	1919.4	87.4	3.35
3661	Telephone & Telegraph Apparatus	18	2011.4	-78.4	5.00
3845	Electromedical & Electrotherapeutic Apparatus	16	1733.9	238.5	6.56
2836	Biological Products, (No Disgnostic Substances)	12	1408.0	631.5	6.92

n=954			
SIC	*Name of Industry*	*n*	*avg. TAD*
7372	Services-Prepackaged Software	99	1657.2
3674	Semiconductors & Related Devices	31	989.3
7373	Services-Computer Integrated Systems Design	27	1977.8
1311	Crude Petroleum & Natural Gas	26	984.8
3841	Surgical & Medical Instruments & Apparatus	24	2130.0
2834	Pharmaceutical Preparations	23	2006.1
3577	Computer Peripheral Equipment, NEC	23	1673.5
3661	Telephone & Telegraph Apparatus	21	1955.4
3845	Electromedical & Electrotherapeutic Apparatus	18	1780.2
3663	Radio & TV Broadc. & Comm. Equipment	14	1283.3

Table 3: Transactions per Year

This table shows the number of transactions and the average target-acuirer-distance per year for the small (n=545) and the large (n=954) sample. Additionally, for the small sample the average proximity preference and the average portfolio size for each year are reported.

	n=545				n=954	
Year	*n*	*avg. TAD*	*avg. PP*	*avg. P-size*	*n*	*avg.TAD*
1990	3	1670.9	-439.7	5.0	25	1517.8
1991	7	917.0	495.0	4.7	16	1104.8
1992	5	1327.9	-315.0	2.8	22	1520.2
1993	12	1091.0	501.2	3.7	33	929.3
1994	12	1407.0	-218.1	3.8	27	1629.6
1995	33	1149.7	468.8	4.6	66	1435.0
1996	46	1728.1	133.8	5.2	88	1538.6
1997	58	1149.1	453.3	6.3	99	1145.2
1998	77	1579.8	273.7	5.2	119	1638.1
1999	72	1549.7	274.9	6.1	138	1482.4
2000	81	1500.2	71.9	6.1	123	1429.5
2001	60	1766.9	292.4	7.1	89	1680.0
2002	41	1312.5	511.3	7.3	56	1342.4
2003	35	1627.8	337.7	8.5	50	1510.3
2004	3	3667.8	-1086.4	9.7	3	3667.8

Table 4: One-sided test on proximity preference

This table shows the results of an one-sided hypothesis test on the proximity preference distribution for various portfolio sizes. The Null is that the mean PP is equal to zero, the alternative hypothesis is that the mean is greater than zero. On the right side there are the average proximity preferences in percentage points of the mean target-to-acquirer distance.

Portf.-size	*n*	*avg. PP*	*s.d.*	*t-value*	*avg. TAD*	$\frac{\textit{avg. PP}}{\textit{avg. TAD}}$
≥ 1+1	545	267	1193	5,23	1495	17,9%
≥ 2+1	399	324	1296	5,00	1541	21,0%
≥ 5+1	203	432	1362	4,52	1486	29,1%
≥ 10+1	88	449	1394	3,02	1591	28,2%

Table 5: Matched pair analysis

This table reports the conditional logistic regression on the dummy variable ACQ, which has a value of one if the transaction has actually happened and a value of zero if the target is hypothetical. The regression conditions on the matched pairs of target and peer target and therefore controls for acquirer characteristics, industry und time fixed effects.

TAD	*Leverage*	*P/B*	*RoA*	*ln(TgEco)*	*n*	*LR chi*
-0,000119 **	-0,002162	-0,041369 **	-0,001625	-0,80963	744	19,55
(-2.09)	(-0.01)	(-2.47)	(-0.65)	(-1.34)		

***, **, * represent 1%, 5%, 10% confidence levels, respectively

Table 6: Best and worst quantiles

The table shows a comparison of the worst with the best 25 percent measured in abnormal return. It reports the mean and median abnormal return CAR, the mean and median target to acquirer distance TAD as well as the mean and median proximity preference PP. Additionally, the middle and right colum report the subsamples for consolidating and diversifying transactions according to four digit SIC.

