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Corporate Takeovers and Economic Efficiency

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Abstract

I review recent takeover research which advances our understanding of "who buys who" in the drive for productive efficiency. This research provides detailed information on text-based definitions of product market links between bidders and targets, the role of the supply chain and industrial networks in driving takeovers, target plant efficiency, and pre- and post-takeover investment in product innovation. Moreover, recent evidence adds to our understanding of "how firms are sold" (transaction efficiency). Almost half of takeovers involving public targets are initiated by the seller and not by the buyer. Targets are strongly averse to bidder toeholds, and the merger negotiation process strongly protects proprietary information. Takeover premiums leave traces of rational bidding strategies, including bid preemption and winner's curse avoidance. Recent tests employing exogenous instrumentation of bidder valuations reject that bidder shares are systematically overpriced in all-stock bids, and suggest that bidder synergy gains are much larger than previously thought.

Keywords: Takeover, supply chain, innovation, bidding, deal terms, takeover gains

JEL Classifications: G30, G34

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I review recent takeover research which advances our understanding of ``who buys who" in the drive for productive efficiency. This research provides detailed information on text-based definitions of product market links between bidders and targets, the role of the supply chain and industrial networks in driving takeovers, target plant efficiency, and pre- and post-takeover investment in product innovation. Moreover, recent evidence adds to our understanding of ``how firms are sold" (transaction efficiency). Almost half of takeovers involving public targets are initiated by the seller and not by the buyer. Targets are strongly averse to bidder toeholds, and the merger negotiation process strongly protects proprietary information. Takeover premiums leave traces of rational bidding strategies, including bid preemption and winner's curse avoidance. Recent tests employing exogenous instrumentation of bidder valuations reject that bidder shares are systematically overpriced in all-stock bids, and suggest that bidder synergy gains are much larger than previously thought.

> "[T]ake-overs, like bankruptcy, represent one of Nature's methods of eliminating deadwood in the struggle for survival. A more open and more efficiently responsive corporate society can result." (Samuelson 1970, p. 505).

1 INTROUCTION

Over the past century, waves of U.S. corporate mergers and acquisition (M&A) activity have resulted in industrial reorganization on a massive scale. As suggested by Nobel Laureate Paul Samuelson (above quote), this important business activity may be thought of as a form of Darwinian industrial selection promoting social welfare. The engine for this selection process is managerial competition in the market for corporate control. The managerial competition model, in combination with the development of agency- and optimal contracting theory, has over the past four decades spawned a large body of empirical corporate finance research related to the fundamental question of whether and how takeovers promote economic efficiency.

As thoroughly reviewed elsewhere,[1] a large part of this literature examines the role of corporate governance and compensation contracts in inducing self-interested managers to relinquish control. Another and relatively recent part, which is a primary focus of this review, places takeovers squarely in the context of industrial organization. Motivated by productive efficiency arguments, it traces with unprecedented level of detail "who buys who" up and down the supply chain and within industrial networks. Moreover, it asks whether pressures from the market for corporate control stifle or promote long-term investments in research and development (R&D).

I also review recent research testing the rationality of the bidding process, including whether the sales mechanism promotes a transfer of control of the target resources to the most efficient buyer. This literature draws on auction theory to describe optimal bidding strategies and it uses

[1] Jensen & Ruback 1983, Jensen 1993, Shleifer & Vishny 1997, Becht, Bolton & Roell 2003, Betton, Eckbo & Thorburn 2008, Eckbo & Thorburn 2013.

sophisticated econometric techniques to generate counterfactuals, exogenous variation, and causality. The review is necessarily selective, with an emphasis on the most recent contributions: one-half of the referenced articles were drafted or published within the past five years.

I divide the research into six areas, beginning in Section 2 with research linking finance and industrial economics. This includes estimating production efficiency effects at the plant level, defining industry relatedness using text-based analysis to identify products, and identifying industry networks. This literature concludes that takeover activity likely enhances production efficiency along the supply chain, and that the search for a merger partners is often driven by a desire to promote new product development.

Next, in Section 3, I review recent papers estimating effects of takeovers on corporate innovation. This literature quantifies corporate innovation activity using large-sample databases containing the number of patents as well as patent citations of bidders and targets. The quality of this research is such that it helps settle a controversy that goes back at least to the era of hostile takeovers in the early 1980s. A claim heard often then, and sometimes also today when executives are defending against unwanted takeover, is that takeovers prevent managers from implementing "long- term" investments. Contrary to this claim, the evidence concludes that takeovers promote corporate R&D expenses and valuable innovations—conventionally regarded as "long-term" investments—in particular among smaller firms aiming to become targets of larger organizations.

