Does Hiring M&A Advisers Matter for Private Sellers?

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Comments welcome

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Abstract

We examine the determinants of private sellers' choice of hiring M&A advisers or top-tier advisers and the effects of these choices on deal valuations. In a large sample of M&A deals, private sellers appear to make these choices in economically sensible ways. After accounting for this selection effect, we find strong (weak) evidence that the treatment effect of using advisers (top-tier advisers) is positive for acquisition premiums. Acquirers' announcement returns are significantly lower in deals where private sellers use M&A advisers. Our findings suggest that the hiring and reputation of M&A advisers improve private sellers' bargaining power and deal valuations.

Keywords: M&A; Private Targets; M&A Advisers; Acquisition Premium

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1. Introduction

M&A transactions are outcomes of negotiations between buyers and sellers. In a negotiation, the outcome partly depends on the relative bargaining strengths of the two parties. A party's bargaining strength depends on some factors that are beyond its control and others within its control. In an M&A transaction, hiring an M&A adviser is a step that either side can take to increase its bargaining power. While the decision and impact of hiring M&A advisers by acquirers have been examined extensively,[1] to our knowledge, these issues have not been analyzed for targets.[2] This paper aims to fill this gap by investigating the determinants of private sellers' choice of whether to hire M&A advisers (or top-tier M&A advisers) and the effect of this choice on deal valuations.

We focus on the hiring of M&A advisers by private sellers because advisers, especially more reputable ones, can be more beneficial to private sellers than to public sellers for at least three reasons. First, private firms are less familiar with the M&A process because they have limited experience in acquiring other firms. Second, there is less public information about private firms, which subjects them to greater information asymmetry with potential acquirers and lowers their valuations compared to public sellers. Because M&A advisers can reduce information asymmetry between bidders and sellers, advisers and their reputations are likely more valuable to private sellers. Finally, private sellers tend to be less visible than public companies, which receive more attention from investors, analysts and the news media. So the sale of a private

[1] See, e.g., McLaughlin (1992), Servaes and Zenner (1996), Rau (2000), Golubov, Petmezas, and Travlos (2012), and Bao and Edmans (2011).

[2] Roberts (2009) provides anecdotal evidence of the benefit to private sellers of using M&A advisors, and says, "'The lawyer who represents himself has a fool for a client.' This famous quote also applies, without question, to the sellers of middle market businesses." On the contrary, Warren Buffett is quite skeptical of the value of investment banks' M&A advice (see, e.g., Buffett and Cunningham (2001, chapter 5)).

company generates fewer competing bids than the sale of a public company, which reduces their bargaining power in deal negotiations. Adviser skill and effort can improve deal valuations for private sellers more than for public sellers by generating more competing bids for them.

But hiring an adviser also entails costs. First, the seller incurs the direct cost of hiring the adviser, namely the adviser's fee. Second, the seller also faces an indirect, agency cost, which arises from differences in the interests of the seller and the agent. On net, does hiring an adviser benefit the seller? That is an empirical issue that we analyze in this paper.

Evidence from the real estate market, which resembles the market for sale of a private company, can serve to aid our intuition. Do individual homeowners who hire a real estate agent to sell their homes fare better or worse than those who do not? When a homeowner hires a realtor to sell her house, the realtor advertises the property via a multiple listing service (MLS), which is a database that links real estate brokers. An MLS listing dramatically expands the market for the property because realtors working for potential buyers from anywhere check the MLS for available properties. Houses sold directly by the owners are not listed on MLS databases. The bundling of MLS and realtor representation makes it difficult to measure the effect of hiring a realtor on the selling price. But findings of two recent studies point to an agency cost of hiring a sell-side realtor, which comes on top of a typical 6% commission that realtors charge sellers. Levitt and Syverson (2008) find that realtor-owned homes sell for 3.7% higher than other comparable homes. In a similar vein, Bernheim and Meer (2013) find that properties available only to Stanford University faculty and staff, which are listed whether or not the seller uses a realtor, sell for about 7% lower, on average, when sellers use realtors.

We analyze a sample of 4,468 acquisitions of private sellers during the period 1980-2010 to examine the decision and the consequences of hiring sell-side M&A advisers. We start by identifying factors that affect the decision of private sellers to use M&A advisers and top-tier

advisers. We then examine whether deal valuations are higher, on average, for private sellers that use M&A advisers than for those that do not, and whether private sellers tend to benefit more from hiring top-tier advisers rather than lower-tier advisers. We next examine whether top-tier advisers charge private sellers higher fees than do lower-tier advisers. Finally, we investigate whether private sellers' use of M&A advisers affects acquirers' announcement returns.

We find that private sellers choose whether to use advisers or top-tier advisers when the potential valuation benefit from hiring an adviser is greater. For example, larger private sellers are more likely to retain M&A advisers and choose top-tier advisers. This result is consistent with the notions that sellers have more at stake in larger deals and that financial advice is more valuable in more complex deals. We find that private sellers are more likely to use M&A advisers (top-tier advisers) when acquirers use M&A advisers (top-tier advisers). This result is consistent with Kale, Kini, and Ryan's (2003) finding that the relative reputation of buy-side advisers compared to sell-side advisers matters to buyers due to the bargaining involved in M&A deals. We find that private sellers that are subsidiaries or are headquartered in states different from their acquirers are more likely to hire M&A advisers or top-tier advisers. These results are consistent with prior studies that find that information asymmetry about seller valuations is more severe in deals involving subsidiaries due to limited public information about them (see Officer (2007)) and higher costs of obtaining information for more distant buyers and sellers (see Uysal, Kedia, and Panchapagesan (2008)).

To account for private sellers' endogenous choice of using M&A advisers or top-tier advisers, we use five econometric approaches: (1) two-stage least squares (2SLS), (2) Heckman's (1979) treatment effect model, (3) endogenous switching regressions, (4) Abadie and Imbens (2006) matching (AIM), and (5) propensity score matching (PSM). The first three approaches require instrumental variables (IVs), while the last two do not. We use the prevalence

of sell-side M&A advisers (top-tier advisers) in the seller's industry and a seller's proximity to a financial center as instruments for the choice to use M&A advisers (top-tier advisers).[3] We discuss the choice and justification of the instruments in section 6.2.1 below.

While identification concerns are generally difficult to completely rule out, we mitigate them by using several different methodologies. The first three of these methods are regression-based approaches and use instruments for identification. In addition, the second and third methods also make use of the non-linearity of the first-stage regression for identification (see, e.g., Li and Prabhala (2007, section 2.3.1)). The last two approaches are matching methods that don't require instruments. While each approach has its own strengths and weaknesses, our results are generally similar across these different methods.

After accounting for a private seller's endogenous decision to hire an M&A adviser and controlling for other factors, we find that private sellers receive significantly higher acquisition premiums when they retain M&A advisers. Our estimates of the magnitude of this effect range from 2.7% in switching regressions to about 5% in matching models to about 32% in treatment effect or 2SLS regressions. However, these estimates do not account for adviser fee. Limited availability and voluntary reporting of adviser fee data preclude strong conclusions on the *net* benefit of hiring M&A advisors for private sellers. Among private sellers that hire M&A advisers, we find weak evidence that sellers that hire top-tier advisers receive higher acquisition premiums. Finally, the announcement returns of acquirers are significantly lower in deals where private sellers use M&A advisers, consistent with the idea that, on average, advisers increase the bargaining power of private sellers. Our estimates of the magnitude of this effect range from -1.3% under a matching method to about -9.6% under treatment effect and 2SLS regressions.

[3] We also use a 3-stage procedure, where we use the predicted probability of using an M&A adviser (or a top-tier adviser) from a probit model as an additional instrument in the 2SLS regressions. Using this non-linear fitted value as an instrument (i.e., generated-IV) provides a 'back-door' identification (see, e.g., Angrist and Pischke (2009)). Since results from the 2SLS and generated-IV approaches are qualitatively similar, we do not tabulate the latter.

Even though acquisitions of private sellers are far more prevalent than deals involving public sellers, relatively few studies analyze acquisitions of private firms.[4] We provide new evidence that financial advisers improve M&A outcomes for sellers that are more likely to lack deal-making experience and negotiating skills and hence can benefit from M&A adviser expertise. By examining how hiring sell-side advisers affects deal outcomes for sellers, our paper complements the literature on the choice and impact of using buy-side advisers (see, e.g., McLaughlin (1992), Servaes and Zenner (1996), Rau (2000), and Golubov, Petmezas, and Travlos (2012)). The findings of this study should also be of interest to owners of private companies, investment banks (IBs), legal advisers, and other participants in the M&A market.

The paper is organized as follows: Section 2 reviews the related literature. Section 3 discusses the role of sell-side M&A advisers. Section 4 describes the sample. Section 5 presents descriptive statistics. Section 6 discusses our empirical models and results, and section 7 concludes.

2. Prior studies

2.1 Acquisitions of private sellers

Private firms are sold, on average, at significant valuation discounts (of about 15% to 30%) relative to public sellers in the M&A market (see, e.g., Officer (2007), and Lian and Wang (2012)). Previous studies find that bargaining power is a significant determinant of the magnitude of private valuation discounts (see Fuller, Netter, and Stegemoller (2002), Officer (2007), and Golubov, Petmezas, and Travlos (2012)). A key positive determinant of a seller's bargaining power is the number of competing bids it receives. Public companies receive more bids than comparable private sellers for several reasons. First, regular SEC filings allow potential

[4] See, e.g., Officer (2007). Almost two-thirds of M&A deals reported by the Securities Data Corporation (SDC) are acquisitions of private sellers (see, e.g., Netter, Stegemoller, and Wintoki (2011)).

bidders to obtain information about public companies that they may be interested in acquiring without incurring significant costs. Second, public companies tend to have greater visibility and media exposure relative to private firms, increasing the probability that they would attract the attention of potential bidders. Third, a public company receiving an initial takeover bid via a tender offer is required to publicly disclose it. The disclosure is followed by a waiting period imposed by the Williams Act of 1968 to provide opportunities for potential buyers to submit competing bids.

2.2 The effect of hiring buy-side M&A advisers

M&A advisers can provide valuable advisory services to acquirers and sellers during the M&A process. Theory suggests that experienced and more reputable M&A advisers should be more effective and improve deal outcomes (see Booth and Smith (1986) and Chemmanur and Fulghieri (1994)). Empirical evidence on this issue is mixed. Early studies find that hiring more reputable buy-side advisors does not result in higher announcement returns on acquirer stocks (see, e.g., McLaughlin (1992), Servaes and Zenner (1996), and Rau (2000)). But more recent studies find a positive relation between the announcement returns of acquirers and the reputations of their M&A advisers (see Golubov, Petmezas, and Travlos (2012) and Bao and Edmans (2011)). Golubov, et al. find such a relation in deals involving public, but not private sellers, and find that top-tier IBs command higher fees. Bao and Edmans (2011) find a significant IB fixed effect in acquirers' announcement returns.

3. The role of sell-side M&A advisers

A sell-side adviser can identify strategic buyers, evaluate the reasonableness of a bidder's offer, manage and pace concurrent negotiations with multiple bidders, reduce the information

advantage that a seasoned acquirer has over a private seller regarding the M&A process, and represent a private seller in negotiations with potential buyers. In section 3.1, we discuss the negotiation process between buyers and sellers. In section 3.2, we discuss how M&A advisers can strengthen the negotiating position of private sellers. In section 3.3, we provide possible explanations as to why most private sellers do not hire M&A advisers.[5]

3.1 Negotiating process

The owners or top managers of a seller may not know how much their business is worth to a bidder because the bidder has better information about the synergies it expects to realize from the acquisition. The posturing of the buyer and seller during the negotiation process, and their flexibility on price will depend on their perceptions of the relative strengths of their negotiating positions. The strength of either party's negotiating position is affected by factors such as need, time, desire, and competition (see Freund (1992)).