25%	All (n=136 each)		Consolidating (n=101 each)		Diversifying (n=35 each)	
	best	worst	best	worst	best	worst
CAR, mean	9,94%	-9,89%	10,31%	-9,04%	8,73%	-12,26%
TAD, mean	1360	1868	1432	1860	1086	1861
TAD, median	814	1506	973	1494	565	1599
PP, mean	322	50	310	59	591	11
PP, median	230	64	246	121	574	7

Table 7: Regression on CAR

This table shows the least squares regression on the cumulated abnormal return CAR for the small sample on the left side and the large sample on the right side. The regressors are target-to-acquirer distance TAD, targert's and acquirers's market value TgMV and AqMV, the consolidating dummy Cons, the target's price-to-book ratio P/B, return-on-assets RoA and financial leverage. We also include dummies for the method of payment and the economic activity of the region AqEco/TgEco of acquirer and target, respectively. To correct the standard errors we use the White heteroscedasticity consistent covariance matrix.

	n=545		n=954	
TAD	-0.0006 ***	-0.0005 **	-0.0005 ***	-0.0004 **
	-(2.65)	-(2.08)	-(2.61)	-(2.10)
log(TgMV)	-0.549 *	-0.422	-0.126	-0.196
	-(1.76)	-(1.14)	-(0.60)	-(0.88)
log(AqMV)	-0.454 **	-0.322	-0.611 ***	-0.431 ***
	-(2.06)	-(1.30)	-(3.86)	-(2.63)
Cons	2.550 ***	2.417 **	1.665 ***	2.032 ***
	(2.88)	(2.55)	(2.95)	(3.49)
P/B	-0.017	-0.040	-0.082	-0.078
	-(0.16)	-(0.35)	-(1.15)	-(1.06)
RoA	-0.014	-0.022	-0.018	-0.032 **
	-(0.99)	-(1.48)	-(1.27)	-(2.10)
Leverage	3.355 **	2.863 *	1.952	1.049
	(2.37)	(1.74)	(1.65)	(0.78)
PaySharesOnly	-1.644 *	-2.263 **	-1.667 **	-1.497 **
	-(1.81)	-(2.44)	-(2.52)	-(2.29)
PayCashOnly	2.906 ***	2.208 **	2.102 ***	2.000 ***
	(3.03)	(2.18)	(3.31)	(3.05)
log(TgEco)	-0.440 *	-0.544 **	-0.253	-0.342 *
	-(1.71)	-(1.99)	-(1.45)	-(1.87)
log(AqEco)	0.229	0.169	0.190	0.164
	(0.65)	(0.44)	(0.90)	(0.76)
Constant	4.507 *		5.209 ***	
	(1.89)		(3.03)	
Year Fixed Effects	no	yes	no	yes
Industry Fixed Effects	no	yes	no	yes
n	545	545	954	954
adj. R^2	0.120	0.123	0.099	0.127
F-Prob.	(0.00)	(0.00)	(0.00)	(0.00)

***, **, * represent 1%, 5%, 10% confidence levels, respectively

Table 8: Regression on CAR - near versus far

This table shows the least squares regression on the cumulated abnormal return CAR for the small sample (n=545). The left two colums report the regression results for transactions within 470 kilometers, the right two colums report regression results for transactions farther than 470 kilometers away. The regressors are target-to-acquirer distance TAD, targert's and acquirers's market value TgMV and AqMV, the consolidating dummy Cons, the target's price-to-book ratio P/B, return-on-assets RoA and financial leverage. We also include dummies for the method of payment and the economic activity of the region AqEco/TgEco of acquirer and target, respectively. To correct the standard errors we use the White heteroscedasticity consistent covariance matrix.

	TAD<=470 km		TAD>470 km	
TAD	0.0018	0.0014	-0.0009 ***	-0.0008 **
	(0.36)	(0.24)	-(2.66)	-(2.19)
log(TgMV)	-0.408	-0.382	-0.448	-0.311
	-(0.67)	-(0.47)	-(1.21)	-(0.71)
log(AqMV)	-0.711 **	-0.383	-0.293	-0.097
	-(1.99)	-(0.84)	-(1.05)	-(0.32)
Cons	2.541	1.991	2.480 **	2.242 **
	(1.45)	(0.98)	(2.50)	(2.10)
P/B	0.028	-0.190	-0.096	-0.071
	(0.12)	-(0.64)	-(0.87)	-(0.60)
RoA	0.017	0.013	-0.042 **	-0.049 ***
	(0.92)	(0.59)	-(2.28)	-(3.03)
Leverage	0.551	3.284	3.999 **	3.253 *
	(0.19)	(0.74)	(2.41)	(1.75)
PaySharesOnly	-0.996	0.541	-1.865	-2.671 **
	-(0.63)	(0.27)	-(1.63)	-(2.37)
PayCashOnly	1.308	1.018	3.820 ***	2.943 **
	(0.85)	(0.58)	(3.00)	(2.21)
log(TgEco)	-0.519	-0.291	-0.224	-0.344
	-(1.05)	-(0.42)	-(0.63)	-(1.01)
log(AqEco)	0.272	0.524	0.286	0.073
	(0.44)	(0.59)	(0.62)	(0.16)
Constant	6.921 *		1.896	
	(1.92)		(0.59)	
Year Fixed Effects	no	yes	no	yes
Industry Fixed Effects	no	yes	no	yes
n	182	182	363	363
adj. R^2	0.030	0.003	0.167	0.189
F-Prob.	(0.13)	(0.46)	(0.00)	(0.00)

***, **, * represent 1%, 5%, 10% confidence levels, respectively

Figure 1: Frequency distribution of target to acquirer distance (TAD)

This histogram shows the frequencies of distances between target and acquirer (TAD). The most stunning feature of this frequency distribution is the prevalence of transactions that take place within a 100 kilometers distance around the acquirer; about 20% of all acquirers choose targets within that radius.