The next three sections deal with various aspects of the takeover mechanism itself—how firms are sold. In Section 4, I discuss evidence on deal initiation, contractual provisions designed to allow revelation of proprietary information to the negotiating parties, final deal terms and offer success rates. This research reveals a high degree of standardization and professionalization of the takeover process, which by itself is efficiency enhancing.

Section 5 asks whether the sales process causes deal terms to be "market driven", either by

affecting negotiated offer prices or by allowing bidders to exchange overpriced stock for "hard" target assets. Model-based tests reject the notion of a costly feedback loop from the pre-bid target stock price runup to the takeover premium. The question of whether the takeover process systematically permit the most overvalued rather than the most efficient bidder to gain control of the target resources has also been recently addressed: tests which exogenously instrument bidder pricing errors (exogenous to bidder valuation fundamentals) reject this proposition as well.

The discussion of the selling mechanism ends in Section 6 with a review of evidence on takeover bidding. An important work horse here is the (English) auction. Auction theory provides optimal bidding strategies in specific settings, and is useful for analyzing tender offers as well as bilateral merger negotiations. The empirical studies present some evidence consistent with rational strategic bidding behavior, focusing on toehold bidding, preemptive bidding, and winner's curse avoidance. Moreover, the recent literature presents an interesting contrast between the strategies of industrial and financial buyers (where the latter are private equity firms).

Finally, I turn to estimates of shareholder gains from takeover activity. Direct evidence on the wealth effects of mergers presents an important check on the assumption of value-maximizing corporate behavior driving economic efficiency. Traditional estimates show large gains to the seller but near-zero average gains for buyers (after transaction costs). However, recent work take issue with the implicit assumption behind traditional estimates that bidder stand-alone values are unchanged throughout the takeover process. Quasi-experiments as well as structural estimation techniques designed to identify the (counter-factual) bidder stand-alone value change suggest that bidder takeover gains are significantly greater than previously thought.

2 TAKEOVERS AND INDUSTRIAL ORGANIZATION

2.1 A century of merger waves

At the end of the 19th century, an unprecedented level of merger activity created large industrial voting trusts such as the Standard Oil of New Jersey, the United Fruit Company, and U.S. Steel. In response to this ``monopolization wave", the U.S. Congress introduced in rapid succession 45 different antitrust legislative acts, placing strict limits on large within-industry (horizontal) takeovers. As a consequence, subsequent merger waves, visualized in Figure 1 for takeovers involving publicly traded targets, largely involves vertical integration and scale economies.[2]

Subsequent legislation also affected the disciplinary function of the market for corporate control. For example, the Glass-Steagall provisions of the U.S. Banking Act of 1933 (repealed with the Gramm-Leach-Bliley Act of 1999), and the 1940 Investment Company Act, placed restrictions on shareownership and the exercise of voting rights by financial institutions. A (unintended) consequence of such restrictions is to reduce shareholder monitoring of corporations. Lack of monitoring in part explains the ``conglomeration merger wave" of the 1960s, in which corporate executives built ``empires" consisting of largely unrelated divisions.

The merger wave of the 1960s triggered the 1968 Williams Act which regulates the cash tender offer mechanism. Prior to 1968, the cash tender offer bypassed rules governing proxy solicitations in security-exchange deals and, in so doing, enabled quick-to-execute unsolicited offers made directly to target shareholders on a first-come-first serve basis. Through a combination of disclosure rules, minimum tender offer period, and pro-rata purchase of tendered target shares, the Williams Act eliminated the ``overnight merger" (``Saturday night special").

[2] The merger waves in Figure 1 (solid line) are constructed as the annual fraction of all public firms on the University of Chicago's Center for Research in Security Prices (CRSP) database that delist due to merger during the year

The 1970s and the 1980s saw ``refocusing merger waves", which sought to downsize many of the large and complex corporate structures created by the conglomeration wave of the 1960s, as well as by the economic downturn triggered by high oil prices (following the formation of the OPEC cartel), and excess industrial capacity created by dramatic innovation in computer- and communication technology. This period also saw the emergence of a culture of shareholder activism not previously seen since the beginning of the century. With it came unsolicited (``hostile") takeovers, sophisticated takeover defenses, and a corporate governance movement driven by private equity investors, hedge funds, large pension funds, as well as sovereign wealth funds worldwide.