Financial distress can force a private company to find a buyer quickly to avoid bankruptcy. As the parties discuss a possible acquisition, the prospective buyer's analysis of the seller's financial statements and disclosures about debt obligations can reveal whether the seller is financially distressed and is facing a distress sale. That can weaken its ability to negotiate more favorable deal terms with a bidder in a stronger negotiating position. Significant synergies that a prospective buyer expects to realize as a result of an acquisition can intensify a bidder's desire to acquire the seller and cause the bidder to be more flexible in increasing its offer price. Presumably, as the number of bidders increases, the bidder that wants the seller the most will outbid its competitors if it can afford to do so. A bidder's need and the presence of competing bidders strengthen the seller's negotiating position, especially if bidders display their eagerness

[5] Sections 3.1 and 3.2 are based on Roberts (2009).

to acquire it.

3.2 Benefits of hiring sell-side M&A advisers

A sell-side adviser can help a private seller in several ways. First, it can aid in identifying strategic buyers. The desire of a private seller's shareholders to cash out, the seller's inability to obtain capital needed to finance growth, and financial distress are examples of situations that can motivate a private seller to initiate the M&A process and identify strategic buyers that would likely benefit from acquiring the company. M&A advisers often have extensive proprietary M&A databases that can be used to identify potential strategic buyers that a private seller is unaware of. Identifying a pool of potential strategic buyers can result in multiple serious bidders and strengthen the seller's negotiating position.

Second, the adviser can provide the valuation analysis needed by the seller to evaluate the reasonableness of a buyer's potential offer. For example, a private seller's shareholders may believe that their business is worth around $20 million, but based on reasonable assumptions, its M&A adviser may value it around $30 million, even before considering the value of synergies that a buyer could realize from acquiring the company. Also, the adviser's analysts can glean valuable information from the seller's management during preliminary due diligence that, when skillfully shared with the buy-side of the deal, can persuade a bidder to increase its valuation of the synergies from acquiring the business.[6] In both of these situations, the seller's shareholders are likely to receive more for their business than they would have without the services provided by the adviser.

Third, an M&A adviser can influence the attitudes and assumptions of bidders. If a seller

[6] An acquirer buys a seller's business, not merely the assets on the seller's balance sheet. An acquirer, for example, buys the seller's established customer base; existing arrangements, contracts, and relationships with customers and suppliers; brand and trademark recognition; customer loyalty; reputation; proprietary knowledge and trade secrets; patents, copyrights, and un-patented product designs; distribution networks; and the human capital of the seller's employees.

only has one strategic buyer interested in purchasing the company, using an M&A adviser can give the prospective buyer the impression that there are competing strategic buyers against which it must compete to acquire the seller. A seller has more negotiating leverage when a prospective buyer believes that it is competing with other bidders. Also, from the perspective of a bidder's management and advisers, the presence of an M&A adviser adds credibility to the sell-side of a deal and can affect the attitudes and behavior of the bidder's management and advisers. When there is an M&A adviser on the sell-side, the buy-side of the deal must contend with the seller's management, shareholders, and M&A advisers. Thus, an M&A adviser can level the playing field and can decrease the buyer's sense of control over a deal.

Fourth, M&A advisers can manage the auction process. In a negotiated auction, a seller receives at least two bids from potential acquirers. A given bid provides a broad outline of the terms of a proposed deal. During preliminary negotiations, each bidder provides information about the form of consideration that it would pay to the seller, e.g. cash, stock, notes, or some combination of these. A bidder's preliminary offer would include information such as a closing date, the timing of consideration payments, the percentage of the seller's stock being acquired, a description of the business being acquired, and the assets on the balance sheet that the bidder would be buying. The seller and its advisers would discuss and negotiate with each bidder the major elements of the bidder's preliminary offer.

Effective negotiation requires strategy and soft skills, such as the ability to establish rapport with the other side of a deal and discern when to stand firm and when to make concessions during the negotiation process. The sell-side of a deal can potentially strengthen its negotiating position by using an M&A adviser's soft skills and knowledge of the M&A process to pace negotiations with multiple bidders.

Pacing M&A negotiations does not necessarily require that the seller set a deadline by which

competing bidders submit their offers. A deadline can weaken a seller's negotiating power by limiting the opportunity to extend negotiations and obtain more favorable terms in the bidders' initial offers. On the other hand, remaining undecided about accepting a bidder's offer gives the bidder more time to change its mind and lose interest in acquiring the seller. We hypothesize that M&A advisers are more likely than a private seller's management to be skilled at pacing the negotiations so that preliminary negotiations with each bidder end at approximately the same time and within some targeted time window that is not disclosed to bidders.

3.3 Why do some private sellers choose not to hire M&A advisers?

An M&A transaction is consummated when buyer and seller sign a definitive agreement that describes, for example, the seller's assets being sold, the values of the assets at the closing date, the amount and type of consideration being paid by the buyer, and the recourse rights of the buyer if various representations made by the seller turn out to be inaccurate during a specified period subsequent to the closing of the deal. A buyer and seller will likely require the services of legal counsel to verify that the transaction agreement is complete and accurately reflects the negotiated terms of the deal. Given the specialized knowledge required, M&A lawyers sometimes serve as chief negotiators in M&A deals, eliminating the need to hire an IB as an M&A adviser.

The owners of a private target can sometimes be astute and informed negotiators that do not require the expertise of an M&A adviser, for example, when the owners are private equity firms, venture capitalists, or institutional investors. These shareholders are less likely to be at a disadvantage if their firms do not hire M&A advisers. Finally, a private seller is less likely to hire an adviser if it thinks that the adviser's fees will be excessive. The benefits of hiring an adviser cannot be quantified by a seller, while the fees can, and sellers sometimes conclude that

the adviser's fees would exceed the benefits of the advice.

4. Sample

We use the Thomson Financial SDC Mergers and Acquisitions Database to identify all acquisitions that occurred during the period 1980-2010. We exclude from our sample leveraged buyouts, recapitalizations, spin-offs, privatizations, reverse-takeovers, repurchases, and deals valued below $1 million. We also exclude any deal in which the buyer acquires less than 50% of the seller's stock, the payment structure is labeled as "unknown" by SDC, or the seller is a non-U.S. firm. We then include in our sample any transaction for which SDC reports at least one of the following financial statement items for the seller: sales, net earnings, earnings before interest, taxes, depreciation, and amortization (EBITDA), or the book value of stockholders' equity. This leaves us with 7,876 acquisitions of public firms and 7,846 acquisitions of private firms. We follow Officer's (2007) procedure, as described in Section 4.1, to calculate a private seller's valuation premium relative to the average valuations of comparable public targets. We are able to calculate the valuation premium for 4,563 acquisitions of private targets. We further exclude from the sample 26 acquisitions by government entities or joint ventures, nine unresolved transactions, and 60 withdrawn transactions. Our final sample consists of 4,468 completed acquisitions involving private sellers. Sell-side M&A advisers are retained in 1,894 of these transactions. SDC reports the advisory fees paid by private sellers for 447 of the deals in our sample.[7]

4.1 Private seller valuation premium

As noted previously, we follow Officer (2007) and use the modified comparable industry

[7] The availability of fee data is limited because the SEC does not require public acquirers and sellers to disclose M&A advisory fees (see, e.g., Mclaughlin (1990) and Golubov, Petmezas, and Travlos (2012)). In a sample of 4,803 deals, Golubov, et al. find only 829 deals in which bidders' advisory fees are reported.

transaction method to calculate private seller valuation premiums (see also Kaplan and Ruback (1995)). We compute an excess deal value multiple as (A-B)/B, where A is a deal value multiple for a private seller, and B is the corresponding average multiple for the portfolio of public sellers with the same primary two-digit SIC industry code as the private seller, deal value within ±20% of the private seller deal, and announcement date within ±1.5 calendar years of the private seller deal announcement. If there is no match, we relax the deal value restriction to 30%, 40%, or 50%, as necessary. We match with replacement of public sellers. We use four excess deal value multiples: *Deal value* to either sales or EBITDA or net earnings or the book value of equity. To reduce skewness, we discard observations in which the absolute value of the excess deal value multiple exceeds one. We finally compute *Average* a*cquisition premium* for a deal as the average of the available excess deal value multiples.[8] The acquisition premium is usually negative because the acquisition multiple for a private seller is typically less than that for comparable public sellers.

4.2 Measure of Adviser Reputation

Following Rau (2000), we rank IBs by their M&A market share for each year in our sample. An IB's market share for a given year equals the total value of completed and withdrawn deals, including tender offers, for which the IB is an adviser, divided by the total value of deals during the year. If two IBs merge during a year, we compute their separate market shares using deals that each advised before the merger. For example, First Boston and Credit Suisse merged in 1988. So for 1988, we calculate separate market shares for First Boston and Credit Suisse using deals that they advised in 1988 before their merger. For that same year, we compute a third market share for deals advised by the combined entity, CS First Boston, after the merger.

[8] While the precision of *Average* a*cquisition premium* varies across deals based on the number of valuation measures available, that does not affect our subsequent results. In untabulated regressions of *Average* a*cquisition premium*, when we add the number of valuation measures as a control variable, its coefficient is always insignificant.

To capture the two-tiered structure of Wall Street IBs (see, e.g., Fang (2005) and Golubov, Petmezas, and Travlos (2012)), we classify the ten IBs with the largest market shares as top-tier advisers. IBs ranked 11th through 20th are classified as second-tier, and IBs ranked below 20th are classified as unranked.[9] We group together the second-tier and unranked IBs as lower-tier IBs. Table 1 shows the list of the top 30 IBs ranked by total transaction value of the deals that they advised during the period 1980-2010. Table 1 also reports for each of the 30 IBs the percentage of the sample years that it is classified as top-tier, second-tier, and unranked. The annual rankings of most IBs listed in Table 1 change from year to year. Exceptions are Goldman Sachs, Morgan Stanley, Merrill Lynch, and Lazard Freres, which are classified as top-tier for 100%, 90%, 84%, and 74%, respectively, of the years in the sample period.

5. Descriptive statistics

5.1 Sample distribution by year

In Panel A of Table 2, the yearwise distribution of acquisitions of private sellers exhibits a pattern that is consistent with the well-documented merger-wave phenomenon. About 50% of the acquisitions in our sample occurred during 1993-2000, a period that includes the stock market 'bubble' and merger boom of the late 1990s. About 67% of the private sellers are stand-alone firms, while the remaining are subsidiaries. Of the 4,468 private sellers in our sample, 1,894 (about 42%) hire M&A advisers, and 701 (about 37%) of the latter employ top-tier IBs.

Panel B of Table 2 shows industry distributions of acquisitions of private sellers. Using Song and Walking's (1993) 20-industry grouping, we identify a seller's industry using its primary two-digit SIC code reported by SDC. Similar to the industry distribution of acquisitions of public sellers during the sample period (see, e.g., Agrawal, et al. (2013)), the top three industries with

[9] Fang (2005), and Golubov, et al. (2012) use the financial adviser league tables from SDC to rank IBs and classify the top eight advisers as top-tier.

private sellers are services, financial, and machinery manufacturing, at 28%, 22%, and 11%, respectively. Industry distributions of deals grouped according to private targets using advisers, hiring top-tier IBs or selling as stand-alone firms are generally similar to that for the full sample of private sellers.

5.2 Sample characteristics

Table 3 reports mean and median values for various characteristics of the deals in our sample. Panel A reports descriptive statistics for the overall sample. The number of observations varies across the characteristics due to data availability. The sample characteristics reported in Panel A of Table 3 are consistent with previous studies. Private sellers in our sample receive lower valuation multiples than comparable public sellers; all four excess deal value multiples are negative with mean (median) values ranging from -3.3% to -33.5% (-3.8% to -43.2%). The mean and median values of *Acquisition premium* are -22.0% and -26.5%, respectively. These values are comparable in magnitude to the mean and median private-company acquisition premiums of -15% and -30%, respectively, reported by Officer (2007).