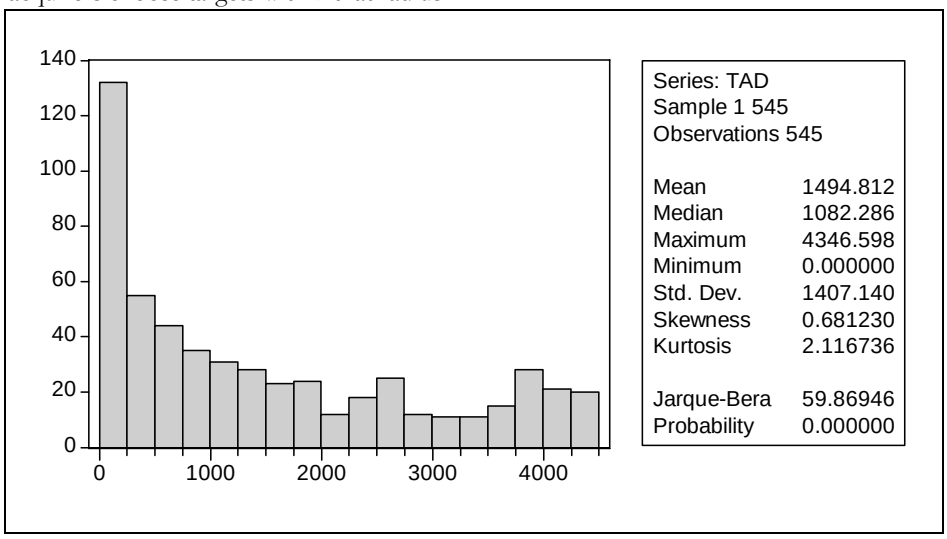

Figure 2: Proximity preference - frequency distribution

This histogram shows the frequencies of proximity preferences PP between the acquirer and it's portfolio of potential targets. The mean value of 267 kilometers reflects a positive proximity preference in our dataset. If acquirers had no preference we would expect to have a mean value which is not significantly different from zero.

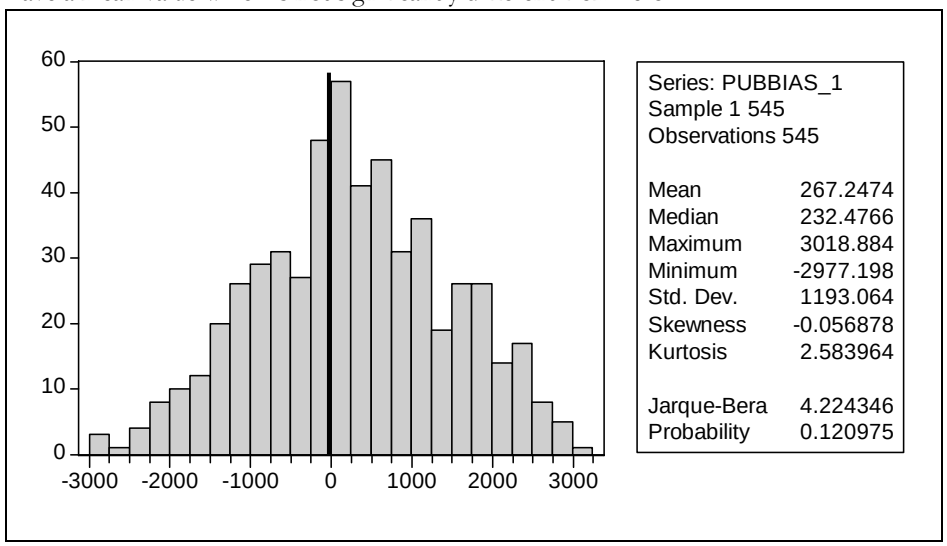

Figure 3: Moving average abnormal return per distance decile

These graphs show the average abnormal return per distance deciles as a one-step-one-percentile moving average. The black line displays the average CARs over TAD for the small n=545 sample, the gray line displays the larger n=954 sample. The first dot of the graph amounts to the average abnormal return of 0.02% within the first ten percent of distance, which contains all distances from zero to about 15 kilometers. The horizontal axis refers to the mid percentile – in the case of the first dot this is an interval of [-5; +5] around the 5th percentile's deal, resulting in a 10 percent window.