There is substantial evidence that the gradual industrial deregulation over the past four decades (including airlines, telecommunications, railroads, utilities, financial institutions, etc.) has fueled industry merger waves taking advantage of new investment opportunities.[3] Moreover, the late 1990s and early 2000s also saw a wave of mergers with global strategic partners, in part triggered by foreign deregulation activity.[4]

2.2 Theories suggesting "who buys who"

The merger literature has made significant strides towards increasing our empirical understanding of the industrial organization aspects of mergers. Economic theory provides broad strokes in terms of understanding the incentives to merge or restructure within an industry, exploiting valuation discrepancies reflected in Tobin's *q*. For example, in Gort (1969) and Jovanovic and Rousseau (2002, 2008) capital is reallocated from under-performing, low-q targets to high-q bidders with superior management skills and productive resources. The associated empirical prediction is that "high buys low" in terms of market-to-book ratios (M/B). Yang (2008) refines this prediction to one where firms with rising productivity buy assets of firms with falling

[3] See, e.g. Mitchell & Mulherin (1996), Boon & Mulherin (2000), Maksimovic & Phillips (2001), Harford (2005), Becher, Mulherin & Walkling (2012) and Ovtchinnikov (2013).
[4] See, e.g. Powell & Yawson (2005), Erel, Liao & Weisbach (2012) and Makaew (2012) for cross-border M&As.

productivity, or "rising buys falling".

Rhodes-Kropf and Robinson (2008) use the idea that bidders search for targets with complementary assets. Classical property rights theory holds that, when there are significant complementarities among assets (e.g. upstream oil field and downstream pipeline), placing these assets under the control of a single firm reduces the hold-up problem and underinvestment that results from incomplete contracting (Klein, Crawford & Alchian 1978; Hart 1995). Depending on the relative bargaining power of the bidder and target, their model suggests that merging firms will have similar M/B ratios, or "like buys like", which receives some empirical support.

Levis (2011) also builds on the idea of complementarities: firms with high revenue growth opportunities but high operating costs, become targets of firms with lower growth prospects but higher cost efficiency. In Gomes and Livdan (2004), synergies emanate from economies of scope which allow merged firms to lower their fixed cost of production by eliminating redundant and inefficient activities. Morellec and Zhdanov (2005) model the option value of merger in industry equilibrium, while David (2011) and Dimopoulos and Sacchetto (2013) examine industry dynamics resulting from mergers, exit and entry.

2.3 Industrial networks

Recent work has substantially broadened our empirical understanding of the industrial links which give rise to takeover activity. Ahern and Harford (2013) broaden the standard industry analysis (much of which has been based on Standard Industrial Classification or SIC codes) to also include a network of customer-supplier relationships. The idea is that merger waves motivated by economic efficiency could propagate from one industry to related industries through customer and supplier links in the overall network. They identify industry networks using text-based product identification (Hoberg & Phillips 2010) and input-output accounts from the Bureau of Economic Analysis at the U.S. department of Commerce. They find that the

average industry engages in mergers with a small set of local industries that are closely related through customer-supplier links. Within the network, stronger product market connections lead to a greater incidence of cross-industry mergers.

Ahern and Harford (2013) complement the findings of Hoberg and Phillips (2010) who use network techniques to group firms based on textual product market descriptions. They conclude that the "best" mergers, i.e. mergers with the highest *ex post* cash flows and new product introductions are "similar but different": (1) acquirer and target are similar in the product space, (2) targets are different from acquirer's nearest rivals, and (3) targets have unique assets (in the form of patents).