Panel A also compares the acquisition valuations of private sellers with and without advisers. The mean (median) value of *Excess deal value to net earnings* is -29.7% (-39.1%) for private sellers that use M&A advisers compared to -37.5% (-49.6%) for private sellers that do not use M&A advisers. The differences between both the mean and median values for *Excess deal value to net earnings* for the two groups are statistically significant at the 1% level. For the other three excess deal value multiples and *Acquisition premium*, the differences between both the mean and median values observed for the two groups of private sellers are statistically indistinguishable.

Panel B in Table 3 reports descriptive statistics for the subsample of private sellers that use M&A advisers; the private sellers are grouped according to whether they use top-tier or lower-

tier advisers. Except when acquisition valuations of deals are measured with *Excess deal value to net earnings*, the magnitudes of the mean and median valuation discounts for the *Top-tier adviser* group are significantly larger (more negative) than the corresponding values for the *Lower-tier adviser* group. The mean (median) valuation premium for deals in which sellers use top-tier advisers ranges from -29.3% (-40.6%) for *Excess deal value to Sales* to -19.6% (-31.0%) for *Excess deal value to book value of equity*. The mean (median) excess deal value multiples for deals in which private sellers use lower-tier advisers ranges from -31.4% (-40.8%) for *Excess deal value to net earnings* to 3.3% (2.5%) for *Excess deal value to Book value*.

The results of univariate comparisons could be misleading if acquisitions of sellers that use advisers, top-tier advisers, or no advisers have generalizable differences in seller-, acquirer-, and deal-specific attributes. For example, Table 3 shows that: 1) advisers are retained by less profitable sellers with lower median *ROA* (net earnings divided by total assets); 2) sellers with advisers or top-tier advisers are acquired by larger bidders in terms of total assets and the market value of equity; and 3) sellers hire advisers or top-tier advisers in larger deals. Finally, bidders experience lower announcement returns for deals in which private sellers use advisers. The mean (median) acquirer CAR (-1, +1) in deals with seller advisers is 2.1% (0.7%) compared to 2.8% (1.2%) in deals without seller advisers.[10] All these differences are statistically significant at the 5% level.

In deals with (without) seller advisers, 41.7% (27.5%) of sellers are subsidiaries of private firms. Among deals in which sellers use advisers, 58.3% (31.9%) of sellers with top-tier (lower-tier) advisers are subsidiaries of private firms. Both these differences are statistically significant at the 1% level.

[10] CAR (-1, +1) is the cumulative abnormal return, computed as the sum of daily abnormal returns over trading days (-1, +1), where day 0 is the announcement date. The abnormal return for day *t* equals the rate of return on a firm's common stock on trading day *t* minus the CRSP value-weighted market index return on trading day *t*.

Deals with (top-tier) seller advisers more often are cash deals. In Panel A of Table 3, 46.6% of the deals with seller advisers are cash offers compared to 42.5% of deals without such advisers. In Panel B, 57.9% of the deals in which sellers use top-tier advisers are cash offers compared to 39.9% of the deals in which sellers hire lower-tier advisers. Both differences are statistically significant at the 1% level. In Panel B, top-tier seller advisers command significantly larger fees than lower-tier seller advisers.

In sum, the univariate results reported in Table 3 indicate that, on average, the use of M&A advisers is unrelated to private sellers' valuations, while the use of top-tier advisers is negatively related to their valuations. But these univariate comparisons do not control for other determinants of private sellers' valuations. Moreover, the table suggests that private sellers that are likely to receive lower valuations may be more inclined to use M&A advisers and top-tier advisers. Consequently, the endogenous selection of M&A advisers by private sellers also needs to be accounted for when examining the effects of using M&A advisers. We tackle both these issues next.

6. Empirical Models and Results

6.1. Determinants of private sellers' decision to use M&A advisers

We start by analyzing factors that influence the likelihood that a private seller hires M&A advisers and the probability that it chooses top-tier, rather than lower-tier advisers. We estimate the propensity of private sellers to hire M&A advisers using probit and linear probability (i.e., OLS) regression models. In model 1, the probit and OLS regressions are estimated using the full sample; the dependent variable is *Seller adviser*, which equals one if a private seller uses an M&A adviser and equals zero otherwise. In model 2, the probit and OLS regressions are estimated using the subsample of deals in which private sellers hire M&A advisers; the dependent variable here is *Top-tier seller adviser*, which equals one if a seller hires a top-tier

adviser and equals zero otherwise. In the regression models, we include independent variables that can affect the likelihood that a private seller hires an M&A adviser and chooses a top-tier rather than a lower-tier adviser. We discuss below the explanatory variables included in models 1 and 2 and the regression results shown in Table 4. All variables are defined in Appendix 1. All models include year and industry fixed effects.

We use the variable *Deal value* to control for deal size and complexity because, as argued by Servaes and Zenner (1996), acquirers and targets involved in complex transactions have greater need for M&A advisory services. We hypothesize that the opportunity cost of not hiring an M&A adviser is positively related to deal value, which implies that private sellers are more likely to hire M&A advisers in larger deals. In Table 4, the coefficients estimates for *Deal value* are positive and statistically significant in OLS and probit regressions for both models, suggesting that larger private sellers are more likely to retain advisers and choose top-tier advisers. This result is consistent with prior studies that find that the propensity of using buy-side M&A advisers is positively related to deal size (see, e.g., Servaes and Zenner (1996)).

The regressions in Table 4 control for *Acquirer total assets*. The relative negotiating power of a seller is expected to be negatively related to the size of the buyer. Larger acquirers are likely to have more acquisition experience dealing with sellers and greater capacity to devote substantial resources to the M&A process allowing them, for example, to hire top-tier legal representation or maintain in-house M&A expertise. Consequently, we expect the likelihood that a private seller hires an M&A adviser to increase with acquirer size.

Relative to an acquirer that is a private company, a public acquirer would be more likely to have managers with M&A expertise. The potential mismatch between the negotiating power of a large public acquirer and that of a private seller incentivizes the private seller to hire an M&A adviser. In Table 4, the coefficient estimates for *Acquirer total assets* and *Public acquirer* are not

statistically significant, except for *Acquirer total assets* in the OLS regression for model 1.

We use the variable *Seller ROA* to control for the profitability of sellers. All else equal, a more profitable seller is a more attractive target and has greater negotiating power due to competition among bidders. Consequently, we expect a negative relation between *Seller ROA* and the likelihood of hiring an M&A adviser. In Table 4, the coefficient estimates for *Seller ROA* are negative in both models and statistically significant in model 1..

The presence of an M&A adviser on the buy-side should motivate a private seller to hire an M&A adviser to improve its bargaining power, so we include *Acquirer adviser* in the regressions in Table 4. In addition, a top-tier adviser has greater resources that it can use to provide M&A advice that is of higher-quality than the advice that lower-tier advisers would provide. Top-tier advisers are likely to have access to more information, for example, through a more extensive proprietary M&A database and more experience from advising a larger number of deals. Also, the size of a top-tier M&A adviser allows it to devote more human capital, if needed, to a single transaction. So a seller faces greater pressure to hire an M&A adviser when the buyer's M&A adviser is a top-tier IB, and we include *Top-tier acquirer adviser* in the regressions.

In Table 4, the likelihood that a private seller hires an M&A adviser is higher, on average, when the acquirer uses a top-tier or lower-tier M&A adviser. The coefficient estimates for *Acquirer adviser* and *Top-tier acquirer adviser* are positive in all regressions in Table 4. The coefficient estimates for *Acquirer adviser* are statistically significant at the 1% level in both models. In model 1, the coefficient estimate for *Top-tier acquirer adviser* is statistically significant at the 1% (5%) level in the OLS (probit) regression. This result is consistent with Kale, Kini, and Ryan (2003)'s argument that the reputations of buy-side advisers relative to sell-side advisers matters in tender offers due to the bargaining involved in M&A deals.

Officer (2007) finds that the acquisition valuations for private sellers that are subsidiaries are

lower than for stand-alone firms. We expect that subsidiary private sellers are more likely to retain M&A advisers and top-tier advisers to reduce their potentially higher valuation discounts. Our regression results are consistent with this conjecture. The coefficient estimates for *Subsidiary sellers* are positive in all regressions and statistically significant at the 10% level in model 1.

Uysal, Kedia, and Panchapagesan (2008) find a positive relation between geographic distance and the costs of obtaining information. We use the variable *Different state* as a proxy for geographic distance; it equals one if the corporate headquarters of the buyer and seller are in different states and equals zero otherwise. If private sellers use M&A advisers to reduce the costs of obtaining information, the propensity to use M&A advisers and top-tier advisers would be greater when the buyer and seller are headquartered in different states. The results in Table 4 are consistent with this idea. In model 2, the coefficient estimates for *Different state* are positive and statistically significant in both regressions. This logic also suggests that private sellers should be more likely to retain advisers when buyers are non-US firms, so we include a dummy variable *Foreign acquirer* in the regression. While the coefficient estimate of this variable is insignificantly positive in model 2, it is negative in model 1.

Next, a buyer and seller in the same industry have a higher probability of being competitors. One would expect a seller to be more likely to hire an M&A adviser when a potential buyer is a competitor, so we control for whether both parties are in the same industry. The coefficient estimate of *Same industry* is positive and statistically significant in both regressions in model 1.

Officer (2007) finds that the 'price' of liquidity adversely affects private sellers' valuations. We control for the price of liquidity because it measures the cost of debt financing. As the price of liquidity increases, a seller's need for an M&A adviser increases because the number of potential buyers that would be interested in acquiring the seller decreases, all else being equal.

We estimate the cost of liquidity, *C&I loan spread*, using the four-quarter moving average of the spread between commercial and industrial (C&I) loan rates and the federal funds rates.[11]

Officer (2007) finds that IPO activity has a positive effect on private sellers' valuations.[12] We control for IPO activity in the regressions in Table 4 because the IPO market is an alternative to the M&A market as an exit avenue for shareholders of private firms. High IPO volume indicates favorable conditions in the IPO market. As IPO volume increases, the ability of a private firm to go public increases, reducing its need for an M&A adviser due to an increase in the strength of its negotiating position. We control for IPO activity using the variable *IPO volume*, which equals the four-quarter moving average of the number of IPOs per quarter scaled by the number of firms listed on CRSP at the beginning of the quarter.

Firms in cyclical industries are less likely to acquire other companies during economic recessions. During a weak economy, potential sellers have greater incentive to hire M&A advisers that can search for prospective buyers. And IBs are more readily available to serve as M&A advisers due to lower activity in the M&A market. So we include in the regressions a dummy variable *Recession*, which equals one if the acquisition is announced during a recession period, as defined by the National Bureau of Economic Research (NBER), and zero otherwise. The coefficient estimates for *C&I loan spread*, *IPO volume*, and *Recession* are statistically insignificant in all the regressions in Table 4.

A selling shareholder that receives as consideration shares of the acquirer's stock is being paid with a financial asset whose market value changes daily. M&A advisers have expertise in calculating the intrinsic value of a buyer's stock and using comparables to assess the

[11] Harford (2005) use the C&I spread as a proxy for aggregate liquidity. We obtain part of this data from the Federal Reserve Board's website (http://www.federalreserve.gov/release). The rest is generously provided by Professor Jarrad Harford.