2.4 Buying power and industry competition

There is substantial evidence that mergers significantly impact the market valuation of the merging firms' horizontal rivals (Eckbo 1983; Song & Walkling 2000; Cai, Song & Walkling 2011).[5] Importantly, this intra-industry valuation effect is inconsistent with the hypothesis that the mergers have collusive, anticompetitive effects (Eckbo 1983 1992; Fee & Thomas 2004; Shahrur 2005; Becher, Mulherin & Walkling 2012).[6] The evidence is, however, consistent with the alternative hypothesis that rivals are impacted by intra-industry merger announcements because they learn from the productive efficiency driving the merger, possibly putting some rivals in play for a later date.[7]

When identifying upstream suppliers and downstream (corporate) customers using Compustat Industry Segment tapes and input-output accounts from the Bureau of Economic Analysis, there is some evidence that a horizontal merger creates buying power in the merging firms' upstream

[5] For return comovements among peer companies more generally, see Hoberg & Phillips (2012) and Atkas, de Bodt & Roll (2013).
[6] Atkas, de Bodt & Roll (2004, 2007) draw a similar conclusion based on mergers reviewed for anticompetitive effects by the European Union.
[7] Betton, Eckbo & Thorburn (2008) summarizes predictions of classical theories of efficiency and market power for the intra-industry valuation consequences of merger activity.

supplier industry (Fee & Thomas 2004; Shahrur 2005; Bhattacharyya & Nain 2011). Interestingly, there is also some indication that the merger-induced rent appropriation from upstream suppliers (if any) to some extent is passed on to the merging firms' corporate customers: the latter category of firms on average experience positive announcement returns from horizontal mergers upstream (Shahrur 2005). Studies of vertical mergers (and vertical divestitures) also conclude that the pattern of firm-specific and industry wealth effects suggests that vertical integration through merger is foremost motivated by efficiency improvements (Eckbo 1983; Fan & Goyal 2006; Jain, Kini & Shenoy 2011; Shenoy 2012).

2.5 Plant-level efficiency

Maksimovic and Phillips (1998) and a series of subsequent papers exploit the Longitudinal Research Database maintained by the Center for Economic Studies at the Census Bureau (McGuckin & Pascoe, 1988). This high-quality plant-level data covers manufacturing industries (SIC 2000-3999), and includes all firms with more than 250 employees as well as a sample of small firms on a rotating 5-year panel. The data includes plant-level input and output information, value of shipments, and labor- material- and capital costs. The database covers both private and public firms, where public status is determined by matching with Compustat. Importantly, by estimating plant productivity, and tracking plant ownership changes, it is possible to test directly whether plant-level acquisitions enhance productive efficiency.

Maksimovic & Phillips (1998) estimate total factor productivity (using a translog production function) which takes the actual amount of output produced for a given amount of inputs and compares it to a predicted amount of output. They first predict plant output—what the plant should have produced given the amount of inputs it used. A plant subsequently classified as having higher than average productivity if the difference between actual and predicted outputs is positive, given the actual use of inputs. They find that the productivity of plants sold out of

Chapter 11 bankruptcy tends to increase under the new ownership. Maksimovic & Phillips (2001) find that plant sales more generally also tend to improve the allocation of resources, consistent with a simple neoclassical model of profit maximization.

Maksimovic, Phillips & Yang (2013) use the plant-level data to explore differences between merger waves involving public and private firms from 1972-2004, for a total of 665,000 firm-industry-years and more than one million plant-years. The public status of a firm is determined from Compustat, and 20% of the sample plants are held by publicly traded companies, producing 35% of total output. They find that firms with higher productivity are more likely to buy plants while firms with lower productivity are more likely to sell. Plant productivity tends to increase after the transaction. Moreover, accounting for the endogeneity of the decision to go public, they find that firms with higher productivity and greater anticipation of future growth choose to become public and later participate more in acquisitions when opportunities arise. Moreover, consistent with Maksimovic & Phillips (2001, 2002), Yang (2008) and Li (2013), they also show that mergers that occur on the industry merger wave are associated with greater efficiency improvements.

Studying post-merger restructuring activity, Maksimovic, Phillips & Prabhala (2011) track plant sales following 1,483 mergers and acquisitions over the period 1981-2000. They find that acquirers of full firms sell 27% and close 19% of the plants of the target firms within three years of the acquisition. Relatively efficient acquirers tend to retain more acquired plants. More retained plants tend to increase in productivity whereas sold plants do not, suggesting that acquirers restructure targets in ways that exploit their comparative advantage.