[12] Lian and Wang (2012) find that withdrawing an IPO filing in order to be acquired reduces the acquisition discount for a private seller.

reasonableness of an offer that involves receiving shares of a buyer's stock. We expect the likelihood that a private seller uses an M&A adviser to be lower when shareholders of the seller are paid with cash instead of stock, so we include in the regression a binary variable *Cash*. But, contrary to our expectation, the coefficient estimate of *Cash* is positive and statistically significant in model 2.

We use the variable *Prevalence of seller adviser or top-tier adviser* to measure how common it is for private sellers within an industry to use M&A advisers or top-tier advisers. *Prevalence of seller adviser or top-tier adviser* is measured as the proportion of private seller firms in the seller's two-digit SIC industry that have used advisers or top-tier advisers in the year before deal announcements. We hypothesize that a private seller is more likely to hire an M&A adviser (top-tier adviser) if using a sell-side adviser (top-tier adviser) is the norm in the seller's industry. Consistent with this conjecture, the coefficient estimate of *Prevalence of seller adviser* is positive and statistically significant at the 1% level in both regressions in model 1. The estimated coefficient of *Prevalence of top-tier seller adviser* is positive but statistically insignificant in model 2.

Finally, a seller is located near a large number of financial institutions is more likely to hire an M&A adviser and choose a top-tier adviser because of greater familiarity with and access to IBs. Accordingly, we control for whether a private seller is located close to a financial center. In our regressions, the estimated coefficient of *Close to financial center*, which equals one if a target is located in New York, New Jersey, California, Illinois, or Massachusetts and equals zero otherwise, is positive and statistically significant in both models in Table 4.

6.2 The impact of M&A advisers on private sellers' acquisition valuations

6.2.1 Methodologies

Our analysis of private sellers' acquisition valuations needs to consider the possibility that private sellers' decision to hire M&A advisers is endogenous to their acquisition valuations. Private sellers that expect to receive lower acquisition valuations may be more likely to retain M&A advisers and top-tier advisers to induce acquirers to pay higher prices. For example, private sellers that are subsidiaries or are located in states different from their potential acquirers have an incentive to hire M&A advisers and top-tier advisers (see section 6.1) because they tend to receive lower acquisition valuations, all else being equal (see Officer (2007)). This endogenous selection can potentially bias estimates of the impact that hiring M&A advisers has on private sellers' valuations.

In addition to controlling for a large number of factors related to private sellers' acquisition valuations, we use five econometric approaches to address the potential selection bias. These methods are: (1) Heckman (1979)'s two-stage treatment effect model, (2) two-stage least squares (2SLS) regressions, (3) endogenous switching regressions, (4) Abadie-Imbens matching (AIM), and (5) propensity-score matching (PSM). [13]

The first three approaches require instrumental variables (IVs) to analyze the propensity of hiring M&A advisers. We use two IVs, *Prevalence of seller adviser* (*Prevalence of top-tier adviser* for the subsample of deals that use sell-side M&A advisers) and *Close to financial center*. In the treatment effect, 2SLS, and switching regressions, the IVs are included in the first-stage regression dealing with the choice to use M&A advisers (or top-tier advisers) and are excluded from the second-stage regressions in which *Average Acquisition Premium* is the dependent variable. We believe the two IVs are valid. First, they are relevant to the private sellers'

[13] See Appendix 1 of Agrawal, et al. (2013) for technical details about implementation of the Heckman treatment effect, 2SLS, AIM, and PSM models of the choice of M&A advisers.

decision to hire M&A advisers (or top-tier advisers). As we discuss in section 6.1, there are compelling *a priori* reasons to include the IVs in the first-stage equation. Empirically, in Table 4, we find both to be significant determinants of the likelihood that private sellers hire M&A advisers and top-tier M&A advisers. As shown in Table 4, the p-value for the joint significance of the two IVs in the first-stage OLS regression is 0.000 (0.022) for M&A advisers (top-tier advisers).

Second, the IVs must meet the exclusion restriction, i.e., they should not belong in the second-stage equation explaining *Average acquisition premium*. The variable *Prevalence of seller adviser (Top-tier adviser*) measures how commonly sell-side advisers (top-tier advisers) are used by private firms within an industry to guide them through the M&A process. There is no reason why this variable should directly affect the acquisition valuation of a particular private seller, except via its effect on the firm's decision to hire an M&A adviser or top-tier adviser.[14] Similarly, *Close to financial center* indicates that financial advisory services are more familiar and accessible to a private seller. This variable should also not directly affect a private seller's acquisition valuation, other than via its effect on the likelihood that a private seller will use a financial adviser.[15]

6.2.2 OLS, Heckman treatment effect, and 2SLS regressions

The results of the OLS, Heckman treatment effect (second-stage), and 2SLS (second-stage)

[14] An argument to the contrary is the following. If other private firms in the seller's industry use advisers and consequently enjoy higher deal valuations, then a private seller's deal valuation may be higher simply because the parties in an acquisition typically look at recent comparable deals in the seller's industry when negotiating the price. But this argument *assumes* that the use of sell-side M&A advisers affects deal valuations, which is an unsettled empirical issue that we analyze.

[15] A target's proximity to a financial center may reduce the information asymmetry faced by prospective acquirers, perhaps due to greater media coverage or greater information flows from network effects, which may directly affect its valuation. While not a formal test of the exclusion restriction because none exists, if we add *Close to financial center* as an explanatory variable in the OLS regression in model 1 of Table 5, its coefficient is negative (-0.012), with a p-value of 0.588.

regressions of *Average acquisition premium* are reported in Table 5. To address the potential selection bias, we first use a two-stage treatment effect model (see Maddala (1983) and Heckman (1979)). The first-stage regression of the treatment effect model is the probit model from Table 4. We use the coefficient estimates from the first-stage to calculate the *inverse Mills ratio,* which is added to the second-stage regression of *Average acquisition premium* in the treatment effect model.

Next, we use two-stage least squares (2SLS) estimation to account for the potential selection bias. The first-stage equation in the 2SLS model is the OLS regression from Table 4. In the second-stage of 2SLS, we instrument *Seller adviser* and *Top-tier seller adviser*. A linear probability model for the first-stage regression generates consistent second-stage estimates even with a binary endogenous variable (see Angrist and Krueger (2001) and Angrist and Pischke (2009)). The 2SLS estimator is consistent but not unbiased; however, having a large sample makes the 2SLS results more reliable. The first three columns in Table 5 show estimates for the full sample (model 1); the last three columns show estimates for the subsample of deals where sellers use M&A advisers (model 2).

In the OLS regressions in Table 5, the coefficient estimates for *Seller adviser* and *Top-tier seller adviser* are positive but statistically insignificant. However, unlike the Heckman treatment effect and 2SLS models, the OLS regressions do not account for the potential endogenous choice to use an M&A adviser or a top-tier adviser. In the second-stage of the treatment effect regression for model 1 (2) in Table 5, the estimated coefficient for the *inverse Mills ratio* is statistically significant at the 1% (10%) level for the decision to use a seller (top-tier) adviser, suggesting that the choice to use sell-side M&A advisers (top-tier advisers) is endogenous to the seller's acquisition premium. The negative coefficient estimate of the *inverse Mills ratio* suggests that private sellers with certain firm- and deal-specific attributes that negatively affect

acquisition premiums are more likely to retain M&A advisers and top-tier advisers to guide them through the M&A process. The coefficient estimates for *Seller adviser* and *Top-tier seller adviser* in the treatment effect regressions are positive and statistically significant at the 5% and 10% levels, respectively, suggesting that using M&A advisers increases private sellers' acquisition valuations, after accounting for self-selection.

The results from 2SLS are consistent with those from the treatment effect model. First, the p-values of the endogeneity test (Durbin-Wu-Hausman test) are less than 0.05, consistent with a private seller's decision to use an M&A adviser and top-tier adviser being an endogenous choice in this context. In 2SLS regressions, the estimated coefficients for *Seller adviser* and *Top-tier seller adviser* are also positive and statistically significant at the 5% and 10% levels, respectively, confirming that private sellers receive higher acquisition premiums when they hire M&A advisers and that premiums are higher still when they pick top-tier advisers. Treatment effect (2SLS) estimates from model 1 suggest that the acquisition premium is about 27% (37%) higher in deals where the private seller uses an M&A adviser; the corresponding estimates from model 2 suggest that the premium is about 26% (67%) higher when the seller uses a top-tier adviser rather than a lower-tier adviser.

As for control variables, in model 1 in Table 5, the coefficient estimates are significantly negative (positive) for *Subsidiary seller*, *Cash* and *Acquirer adviser* (*Foreign acquirer*), suggesting that the incremental effects of these variables on acquisition premiums are negative (positive) in the full sample. The results are similar for model 2, except that there is no significant effect of *Foreign acquirer* in this subsample.

6.2.3 Endogenous switching regressions

Table 6 reports the results from endogenous switching regressions. This regression is a generalization of the Heckman (1979) two-stage treatment effect model (see, e.g., Maddala

(1983)).[16] It allows certain firm- and deal-specific characteristics to affect acquisition valuations of private sellers with and without M&A advisers differently. As in the treatment effect model, the first-stage regression of the switching model is the probit model from Table 4. The treatment effect model uses only one second-stage equation. Having a single second-stage equation assumes that the impact of a given firm- or deal-specific characteristic on acquisition premium is the same for private sellers that use M&A advisers and those that do not. In the switching regression model, we relax this assumption by estimating two second-stage equations: one each for the group of sellers that hire and that do not hire M&A advisers.

One benefit of using an endogenous switching regression is that it allows us to perform 'what-if' analyses. What would the acquisition premium have been, on average, if a private seller that hires an M&A adviser had chosen not to use an adviser? And what would have been the acquisition premium, on average, if a private seller that does not use an adviser had chosen to use one? For each deal, we compute the improvement, defined as the difference between the actual and the hypothetical acquisition premiums. The hypothetical acquisition premium is the predicted value of the acquisition premium for a firm had it made the opposite choice regarding its use of an M&A adviser. The hypothetical acquisition premium equals the sum of the products from multiplying the subsample means for the independent variables by the respective coefficient estimates from the regression for the subsample of private sellers that make the opposite choice about M&A advisers.

Panel A in Table 6 reports the second-stage coefficient estimates, and Panel B reports the results of 'what-if' analyses. For the full sample (i.e., model 1) in Panel A, the estimated coefficient of the *inverse Mills ratio* is statistically significant at the 5% level in both

[16] Prior studies in finance use this model to analyze underwriter compensation, bond pricing, and bidder announcement returns (see, e.g., Dunbar (1995), Fang (2005), and Golubov, Petmezas, and Travlos (2012)). We follow Golubov, et al.'s implementation of this model. See their Appendix B for technical details on model specifications and what-if analyses.

subsamples, with or without a seller adviser, suggesting that the choice to use a sell-side M&A adviser is endogenous to the seller's acquisition premium for both subgroups. For model 1 in Panel B, for the average private seller that uses an M&A adviser, the actual acquisition premium is -16.8%. The hypothetical premium, had these sellers chosen not to use advisers, would have been -19.5%. The improvement of 2.7 percentage points relative to the counterfactual premium is statistically significant, with a p-value of 0.07. This result from the switching regression model is consistent with the results from the treatment effect and 2SLS models in Table 5. Overall, the results from all three models suggest that while the selection effect of the decision to use M&A advisers is negative for private sellers, the treatment effect of this choice is positive. In other words, private sellers that decide to use M&A advisers would have received lower acquisition premiums had they not used an adviser, and the use of an adviser improves their valuations. For private sellers that do not use M&A advisers, our estimates from switching regressions imply that their premiums would not have been any higher had they used advisers.

For the group of private sellers that use M&A advisers (i.e., model 2) in Panel A, the estimated coefficient of the *inverse Mills ratio* is insignificant in both subsamples, with or without a top-tier adviser, suggesting that the choice to use top-tier advisers is not endogenous to the seller's acquisition premium. Therefore, we do not interpret the Panel B results for this subsample.

6.2.4 Matching methods

The last two methods that we use are AIM and PSM, which control for potential selection bias based on observable firm- and deal-specific characteristics but do not require the use of IVs. Private sellers decide whether to hire M&A advisers, and whether to use top-tier M&A advisers, based on the sellers' firm- and deal-specific characteristics. Both methods control for selection bias and estimate the average treatment effect (ATE), i.e., the effect of using M&A advisers on

private targets' acquisition premiums. We follow Abadie and Imbens's (2006) bias-corrected estimation method to calculate the ATE under the AIM method. For the PSM method, we use the probit regression for model 1 in Table 4 to calculate the propensity score for each firm and match each private seller that uses an adviser to the private seller that has the closest propensity score among sellers that do not use advisers. For model 2, using the subsample of deals in which private sellers hire M&A advisers, we match each private seller that uses a top-tier adviser to the private seller that has the closest propensity score among sellers that use lower-tier advisers. The ATE is the difference between the actual mean of the treated and its counterfactual mean.

Table 7 shows the ATE of private sellers that use M&A advisers. Under both the AIM and PSM methods, the ATE for *Average* a*cquisition premium* for private sellers is positive and statistically significant at the 10% level for using M&A advisers. The incremental acquisition premium from using an adviser is 4.7% (5.6%) under the AIM (PSM) approach. Given that a private seller has chosen to hire an M&A adviser, the ATE for the acquisition premium for using a top-tier adviser is positive under both methods and statistically significant at the 10% level under PSM. In model 2 in Table 7, the incremental acquisition premiums from using a top-tier adviser over a lower-tier adviser are 7.7% and 9.5% under the AIM and PSM approaches, respectively. However, the ATE is only statistically significant under the PSM approach. Our finding that the results from matching methods (AIM and PSM) are qualitatively similar to those from regression methods (treatment effect, 2SLS, and switching regressions) for dealing with endogenous selection reduce the concern that the choice of IVs drives the results from the regression models. Overall, after accounting for selection bias and controlling for other factors, we find that acquisition premiums are higher when private sellers use M&A advisers. And there is a further improvement in valuations of private sellers that hire top-tier rather than lower-tier advisers.

6.2.5 Do private sellers pay higher fees when using top-tier M&A advisers?

Golubov, Petmezas, and Travlos (2012) find that bidders pay higher advisory fees for the services of top-tier buy-side advisers because acquirers benefit more from using top-tier, rather than lower-tier, M&A advisers. Their findings are consistent with the predictions of IB reputation theory (see, e.g., Chemmanur and Fulghiri (1994)). Because we find that private sellers receive higher acquisition premiums when using top-tier advisers, we examine whether they pay higher advisory fees when they hire top-tier advisers. Our empirical model of sell-side advisory fees is based on Golubov, et al.'s model of acquirers' buy-side advisory fee.

Table 8 presents the results from OLS, treatment effect, and 2SLS regressions in which the dependent variable is *Seller adviser fee*. The first-stage regression for the treatment effect (2SLS) model is the probit (OLS) regression for model 2 in Table 4. Selection bias does not appear to be an issue in our analysis of seller adviser fees; in Table 8, the coefficient estimate for the *inverse Mills ratio* is not statistically significant in the treatment effect regression, and the p-value from the endogeneity test is 0.774 in the 2SLS model. The results from the OLS, treatment effect, and 2SLS regressions are largely consistent. The estimated coefficient for *Top-tier seller adviser* is positive but statistically insignificant in each of the three regressions in Table 8. The results in Table 8 indicate that private sellers do not pay significantly higher advisory fees when they hire top-tier M&A advisers. A caveat about our finding is that SDC reports the advisory fees paid by private sellers for 447, or about 24%, of the 1,894 deals in our sample with sell-side advisers. Advisory fee data is not available for most deals because buyers and sellers usually do not disclose the M&A advisory fees that they pay.[17]

[17] In addition, our results on the advisory fees paid by private sellers could be biased due to the self-selection issues that can result from voluntarily disclosed data. But this caveat also applies to prior analyses of acquirers' advisory fees. Mclaughlin (1990) discusses that advisory fees are not always disclosed because the SEC does not require this disclosure, even for deals involving public targets and public acquirers.

6.3 Do acquirers experience lower CARs when private sellers use M&A advisers?

Finally, we examine the impact of private sellers' use of M&A advisers on the announcement returns of their public acquirers. Given the importance of bargaining in M&A negotiations and our finding that acquirers pay higher acquisition premiums for private sellers that use M&A advisers and top-tier advisers, we would expect acquirers to have lower CARs in acquisitions of private sellers that use M&A advisers.

Table 9 reports the results from OLS, treatment effect, and 2SLS regressions in which the dependent variable *is Acquirer CAR(-1, +1).* As in section 6.2.2, the first-stage regression for each model in the treatment effect (2SLS) regression is the probit (OLS) regression for the corresponding model in Table 4. The regressions in model 1 use the full sample; the regressions in model 2 use the subsample of private sellers that hire M&A advisers. The regressions include independent variables that previous studies have found to be significant determinants of acquirer CARs. Officer, Poulsen, and Stegemoller (2009) find that acquisition premiums paid for private sellers are negatively related to acquirers' CARs, so we include *Average acquisition premium* as an explanatory variable in the regressions in Table 9. For brevity, we limit our discussion of the independent variables in Table 9 to the variables of primary interest: *Seller adviser*, *Top-tier seller adviser,* and *Average acquisition premium.*

In the OLS regression for model 1 in Table 9, the coefficient estimate of *Average acquisition premium* is negative and statistically significant, while the coefficient estimate of *Seller adviser* is insignificant. In model 1, the coefficient estimate of the *inverse Mills ratio* is positive and statistically significant at the 1% level in the treatment effect regression, and the p-value of the endogeneity test is 0.012 in the 2SLS regression. These results suggest that the decision to use M&A advisers by private sellers is endogenous to acquirer CARs. The positive coefficient estimate of the *inverse Mills ratio* suggests that private sellers with certain firm- and deal-

specific attributes that are likely to result in higher acquirer CARs are more likely to retain M&A advisers. After controlling for this selection effect, the coefficient estimate of *Average acquisition premium* is negative but no longer statistically significant. In both treatment effect and 2SLS regressions, the estimated coefficient of *Seller adviser* is significantly negative, suggesting that the use of M&A advisers by private sellers tends to result in lower CARs for acquirers. The magnitude of this effect is -6.4% and -12.7%, respectively, under the two models. Similarly, in Table 7, under the Abadie-Imbens matching method, the average treatment effect of the use of sell-side M&A advisers on acquirer CARs is also significantly negative, although its magnitude is much lower at -1.3%. While the ATE is also negative under propensity score matching, it is statistically insignificant.

The potential selection bias does not appear to be a concern in model 2. The coefficient estimate of the *inverse Mills ratio* is statistically insignificant, and the p-value of the endogeneity test for the 2SLS regression is 0.299. In model 2 in Table 9, the coefficient estimate of *Average acquisition premium* is negative and statistically significant at the 1% level in the OLS and treatment effect regressions and at the 5% level in the 2SLS regressions. In all three regressions for model 2, the estimated coefficient of *Top-tier seller adviser* is statistically insignificant. The ATE of the use of top-tier seller advisers is also insignificant in Table 7 under both matching methods. These results suggest that the hiring of top-tier M&A advisers by private sellers does not significantly affect acquirer CARs. The use of top-tier M&A advisers by private sellers appears to only affect acquirer CARs through higher acquisition premiums, i.e. smaller valuation discounts, received by private sellers.

7. Conclusions

This paper investigates the determinants of private sellers' use of M&A advisers and top-tier advisers and the effects that these advisers have on the outcomes of deals involving private

sellers. We find that private-sellers' decisions on whether to hire M&A advisers and whether to pick top-tier rather than lower-tier advisers appear to be driven by factors that affect their acquisition premiums. After accounting for this selection effect via several econometric approaches and controlling for other factors, we find that private sellers that hire M&A advisers receive significantly higher acquisition premiums. Among private sellers that hire M&A advisers, we find some evidence that sellers that hire top-tier advisers receive higher acquisition premiums. The presence of sell-side M&A advisers in deals involving private sellers has a negative effect on announcement returns to acquirers, consistent with the idea that advisers increase the bargaining power of private sellers. But conditional on the hiring of an M&A adviser by a private seller, the impact that a top-tier adviser has on announcement returns to acquirers appears to be primarily due to the higher premiums that private sellers receive when they use more reputable M&A advisers. Overall, our findings suggest that the hiring and reputation of M&A advisers improve the bargaining power and acquisition premiums of private sellers.

Appendix 1

Variable definitions

Variable	Definition
Panel A: Valuation discount variables	
Excess deal value multiple	(A-B)/B, where A is a deal value multiple for a private seller, and B is the corresponding average multiple for the portfolio of public sellers with the same primary two-digit SIC code as the private seller, deal value within ±20% of the private seller deal, and announcement date within ±1.5 calendar years of the private seller deal announcement. If there is no match, we relax the deal value restriction to 30%, 40%, or 50%, as necessary. We match with replacement of public sellers. We use four deal value multiples: *Deal value to either Sales* or *EBITDA or net earnings* or book value of equity.
Average acquisition premium	The average of all available excess deal value multiples for a private seller
Panel B: Deal characteristics	
Deal value	The price paid to the seller's shareholders plus liabilities assumed by the acquirer
Cash	Dummy variable that equals one if the method of payment is cash, and zero otherwise
Same industry	Dummy variable that equals one if the seller has the same two-digit SIC code as the acquirer, and zero otherwise
Days to deal completion	Number of days from the announcement date of a deal to its completion date
Panel C: Seller characteristics	
Seller ROA	The net earnings of the seller divided by its total assets for the last fiscal year ending before the announcement date of the acquisition
Subsidiary seller	Dummy variable that equals one if the seller is a subsidiary, and zero if the seller is a stand-alone firm
Seller adviser	Dummy variable that equals one if the seller hires an M&A adviser, and zero otherwise
Top-tier seller adviser	Dummy variable that equals one if a seller hires a top-tier IB as an M&A adviser, and zero otherwise
Seller advisory fee	The advisory fee paid by a seller scaled by deal value

Appendix 1 (cont'd)

Variable	Definition
Panel D: Acquirer characteristics	
Acquirer market value	Market value of equity of an acquirer one month before the announcement date of the acquisition
Acquirer total assets	Acquirer's total asset for the fiscal year prior to the acquisition announcement
Public acquirer	Dummy variable that equals one if the acquirer is a publicly traded firm, and zero otherwise
Acquirer CAR (-1,+1)	Sum of daily abnormal returns over trading days (-1, +1), where day 0 is the announcement date. The abnormal return for day t equals the rate of return on a firm's common stock on trading day t minus the value-weighted market index return on trading day t
Acquirer adviser	Dummy variable that equals one if an acquirer retains an adviser, and zero otherwise
Top-tier acquirer adviser	Dummy variable that equals one if an acquirer uses a top-10 adviser, and zero otherwise
Panel E: Other control variables	
C&I loan spread	The four-quarter moving average of the spread of commercial and industrial (C&I) loan rates over the federal funds rates
IPO volume	The four-quarter moving average of the number of IPOs per quarter scaled by the number of firms listed on CRSP at the beginning of the quarter
Recession	A dummy variable that equals one if the acquisition is announced during a recession period, as defined by the NBER, and zero otherwise
Different state	A dummy variable that equals one if the seller and the acquirer are not in the same state, and zero otherwise
Foreign acquirer	A dummy variable that equals one for a non-U.S. acquirer, and zero otherwise
Prevalence of seller adviser	Proportion of private seller firms in the same two-digit SIC industry that have used a financial adviser in the year prior to acquisition announcement
Prevalence of top-tier seller adviser	Proportion of private seller firms in the same two-digit SIC industry that have used a top-tier financial adviser in the year prior to acquisition announcement
Close to financial center	A dummy variable that equals one if the seller is located in New York, New Jersey, California, Illinois, or Massachusetts, and zero otherwise

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Table 1: Financial adviser ranking

This table ranks the top 30 investment-bank M&A advisers by the total value of completed and withdrawn deals, including tender offers that they advised during the period 1980-2010. Totals are computed using data from the Thomson Financial SDC database. Dollar values are inflation-adjusted to 2009. The table also reports for each M&A adviser the total number of deals that it advised during the sample period. An M&A adviser is given full credit for each deal in which it provided advisory services to the seller or acquirer, regardless of the number of advisers working on the deal. For each year in the sample period, we rank all M&A advisers by the total value of deals advised during the year. For a given year, we classify an M&A adviser as *Top-tier* (*Second-tier*) [Not ranked] if it ranks in the top 10 (next 10) [below 20]. For each M&A adviser, we report the percentage of the sample period that it was classified as *Top-tier*, *Second-tier*, and *Not ranked*. Column 1 shows an adviser's rank over the full sample period.