3 TAKEOVERS AND CORPORATE INNOVATION

3.1 Two opposing arguments

Does the threat of an unwanted takeover promote or stifle "long-term" corporate investment in R&D and innovative activity? Economic theory provides arguments for both sides of this issue. On the one hand, the agency cost view holds that absent the disciplinary effect of an active market for corporate control, managers may shirk, innovate less and create less valuable innovations (Jensen 1986; Fulghieri & Sevilir 2009). Thus, in this view, the threat of a takeover tends to promote valuable innovation activity. On the other hand, economic theory also recognizes that with incomplete contracting, the threat of *ex post* rent appropriation through unwanted takeover may reduce managerial incentives to develop valuable firm-specific human capital *ex ante* (Williamson 1985; Shleifer & Summers 1988), including of the type driving a successful innovation program. Innovation activity may also be deterred if the stock market tends to undervalue hard-to-assess payoffs from R&D investments (Stein 1988).

3.2 Post-acquisition innovation by large bidders

The recent empirical merger literature sheds interesting light on this important issue. The studies combine samples of completed and withdrawn mergers (Thomson SDC) and matched non-merging companies, with data on R&D expenditures (Compustat), patent counts in different technology classes and patent citations (European Patent Office worldwide Patent Statistical Database, U.S. Patent and Trademark Office), product market relatedness and technological proximity, and the passage of state antitakeover legislation and business combination laws.

There is evidence that, post-acquisition, larger firms innovate less. For example, Seru (2011) finds that patenting goes down post-acquisition (relative to targets of failed bids). He uses a quasi-experimental approach involving failed merger bids to generate exogenous variation in acquisition outcomes of target firms. A difference-in-difference estimation reveals that, relative

to failed targets, firms acquired in a diversifying merger produce both a smaller number of innovations and also less novel innovation. He also finds that conglomerates are more likely to outsource R&D through alliances and joint ventures.

3.3 Pre-acquisition innovation by targets

Phillips & Zhdanov (2013) present model-based tests indicating that an active acquisition market positively affects small firms' incentives to innovate. In their model, which emphasizes asset complementarities and product market synergies, acquiring innovation through merger is a substitute for in-house R&D. Some large firms let small firms innovate and subsequently acquire successful innovators. The prospect of becoming a target in turn increases the incentives for small firms to innovate as it amplifies the potential gain from successful R&D. Thus, profit maximization leads larger firms to innovate less than smaller firms.

Like Edmans, Goldstein & Jiang (2012), they employ shocks to aggregate mutual fund net asset values (fund flows) to generate variation in firm valuation and thus acquisition activity that is exogenous to firm fundamentals and innovation. They find evidence that R&D activity by small firms responds positively to greater probability of becoming the target of a larger firm. Thus, rather than stifling innovation as interpreted by Seru (2011), large firms may actually be promoting greater innovation through their acquisition activity, and through an ability of the merged firm to apply innovation to both the bidder's and the target's product ranges.

The evidence in Bena and Li (2013) further supports the notion that synergies obtained from combining innovation capabilities are important drivers of acquisitions. They show that technological overlap between firms' innovation activities positively impacts the likelihood or a merger pair formation. Moreover, based on a quasi-experiment involving withdrawn bids that fail for reasons exogenous to innovation, they find a positive treatment effect of a merger on post-merger innovation output when there is pre-merger technological overlap between the merging

firms. They conclude that synergies obtained from combining innovation activities are an important acquisition impetus.

3.4 Innovation and vertical integration

Fresard, Hoberg & Phillips (2012) use 10-K text-based measures of product market relatedness and find that firms in high R&D industries are less likely to vertically integrate or engage in vertical mergers, and are more likely to initiate customer and supplier relationships outside the firm. They interpret these findings in light of the contracting theory of Grossman and Hart (1986): firms with unrealized innovation avoid integration in order to maintain *ex ante* incentives to make relationship specific investments and maintain residual control rights. In contrast, they find that firms in high patenting industries (industries with high level of realized innovations) are more likely to vertically integrate. The latter firms obtain control rights to facilitate commercialization of realized innovations.

3.5 Innovation following LBOs and antitakeover laws

Lerner, Sorenson & Stromberg (2011) study innovation activity in firms following LBOs, and conclude that firms do not sacrifice long-term investments after the buyout: LBO firm patents are more cited, show no shifts in the fundamental nature of the research, and become more concentrated in important areas of companies' innovative portfolios. The paper does not argue causality—whether private equity investors cause these changes or selectively invest in firms that are ripe for an improvement in innovation activity.