		Transaction value		% of years classified as		
Rank	Financial adviser	($billions)	Number of deals	Top-tier	Second-tier	Not ranked
	Top-tier					
1	Goldman Sachs & Co	9,883	5,166	100	0	0
2	Morgan Stanley & Co	7,719	4,025	90	10	0
3	Merrill Lynch Capital Markets	5,569	3,403	84	13	0
4	JP Morgan	4,052	1,962	45	16	0
5	Credit Suisse First Boston	3,607	2,320	29	29	0
6	Citigroup/Salomon Smith Barney	3,423	1,698	13	35	0
7	Lehman Brothers	3,314	1,999	48	26	0
8	Lazard Freres & Co LLC	2,905	1,824	74	26	0
9	Bear Stearns & Co Inc	2,069	1,518	39	48	0
10	Salomon Smith Barney	2,024	770	16	3	0
	Second-tier					
11	UBS Investment Bank	1,659	1,062	19	23	0
12	Salomon Brothers	1,310	1,440	58	0	0
13	First Boston Corp	1,273	1,706	45	3	0
14	Donaldson Lufkin & Jenrette	1,246	1,688	29	35	0
15	Bank of America Securities LLC	1,198	839	16	19	0
16	Dean Witter Reynolds Inc	933	405	6	32	0
17	Wasserstein Perella Group Inc	911	445	10	32	0
18	Evercore Partners	844	186	6	23	0
19	Houlihan Lokey	636	2,003	0	68	0
20	Shearson Lehman Brothers	628	1,041	32	3	0
	Not ranked					
21	Dillon, Read & Co Inc	584	591	29	29	0
22	Drexel Burnham Lambert	561	888	23	10	0
23	Sagent Advisers Inc	558	382	0	58	0
24	Blackstone Group LP	523	300	6	52	0
25	Barclays Capital	390	179	6	3	0
26	Allen & Co Inc	385	134	0	61	0
27	Kidder Peabody & Co Inc	362	851	23	26	0
28	Smith Barney, Harris Upham	358	819	3	55	0
29	Bank of America Merrill Lynch	354	199	6	0	0
30	Greenhill & Co, LLC	347	148	0	32	0

Table 2: Sample distribution

Panels A (B) shows the year (industry) distributions for the full sample and six subsamples. The full sample consists of 4,468 completed acquisitions of private U.S. firms during the period 1980-2010 for which SDC reports enough data to compute excess deal valuation multiples. The grouping of two-digit SIC codes follows Song and Walkling (1993). We group deals based on whether sellers use M&A advisers and report the distributions for the two subsamples. The subsample of deals that employ sell-side advisers is broken down further into two subsamples based on whether the sell-side adviser is a top-tier or lower-tier adviser. We classify an M&A adviser as *Top-tier (Lower-tier)* if its market share ranks in the top 10 (below 10). The full sample is also broken down into two subsamples based on whether private sellers are stand-alone firms or subsidiaries.

Panel A: Year distribution

Year	All acquisitions	No seller adviser	Seller adviser	Lower-tier seller adviser	Top-tier seller adviser	Stand-alone	Subsidiary
1980	16	7	9	6	3	13	3
1981	114	75	39	22	17	91	23
1982	167	97	70	41	29	145	22
1983	147	92	55	38	17	119	28
1984	85	37	48	24	24	67	18
1985	30	12	18	6	12	14	16
1986	53	15	38	20	18	34	19
1987	56	26	30	16	14	29	27
1988	66	30	36	20	16	27	39
1989	96	54	42	21	21	29	67
1990	65	28	37	15	22	29	36
1991	93	63	30	15	15	55	38
1992	199	120	79	58	21	131	68
1993	308	201	107	63	44	198	110
1994	331	198	133	100	33	245	86
1995	168	114	54	38	16	121	47
1996	141	71	70	42	28	100	41
1997	359	244	115	69	46	236	123
1998	286	179	107	75	32	193	93
1999	245	131	114	80	34	156	89
2000	214	127	87	51	36	125	89
2001	132	66	66	45	21	75	57
2002	98	50	48	30	18	60	38
2003	122	56	66	45	21	80	42
2004	155	97	58	37	21	110	45
2005	160	84	76	39	37	107	53
2006	160	80	80	53	27	115	45
2007	146	81	65	36	29	91	55
2008	129	71	58	45	13	97	32
2009	73	43	30	24	6	48	25
2010	54	25	29	19	10	31	23
Total	4,468	2,574	1,894	1,193	701	2,971	1,497

Table 2 (cont'd)

Panel B: Seller Industry distribution

Industry (two-digit SIC codes)	All acquisitions		No seller adviser		Seller adviser		Lower-tier seller adviser		Top-tier seller adviser		Stand-alone		Subsidiary	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Agriculture (01-09)	1	0.0	0	0.0	1	0.1	1	0.1	0	0.0	0	0.0	1	0.1
Mining (10-14)	123	2.8	76	3.0	47	2.5	24	2.0	23	3.3	78	2.6	45	3.0
Construction (15-19)	18	0.4	10	0.4	8	0.4	4	0.3	4	0.6	9	0.3	9	0.6
Food and tobacco (20-21)	85	1.9	33	1.3	52	2.7	24	2.0	28	4.0	34	1.1	51	3.4
Textiles and apparel (22-23)	42	0.9	23	0.9	19	1.0	9	0.8	10	1.4	22	0.7	20	1.3
Lumber, furniture, paper, and print (24-27)	69	1.5	32	1.2	37	2.0	15	1.3	22	3.1	34	1.1	35	2.3
Chemicals (28)	249	5.6	147	5.7	102	5.4	42	3.5	60	8.6	119	4.0	130	8.7
Petroleum, rubber, and plastics (29-30)	44	1.0	28	1.1	16	0.8	12	1.0	4	0.6	19	0.6	25	1.7
Leather, stone, glass (31-32)	21	0.5	9	0.3	12	0.6	1	0.1	11	1.6	7	0.2	14	0.9
Primary and fabricated metals (33-34)	99	2.2	46	1.8	53	2.8	32	2.7	21	3.0	47	1.6	52	3.5
Machinery (35-36)	482	10.8	274	10.6	208	11.0	126	10.6	82	11.7	266	9.0	216	14.4
Transport equipment (37)	65	1.5	35	1.4	30	1.6	14	1.2	16	2.3	24	0.8	41	2.7
Instruments and other manufacturing (38-39)	353	7.9	231	9.0	122	6.4	74	6.2	48	6.8	202	6.8	151	10.1
Transport, communications, utilities (40-49)	243	5.4	145	5.6	98	5.2	49	4.1	49	7.0	135	4.5	108	7.2
Wholesale trade (50-51)	189	4.2	128	5.0	61	3.2	34	2.8	27	3.9	126	4.2	63	4.2
Retail trade (52-59)	120	2.7	69	2.7	51	2.7	25	2.1	26	3.7	84	2.8	36	2.4
Finance, insurance, real estate (60-69)	985	22.0	464	18.0	521	27.5	393	32.9	128	18.3	828	27.9	157	10.5
Hotels and personal services (70-71)	12	0.3	6	0.2	6	0.3	3	0.3	3	0.4	5	0.2	7	0.5
Services (72-89)	1,268	28.4	818	31.8	450	23.8	311	26.1	139	19.8	932	31.4	336	22.4
Public administration and others (90-99)	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Total	4,468	100.0	2,574	100.0	1,894	100.0	1,193	100.0	701	100.0	2,971	100.0	1,497	100.0

Table 3: Sample characteristics

This table reports the mean and median values for excess deal valuation multiples and various deal, seller, and acquirer characteristics. The full sample consists of 4,468 completed acquisitions of private U.S. firms during the period 1980-2010 for which SDC reports enough data to compute excess deal valuation multiples. The number of observations reported for a given excess deal valuation multiple or other characteristic depends on data availability. Panel A reports mean and median values for the full sample and subsamples that group deals based on whether sellers use M&A advisers. Panel B reports mean and median values for subsamples that group deals based on whether sellers use top-tier or lower-tier advisers. P-values for differences in mean (median) values are from two-tailed t-tests (Wilcoxon rank-sum tests). Variables are defined in Appendix 1.

Panel A. Acquisitions with vs. without seller M&A adviser

	All acquisitions			Mean			Median			
	Mean	Median	N	Seller adviser	No seller adviser	p-value	Seller adviser	No seller adviser	p-value	Sample size
Valuations										
Excess deal value to:										
Sales	-0.214	-0.286	3,868	-0.215	-0.213	0.911	-0.274	-0.296	0.789	1,629/2,239
Net earnings	-0.335	-0.432	1,477	-0.297	-0.375	0.001	-0.391	-0.496	0.000	755/722
EBITDA	-0.230	-0.289	975	-0.237	-0.224	0.673	-0.277	-0.303	0.886	506/469
Book value of equity	-0.033	-0.038	1,109	-0.033	-0.032	0.961	-0.038	-0.048	0.975	579/530
Acquisition premium	-0.220	-0.265	4,468	-0.222	-0.219	0.819	-0.253	-0.271	0.530	1,894/2,574
Deal characteristics										
Deal value ($ mil.)	222	44	4,468	426	72	0.000	109	25	0.000	1,894/2,574
Cash	0.442	0.000	4,468	0.466	0.425	0.007				1,894/2,574
Same industry	0.583	1.000	4,468	0.620	0.556	0.000				1,894/2,574
Days to deal completion	86	50	4,468	106	72	0.000	75	35	0.000	1,894/2,574
Seller characteristics										
ROA	0.05	0.02	1,966	-0.02	0.11	0.125	0.01	0.05	0.000	906/1,060
Subsidiary	0.335	0.000	4,468	0.417	0.275	0.000				1,894/2,574
Adviser fee	0.009	0.005	447							
Acquirer characteristics										
Market value ($ mil.)	2,105	384	3,322	3,445	1,086	0.000	675	233	0.000	1,435/1,887
Book value of assets ($ mil.)	4,862	421	3,437	8,312	2,200	0.000	912	196	0.000	1,497/1,940
Public	0.866	1.000	4,468	0.870	0.864	0.564				1,894/2,574
Acquirer CAR (-1, +1)	0.025	0.010	3,328	0.021	0.028	0.042	0.007	0.012	0.015	1,437/1891
Acquirer adviser	0.333	0.000	4,468	0.522	0.195	0.000				1,894/2,574
# of acquirer advisers	1.150	1.000	1,490	1.176	1.098	0.001	1.000	1.000	0.000	988/502
Top-tier acquirer adviser	0.131	0.000	4,468	0.244	0.048	0.000				1,894/2,574

Table 3 (cont'd)

Panel B. Acquisitions with top-tier vs. lower-tier seller M&A adviser

	Mean			Median			
	Top-tier seller adviser	Lower-tier seller adviser	p-value	Top-tier seller	Lower-tier seller adviser	p-value	Sample size
Valuation							
Excess deal value to:							
Sales	-0.293	-0.170	0.000	-0.406	-0.208	0.000	603/1,026
Net earnings	-0.256	-0.314	0.122	-0.356	-0.408	0.287	228/527
EBITDA	-0.292	-0.215	0.089	-0.349	-0.255	0.062	140/366
Book value of equity	-0.196	0.033	0.000	-0.310	0.025	0.000	168/411
Acquisition premium	-0.276	-0.191	0.000	-0.355	-0.204	0.000	701/1,193
Deal characteristics							
Deal value ($ mil.)	849	178	0.000	305	62	0.000	701/1,193
Cash	0.579	0.399	0.000				701/1,193
Same industry	0.572	0.649	0.001				701/1,193
Days to deal completion	104	107	0.610	76	75	0.179	701/1,193
Seller characteristics							
ROA	-0.072	0.003	0.544	0.031	0.012	0.138	285/621
Subsidiary	0.583	0.319	0.000				701/1,193
Adviser fee	0.016	0.007	0.065	0.007	0.005	0.065	119/328
Acquirer characteristics							
Market value ($ mil.)	5,579	2,236	0.000	1,102	464	0.000	519/916
Book value of assets ($ mil.)	13,767	5,286	0.002	1,290	758	0.000	534/963
Public	0.837	0.889	0.001	1.000	1.000	0.001	701/1,193
Acquirer CAR (-1, +1)	0.032	0.015	0.001	0.012	0.005	0.002	519/918
Acquirer adviser	0.709	0.412	0.000				701/1,193
# of acquirer advisers	1.237	1.114	0.000	1.000	1.000	0.000	497/491
Top-tier acquirer adviser	0.419	0.141	0.000				701/1,193

Table 4: Choice to use a (top-tier) seller M&A adviser

This table shows results from OLS and probit regressions of the choice of hiring a (top-tier) seller adviser. The full sample consists of completed acquisitions of private U.S. firms during the period 1980-2010 for which SDC reports enough data to compute acquisition premium. In model 1, the dependent variable is *Seller adviser*, which equals one if a seller is advised by an M&A adviser and equals zero otherwise. The regressions in model 2 use the subsample of deals in which sellers hire M&A advisers; the dependent variable is *Top-tier seller adviser*, which equals one if a seller hires a top-tier M&A adviser and equals zero otherwise. We report p-values in parentheses below coefficient estimates. P-values are based on heteroskedasticity-adjusted standard errors. Variables are defined in Appendix 1. The superscripts ***, **, * denote statistical significance at 1%, 5%, and 10% levels, respectively.

	Model 1 Seller_adviser		Model 2 Top-tier seller_adviser	
	OLS	Probit	OLS	Probit
Deal value	0.061***	0.944***	0.054**	0.163**
	(0.000)	(0.000)	(0.022)	(0.050)
Acquirer total assets	-0.001**	-0.002	-0.000	0.001
	(0.016)	(0.294)	(0.340)	(0.764)
Public acquirer	0.057	0.073	-0.024	-0.108
	(0.434)	(0.759)	(0.832)	(0.757)
Seller ROA	-0.010***	-0.041**	-0.009	-0.025
	(0.002)	(0.023)	(0.233)	(0.281)
Acquirer adviser	0.197***	0.477***	0.138***	0.576***
	(0.000)	(0.000)	(0.000)	(0.000)
Top-Tier acquirer adviser	0.128***	0.324**	0.066	0.114
	(0.001)	(0.014)	(0.187)	(0.442)
Subsidiary seller	0.049*	0.139*	0.056	0.170
	(0.083)	(0.100)	(0.164)	(0.179)
Different state	0.024	0.046	0.081**	0.434***
	(0.358)	(0.548)	(0.015)	(0.003)
Foreign acquirer	-0.303***	-0.954***	0.019	0.141
	(0.000)	(0.002)	(0.844)	(0.618)
Same industry	0.048*	0.134*	0.054	0.156
	(0.062)	(0.087)	(0.148)	(0.227)
C&I loan spread	-0.031	-0.117	-0.143	-0.345
	(0.777)	(0.724)	(0.244)	(0.521)
IPO volume	-0.075	-0.252	-0.063	-0.354
	(0.236)	(0.180)	(0.348)	(0.228)
Recession	0.112	0.347	-0.074	-0.165
	(0.204)	(0.178)	(0.420)	(0.650)
Cash	0.019	0.061	0.071*	0.256**
	(0.475)	(0.438)	(0.062)	(0.037)
IV_{1a}: Prevalence of seller adviser	0.245***	0.796***		
	(0.000)	(0.000)		
IV_{1b}: Prevalence of top-tier seller adviser			0.101	0.410
			(0.469)	(0.321)
IV_2: Close to financial center	0.045*	0.159**	0.093***	0.355***
	(0.068)	(0.033)	(0.008)	(0.002)
Constant	0.773**	1.026	0.333	-1.004
	(0.031)	(0.340)	(0.397)	(0.568)
Year and industry fixed effects	Yes	Yes	Yes	Yes
Observations	1,694	1,694	812	812
Adjusted (Pseudo) R-squared	0.173	0.184	0.246	0.278
p-value of F-test for joint significance of the two IVs	0.000	0.000	0.022	0.006

Table 5: Regressions of acquisition premium

This table reports results from OLS, Heckman treatment-effect model, and two-stage least squares (2SLS) regressions in which the dependent variable is *Average acquisition premium*. The full sample consists of completed acquisitions of private U.S. firms during the period 1980-2010 for which SDC reports enough data to compute acquisition premium. For both the treatment effect and 2SLS regressions in model 1 (2), we use *Prevalence of seller adviser (Prevalence of top-tier seller adviser)* and the dummy variable *Close to financial center* as instruments. Regressions for model 1 are estimated using the full sample of deals involving private sellers; regressions for model 2 are estimated using the subsample of deals in which private sellers use M&A advisers. Each treatment effect regression includes the *inverse Mills ratio* as an explanatory variable. We use the first-stage probit regression model in Table 4 to calculate the inverse Mills ratios. In 2SLS regression models, we use the same covariates as those in OLS regressions, but instrument *Seller adviser* and *Top-tier seller adviser*. P-values are reported in parentheses below coefficient estimates; p-values are based on heteroskedasticity-adjusted standard errors. The p-value for the endogenity test is based on the Durbin-Wu-Hausman test. The p-value for the over-identification test is based on the Sargan-Hansen test. Variables are defined in Appendix 1. The superscripts ***, **, * denote statistical significance at 1%, 5%, and 10% levels, respectively.

Table 5 (cont'd)

	Dependent variable: Average acquisition premium					
	Model 1: All deals			Model 2: Deals with sell-side advisers		
	OLS	Treatment effect model	2SLS	OLS	Treatment effect model	2SLS
Seller adviser	0.023	0.274**	0.374**			
	(0.321)	(0.016)	(0.043)			
Top-tier seller adviser				0.041	0.261*	0.668*
				(0.285)	(0.104)	(0.090)
Acquirer total assets	0.000	0.000	0.000	0.000	0.000	0.000
	(0.870)	(0.759)	(0.358)	(0.626)	(0.399)	(0.342)
Seller ROA	0.002	0.004	0.005	0.004	0.006	0.009
	(0.802)	(0.485)	(0.458)	(0.690)	(0.479)	(0.509)
Deal value	0.008	-0.004	-0.013	-0.002	-0.015	-0.036
	(0.526)	(0.804)	(0.442)	(0.890)	(0.357)	(0.196)
Public acquirer	0.042	0.032	0.025	-0.031	-0.026	-0.003
	(0.509)	(0.662)	(0.699)	(0.752)	(0.782)	(0.983)
Subsidiary seller	-0.118***	-0.123***	-0.133***	-0.083**	-0.100***	-0.114**
	(0.000)	(0.000)	(0.000)	(0.027)	(0.006)	(0.013)
Same industry	0.042*	0.021	0.021	0.036	0.039	-0.000
	(0.089)	(0.408)	(0.467)	(0.316)	(0.258)	(0.994)
Cash	-0.064***	-0.066***	-0.068***	-0.073**	-0.103**	-0.120**
	(0.008)	(0.007)	(0.007)	(0.046)	(0.011)	(0.016)
Acquirer adviser	-0.033	-0.083**	-0.101**	-0.057	-0.094**	-0.142**
	(0.206)	(0.017)	(0.024)	(0.116)	(0.032)	(0.041)
Top-tier acquirer adviser	0.032	-0.006	-0.013	0.032	0.008	-0.015
	(0.395)	(0.886)	(0.785)	(0.475)	(0.864)	(0.813)
C&I loan spread	0.052	0.055	0.078	-0.014	0.005	0.071
	(0.605)	(0.577)	(0.457)	(0.915)	(0.966)	(0.644)
IPO volume	0.080	0.076	0.104*	0.037	0.038	0.072
	(0.156)	(0.179)	(0.082)	(0.603)	(0.596)	(0.361)
Recession	0.006	-0.015	-0.034	-0.048	-0.021	0.006
	(0.947)	(0.856)	(0.715)	(0.648)	(0.829)	(0.965)
Different state	-0.033	-0.029	-0.035	-0.021	-0.046	-0.065
	(0.149)	(0.227)	(0.151)	(0.526)	(0.233)	(0.163)
Foreign acquirer	0.096	0.155*	0.200**	0.057	0.050	0.045
	(0.174)	(0.055)	(0.027)	(0.484)	(0.520)	(0.601)
Inverse Mills ratio		-0.159***			-0.133*	
		(0.012)			(0.080)	
Constant	-0.447	-0.570*	-0.783**	-0.081	-0.105	-0.302
	(0.167)	(0.082)	(0.037)	(0.847)	(0.797)	(0.519)
Year and industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Endogenity test p-value			0.044			0.045
Over-identification test p-value			0.282			0.968
Observations	1,694	1,694	1,694	812	812	812
Adjusted R-squared	0.077			0.090		

Table 6: Switching regressions of acquisition premium

The table reports the second-stage results from switching regressions in which the dependent variable is *Average acquisition premium*. The full sample consists of completed acquisitions of private U.S. firms during the period 1980-2010 for which SDC reports enough data to compute acquisition premium. In model 1, one regression is estimated using the subsample of deals in which private sellers use M&A advisers, and the other using the subsample of deals where they do not use M&A advisers. In model 2, one regression is for the subsample of private sellers that use top-tier M&A advisers, and the other is for the subsample where they use lower-tier advisers. We use the first-stage probit regression models in Table 4 to calculate the inverse Mills' ratios. Panel A reports coefficient estimates, followed below by their p-values in parentheses; p-values are based on heteroskedasticity-adjusted standard errors. Panel B compares the actual acquisition premiums and their hypothetical counterparts based on 'what-if analyses' based on the results reported in Panel A. The hypothetical acquisition premium is what the premium would be if the opposite choice of advisers is made, that is, the product of the independent variables and the coefficient estimates for the regressions for the subsample of firms that make the opposite choice of M&A adviser. The improvement is defined as the actual acquisition premium minus the hypothetical acquisition premium. Variables are defined in Appendix 1. The superscripts ***, **, * denote statistical significance at 1%, 5%, and 10% levels, respectively.