Atanassov (2013) employs panel data on 13,000+ firms over the 1976-2000 period to examine whether the enactment of state antitakeover laws—representing an exogenous reduction in the threat of hostile takeovers—affects innovation. He finds a decline in innovation for firms incorporated in states that pass antitakeover laws relative to firms incorporated in states that do not. Moreover, most of the impact of antitakeover laws on innovation occurs two or more years

after they are enacted, which suggests a causal effect from the law on innovation. He also finds that the negative effect of antitakeover laws is somewhat mitigated by the presence of firm-level governance mechanisms.

4 HOW FIRMS ARE SOLD

4.1 Deal initiation

This section summarizes empirical research on the selling process. What do we know about deal initiation, deal terms and deal success rates? First, in merger deals, Regulation 14A of the 1933 Securities Act requires the target to file a proxy statement soliciting target shareholder votes. The section "background of the merger", which provides a detailed description of the process leading up to the merger agreement, is increasingly used by researchers to describe the selling process.[8]

Hansen (2001) and Boone & Mulherin (2007) provide institutional details of the takeover selling process, particularly as it pertains to auctions. Recent research has focused on which party (the buyer or the seller) is likely to initiate merger talks. Gorbenko & Malenko (2013) models the effect of entry costs on deal initiation in either private- or common-value auctions, while Atkas, de Bodt & Roll (2010), Masulis & Simsir (2013) and Eckbo, Norli & Thorburn (2013) provide empirical evidence on deal initiation.

Eckbo, Norli & Thorburn (2013) show that seller-initiation is much more pervasive than previously thought: with a sample exceeding 3,800 takeover bids for public targets with SEC filings during the period 1996-2009, as much as 45% of the bids were initiated by the target board and not by the bidder. The literature on deal initiation also establishes that takeover premiums are lower in seller-initiated than in bidder-initiated deals, and that deal initiation affects target CEO compensation (Fich, Cai & Tran 2011; Heitzman 2011).

[8] Useful SEC filings include DEFMA14A (definitive proxy statement for M&A), PREM14A (preliminary proxy statement for M&A), schedule TO-T (third party tender offer), 14D9 (management tender offer recommendation, and S-4 (registration of securities issues in business combination transactions).

4.2 Deal terms

In a seller-initiated deal, the target's investment bank begins the process by contacting several potentially interested parties. To participate in the bid process, these parties must sign a confidentiality agreement (allowing the release of non-public information, including site visits and documents assembled by the target in a data room), and agree to non-solicitation (preventing hijacking of key target employees) and a standstill (blocking market purchases of target shares). After the initial rounds of preliminary bidding, the seller selects its preferred negotiating party for a merger agreement.

The merger agreement sets out the form of the acquisition (merger, tender offer); the total consideration and how it is to be settled via cash, stock swap, collar, clawback and earnout (Officer 2004; Cain, Denis & Denis 2011); material adverse change (MAC) clauses (Denis & Macias 2013); lockup provisions (Burch 2001) and provisions for deal termination with associated termination or breakup fee anywhere from two to five percent of the deal value (Officer, 2003; Bates & Lemmon, 2003); and to organize shareholder voting. Listing rules may also require a bidder shareholder vote on the takeover (the NYSE requires this if the bidder issues 20% or more of its stock to pay for the target).

The target typically purchases a fairness opinions as part of the due diligence process (Kisgen, Qian & Song 2007; Cain & Denis 2013). Moreover, the merger proposal may include a "go shop" provision under which the target actively signals to other potential bidders that it is "in play". Some bidders obtain tender agreements from target insiders, under which these insiders forsake the right to tender to a rival bidder (Bargeron 2012). Also, Delaware case law suggests that a merger agreement would benefit from a "fiduciary out" clause explicitly enabling the target board to agree to a superior third-party offer should one materialize (Gaughan 2011).

When merger negotiations close, the bidder seeks SEC approval for any share issue required in the deal, and a merger prospectus is worked out. Writing the prospectus typically takes from 30 to 90 days, so the target shareholder vote is typically scheduled three to six months following the signing of the initial merger proposal. During this wait-period, the bidder also performs a due diligence on key assumptions behind the merger agreement. If the bidder receives 90% of the target shares in a prior tender offer, the bidder can force a merger without calling for a vote among the remaining minority target shareholders—so-called "short-form" merger (Bates, Lemmon & Linck 2006).

4.3 Deal completion

Betton, Eckbo & Thorburn (2009) use information from Thomson SDC to track the final outcome of nearly eleven thousand "initial control bids" from their first bid announcement date. The SDC covers bid rumors as well as actual bids and flag the deal status later in the takeover process as completed, withdrawn, rumors not materialized, status unknown, etc. In their total sample, only two-thirds of the initial bidders complete the deal (even fewer if the initial bidder is a private firm). When a rival bidder enters the contest (which happens in less than ten percent of their sample), the rival wins twice as often as the initial bidder. This low completion rate reflects factors ranging from early press coverage of rumored offers (which do not necessarily materialize in a bid) to rival bidder entry and ultimate target shareholder rejection when voting on the merger proposal.

Betton, Eckbo, Thompson &Thorburn (2013) find that the (conditional) probability that the initial bid succeeds increases with target size and liquidity as well as with the offer premium and the bidder toehold. Moreover, the success probability is greater for public acquirers and in horizontal transactions. As discovered by Baker, Pan & Wurgler (2012), the success probability is greater when the target's current stock price is relatively close to its 52-week high. The success

probability is lower for hostile bids (although the existence of a poison pill has no impact at the margin).

4.4 Deal advisors

Several studies confirm that the choice of deal advisors matter for deal terms. Kale, Kini & Ryan (2003) and Golubov, Petmezas &Travlos (2012) find that using top-tier investment banks is associated with higher bidder returns, and Bao and Edmans (2011) document a significant investment bank fixed effect in the announcement returns of M&A deals. Krishnan and Masulis (2013) find that using a top-tier law firm as deal advisor for the bidder significantly increases the deal completion rate. Moreover, top-tier target law firms lower the completion rate while increasing the deal premium (raising the expected deal premium). They also report that top law firms have a stronger effect on M&A outcomes than do top investment banks. Agrawal, Cooper, Lian &Wang (2013) find that deals tend to take longer to complete, and to provide lower premiums to targets, when the bidder and targets use common advisors.

4.5 Predicting targets

In an average year over the period 1980-2012, roughly five percent of U.S. publicly traded companies delist from the exchange due to takeover. While five percent may seem like a substantial quantity, and notwithstanding the large takeover premiums typically received by target shareholders (discussed further below), predicting targets with any degree of accuracy has proven difficult. The result of the study by Cremer s, Martijn, Nair & John (2008) is typical. They use a panel consisting of 83,000+ firm-year observation (1981-2004) to predict the likelihood of a public firm in one year becoming a takeover target in the following year. Although the regression model contains the firm-specific characteristics capturing growth, capital structure and ownership structure, the explanatory power of the regression model is only around 3 %. The research challenge is to more clearly identifying the underlying sources of merger gains. Even though the

stock market systematically impounds a positive valuation effect of becoming a target, the coarser information set available to the econometrician renders the firm-specific source of merger gains elusive.

There is, however, an empirically interesting dichotomy between the type of takeover gain which is specific to targets and do not require any particular bidder input, and the type which is bidder-specific (typically referred to as ``synergies"). In bidding theory, this dichotomy is represented by bidder valuation being either of the ``common value" or of the ``private value" type. Examples of common-value settings are when the target is ``sitting on a gold mine" (Bradley, Desai & Kim 1983) or owning large cash reserves attractive to financially constrained bidders (so bidder valuations are positively correlated).

In a common-value setting, bidder gains are to some extent dependent on acquiring the target resources for less than their full (intrinsic) value. Bradley, Desai & Kim (1983) and Betton, Eckbo & Thorburn (2009) find that, conditional on a takeover bid, the significant market capitalization of target takeover gains is completely reversed when the bid fails and the target remains independent. This suggests that the capitalized target takeover gains at the intensive margin are largely of the bidder-specific type – at least in terms of requiring a target control change.

Edmans, Goldstein & Jiang (2012) look at the role of target market pricing at the extensive margin, i.e. in determining the probability of becoming a target *ex ante*, and find that a target price decline tends to increase takeover likelihood. They instrument target price changes using aggregate mutual fund flows, which are exogenous to any specific takeover incentive. Using a two-stage instrumental variable estimation approach, they conclude that the average exogenous price decline triggers a significant seven percentage point increase in takeover likelihood. This evidence suggests that bidders to some extent view the development of target price discounts from intrinsic values as a source of takeover gains. Khan, Kogan & Serafeim (2012) also use mutual

fund price pressure (treating buying pressure as a binary independent variable in a regression of the acquisition probability), and conclude that the acquisition probability increases in the four quarters following significant mutual fund buying pressure.