Panel A: Switching regression model

	Dependent variable: Average acquisition premium			
	Model 1: All deals		Model 2: Deals with sell-side advisers	
	Seller adviser	No seller adviser	Top-tier seller adviser	Lower-tier seller adviser
Acquirer total assets	0.000	-0.002*	-0.000	0.000
	(0.349)	(0.065)	(0.392)	(0.581)
Seller ROA	0.007	-0.006	0.018**	-0.050**
	(0.422)	(0.498)	(0.046)	(0.029)
Deal value	-0.011	0.398**	0.014	-0.030
	(0.485)	(0.024)	(0.581)	(0.279)
Public acquirer	-0.048	0.108	-0.018	-0.044
	(0.616)	(0.363)	(0.909)	(0.732)
Subsidiary	-0.102***	-0.083*	-0.095	-0.118***
	(0.005)	(0.093)	(0.148)	(0.007)
Same industry	0.029	0.048	0.050	-0.027
	(0.402)	(0.219)	(0.488)	(0.508)
Cash	-0.091***	-0.038	-0.129*	-0.090**
	(0.009)	(0.333)	(0.058)	(0.039)
Acquirer adviser	-0.114**	0.130*	-0.145	-0.066
	(0.018)	(0.086)	(0.167)	(0.152)
Top-tier acquirer adviser	-0.000	0.118	0.027	0.049
	(0.992)	(0.152)	(0.702)	(0.380)
C&I loan spread	-0.200	0.006	-0.223	-0.306*
	(0.272)	(0.983)	(0.529)	(0.090)
IPO volume	0.078	0.066	0.043	0.025
	(0.309)	(0.527)	(0.820)	(0.752)
Recession	-0.067	0.115	-0.178	0.043
	(0.487)	(0.463)	(0.360)	(0.684)
Different state	-0.028	0.033	-0.071	-0.049
	(0.423)	(0.426)	(0.469)	(0.216)
Foreign acquirer	0.130	-0.074	-0.048	0.151
	(0.151)	(0.755)	(0.706)	(0.134)
Inverse mills ratio	-0.185**	-0.477**	-0.039	0.170
	(0.047)	(0.029)	(0.828)	(0.214)
Constant	0.644	-0.028	0.636	0.811
	(0.269)	(0.978)	(0.603)	(0.165)
Observations	812	882	142	670

Table 6: (Cont.)

Panel B: What-if analyses				
	Model 1		Model 2	
Mean	Seller adviser	No seller adviser	Top-tier seller adviser	Lower-tier seller adviser
Actual acquisition premium	-0.168	-0.192	-0.220	-0.144
Hypothetical acquisition premium	-0.195	-0.203	-0.220	-0.028
Improvement (=Actual – Hypothetical)	0.027	0.011	0.000	-0.116
p-value	0.070	0.468	0.991	0.000

Table 7: Average treatment effect of using sell-side M&A advisers on acquisition premiums and acquirer announcement returns

The table shows the average treatment effect (ATE) that a (top-tier) sell-side M&A adviser has on *Average acquisition premium* and *Acquirer announcement returns* in deals involving private sellers, using Abadie-Imbens matching (AIM) and propensity score matching (PSM). AIM is Abadie et al.'s (2004) method of bias-adjusted matching. For both AIM and PSM, we use all of the explanatory variables from the probit regressions in Table 4. The full sample consists of completed acquisitions of private U.S. firms during the period 1980-2010 for which SDC reports enough data to compute acquisition premium. In model 1, we estimate the ATE of hiring an M&A adviser using the full sample of deals involving private sellers. In model 2, we estimate the ATE of hiring a top-tier M&A adviser using the subsample of deals in which private sellers use an M&A adviser.

		Abadie-Imbens matching		Propensity score matching	
Model	ATE	Coef.	p-value	Coef.	p-value
	Acquisition premium:				
1	Seller adviser vs. no seller adviser	0.047	0.072	0.056	0.066
2	Top-tier seller adviser vs. lower-tier seller adviser	0.077	0.113	0.095	0.059
	Acquirer CAR (-1, +1):				
1	Seller adviser vs. no seller adviser	-0.013	0.033	-0.009	0.104
2	Top-tier seller adviser vs. lower-tier seller adviser	0.027	0.170	0.018	0.239

Table 8: Regressions of seller adviser fees

This table reports results from OLS, Heckman treatment-effect model, and two-stage least squares (2SLS) regressions in which the dependent variable is *Seller adviser fee*. This fee equals the total advisory fees paid by the seller, excluding financing fees, divided by *Deal value*. The sample consists of completed acquisitions for private U.S. firms using advisers during the period 1980-2010 for which SDC reports seller adviser fees. For both the treatment effect and 2SLS regressions, we use *Prevalence of top-tier seller adviser* and the dummy variable *Close to financial center* as the instruments. The treatment effect regression includes the *inverse Mills ratio* as an explanatory variable. We use the first-stage probit regression model in Table 4 to calculate the inverse Mills ratios. In the 2SLS regression models, we use the same covariates as those in the OLS regressions, but instrument *Seller adviser* and *Top-tier seller adviser*. P-values are reported in parentheses below coefficient estimates; p-values are based on heteroskedasticity-adjusted standard errors. The p-value for the endogenity test is based on the Durbin-Wu-Hausman test. The p-value for the over-identification test is based on the Sargan-Hansen test. Variables are defined in Appendix 1. The superscripts ***, **, * denote statistical significance at 1%, 5%, and 10% levels, respectively.

	Dependent variable: Seller adviser fee		
	OLS	Treatment effect model	2SLS
Top-tier seller adviser	0.009	0.009	0.039
	(0.216)	(0.576)	(0.375)
Deal value	-0.002	-0.002	-0.004
	(0.175)	(0.228)	(0.297)
Subsidiary	-0.004	-0.004	-0.004
	(0.279)	(0.541)	(0.343)
Same industry	-0.003	-0.003	0.001
	(0.322)	(0.617)	(0.873)
Cash	0.037	0.037***	0.035
	(0.317)	(0.000)	(0.309)
Acquirer using adviser	0.003	0.003	-0.005
	(0.385)	(0.629)	(0.458)
Top-tier acquirer adviser used	0.005	0.005	0.003
	(0.401)	(0.449)	(0.618)
C&I loan spread	-0.000	-0.000	-0.013
	(0.985)	(0.995)	(0.233)
IPO volume	-0.003	-0.003	-0.001
	(0.308)	(0.579)	(0.570)
Recession	-0.006	-0.006	-0.009
	(0.550)	(0.732)	(0.504)
Different state	0.003	0.003	0.004
	(0.171)	(0.487)	(0.182)
Foreign acquirer	0.006	0.006	0.006
	(0.308)	(0.633)	(0.389)
Inverse Mills ratio		0.000	
		(0.479)	
Constant	-0.008	-0.008	0.016
	(0.787)	(0.822)	(0.184)
Year and industry fixed effects	Yes	Yes	Yes
Endogeneity test p-value			0.774
Over-identification test p-value			0.272
Observations	447	447	447
Adjusted R-squared	0.023		

Table 9: Regressions of acquirer announcement returns

This table reports results from OLS, Heckman treatment-effect model, and two-stage least squares (2SLS) regressions for the cumulative abnormal returns of public acquirers around the announcement dates of acquisitions. *CAR (-1, +1)* equals the sum of daily abnormal returns over trading days (-1, +1), where day 0 is the announcement date. The abnormal return for day *t* equals the return on a stock on trading day *t* minus the corresponding return on the CRSP value-weighted market index. The full sample consists of completed acquisitions of private U.S. firms during the period 1980-2010 for which SDC reports enough data to compute acquisition premium. For both the treatment effect and 2SLS regressions in model 1 (2), we use *Prevalence of seller adviser (Prevalence of top-tier seller adviser)* and the dummy variable *Close to financial center* as instruments. Regressions in model 1 are estimated using the full sample of deals involving private sellers; regressions in model 2 are estimated using the subsample of deals in which private sellers use M&A advisers. Treatment effect regressions include the inverse Mills ratio as an explanatory variable. We use the first-stage probit regression in Table 4 to calculate the inverse Mills ratios. In 2SLS regressions, we use the same covariates as those in the OLS regressions, but instrument *Seller adviser* and *Top-tier seller adviser*. P-values are reported in parentheses below coefficient estimates and are based on heteroskedasticity-adjusted standard errors. The p-value for the endogenity test is based on the Durbin-Wu-Hausman test. The p-value for the over-identification test is based on the Sargan-Hansen test. Variables are defined in Appendix 1. The superscripts ***, **, * denote statistical significance at 1%, 5%, and 10% levels, respectively.

Table 9 (cont'd)

	Dependent variable: Acquirer CAR (-1, +1)					
	Model 1: All deals			Model 2: Deals with sell-side advisers		
	OLS	Treatment effect model	2SLS	OLS	Treatment effect model	2SLS
Seller adviser	-0.004	-0.064**	-0.127**			
	(0.442)	(0.021)	(0.024)			
Top-tier seller adviser				0.015	-0.004	-0.071
				(0.105)	(0.927)	(0.442)
Acquisition premium	-0.012*	-0.010	-0.012	-0.032***	-0.031***	-0.027**
	(0.067)	(0.116)	(0.113)	(0.003)	(0.000)	(0.024)
Acquirer total assets	0.000	0.000	-0.000	-0.000	-0.000	-0.000
	(0.248)	(0.445)	(0.630)	(0.951)	(0.851)	(0.492)
Seller ROA	-0.002	-0.003**	-0.004*	-0.005***	-0.006***	-0.006***
	(0.190)	(0.017)	(0.051)	(0.000)	(0.002)	(0.001)
Deal value	-0.007*	-0.004	0.002	-0.004	-0.003	0.002
	(0.060)	(0.291)	(0.708)	(0.273)	(0.498)	(0.794)
Subsidiary	0.010	0.011*	0.018**	0.008	0.009	0.013
	(0.153)	(0.065)	(0.027)	(0.454)	(0.286)	(0.259)
Same industry	-0.002	0.003	0.002	-0.013	-0.013*	-0.009
	(0.763)	(0.663)	(0.769)	(0.106)	(0.096)	(0.297)
Cash	-0.004	-0.004	-0.004	0.005	0.007	0.013
	(0.495)	(0.535)	(0.552)	(0.597)	(0.466)	(0.281)
Acquirer adviser	-0.004	0.007	0.020	-0.003	0.000	0.011
	(0.523)	(0.401)	(0.149)	(0.725)	(0.979)	(0.556)
Top-tier acquirer adviser	0.004	0.014	0.020	0.003	0.005	0.010
	(0.656)	(0.148)	(0.116)	(0.789)	(0.626)	(0.467)
C&I loan spread	0.010	0.015	-0.013	0.032	0.030	0.026
	(0.733)	(0.634)	(0.698)	(0.339)	(0.426)	(0.473)
IPO volume	0.023*	0.023*	0.014	0.037**	0.037**	0.034*
	(0.093)	(0.087)	(0.396)	(0.033)	(0.028)	(0.058)
Recession	-0.036	-0.030	-0.029	-0.047	-0.049**	-0.059*
	(0.110)	(0.125)	(0.254)	(0.115)	(0.028)	(0.058)
Different state	-0.011*	-0.012**	-0.007	-0.002	-0.000	0.006
	(0.069)	(0.045)	(0.314)	(0.792)	(0.980)	(0.624)
Foreign acquirer	0.044**	0.029	0.008	0.024	0.022	0.014
	(0.012)	(0.245)	(0.765)	(0.215)	(0.377)	(0.582)
Inverse Mills ratio		0.038***			0.012	
		(0.013)			(0.316)	
Constant	-0.071	-0.058	0.110	-0.133	-0.128	-0.129
	(0.436)	(0.575)	(0.402)	(0.203)	(0.287)	(0.266)
Year and industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Endogeneity test p-value			0.012			0.299
Over-identification test p-value			0.184			0.140
Observations	1,554	1,554	1,554	753	753	753
Adjusted R-squared	0.087			0.138		