5 ARE DEAL TERMS "MARKET DRIVEN"?

5.1 Market feedback during merger negotiations

It is conventionally assumed that the target market price may change in response to new information about a takeover event but not the other way around: deal terms are unaffected by pre-bid target price changes. However, Schwert (1996) raises the possibility that a positive pre-bid target stock price runup itself causes an increase in the final offer premium ("markup pricing"), and he presents some supporting evidence. Betton, Eckbo, Thompson, and Thorburn (2013) investigate this possibility further using a simple takeover model which allows for the existence of a costly feedback loop from the target runup to offer price markups (the offer minus the runup).

Under their "costly feedback hypothesis", merger negotiations result in the offer price being raised by a target runup which already reflects anticipated takeover synergies (triggered by a takeover signal to the market during the runup period). Their large-sample tests strongly reject the existence of a costly feeback loop. This conclusion also holds after adjusting for target stand-alone value changes in the runup period. Moreover, it is consistent with the evidence that target runups on average fully revert back to zero when the deal fails and the target remains independent (Bradley, Desai & Kim, 1983; Betton, Eckbo & Thorburn, 2009).

Baker, Pan & Wurgler (2012) find evidence that prior stock price peaks of targets affect several aspects of merger and acquisition activity. Offer prices appear to be biased toward recent peak prices although they are economically unremarkable. Also, an offer's probability of

acceptance jumps discontinuously when it exceeds a peak price. While their evidence does not rule out rational explanations, they conclude that "the most natural explanation is that reference point prices play a role in merger related decisions". A reference point is a concept from psychology and indicates a form of psychological "anchoring". Their suggestion is that the largely irrelevant peak price may play such an anchoring role in merger negotiations.

5.2 Do bidders pay with overpriced stock?

There is an ongoing controversy over whether takeovers present opportunities for selling over-priced bidder shares. From a theoretical viewpoint, this typically requires bidders and targets to be asymmetrically informed about the true value of their respective shares. The controversy concerns whether the takeover event fully reveals the parties' private information. This is the case in the fully revealing, rational expectations equilibria analyzed by Hansen (1986), Fishman (1989), and Eckbo, Giammarino & Heinkel (1990). Other possibilities include equilibria in which rational target managers are unable to fully decipher whether bidder shares are overpriced (Rhodes-Kropf & Viswanathan 2004), or where target managers have a private incentive to accept payment in shares they know are overpriced (Shleifer & Vishny 2003; Jensen 2004).

Understanding the likelihood that bidders succeed in selling overpriced shares to targets is important as it may result in the most overvalued rather than the most efficient bidder winning the target. There have been several empirical approaches to test for bidder overvaluation in all-stock mergers. It is reasonable to argue that overvaluation (if it exists) is more likely when the market valuation is high, and industry merger waves are indeed positively correlated with industry valuations (Rhodes-Kropf, Robinson & Viswanathan 2005; Harford, 2005). However, while this evidence may be necessary for bidder overvaluation to exist, it does not reveal whether the high valuation is a result of overvaluation or expected takeover synergies. The problem is that both these two sources of bidder gains act as a takeover motive, are inherently unobservable, and

affect valuation ratios in the same direction. For the same reason, evidence of the market reaction to takeover events is insufficient to discriminate between the two hypotheses.

While there is evidence that bidder M/B ratios are greater than that of the target in all-stock financed mergers (Dong, Hisrshleifer, Richardson & Teoh 2006), Fu, Lin & Officer (2013) show that much of this relative bidder overvaluation corrects itself in the runup to and including the time of the offer, and conclude against the overvaluation hypothesis. Savor & Lu (2009) create a sample of merger bids that fail for reasons that are exogenous to the market valuation itself. The unsuccessful bidders represent a proxy for how the successful ones would have performed had they not managed to close the takeover deal. If mergers are beneficial to the overpriced acquirer's shareholders, failed acquirers should on average underperform successful ones (they are revealed as overpriced but do not realize synergy gains). While the need for unsuccessful bids restricts sample size, long-run abnormal stock returns with up to 3-year holding periods support this prediction.

Giuli (2012) finds that a measure of long-term investment is positively correlated with the use of stock as a method of payment in mergers, suggesting that the use of stock is correlated with better investment opportunities. Ben-David, Drake & Roulstone (2013) use short interest as an investor-based measure of misvaluation in order to distinguish between misvaluation and q-theories of merger. Their assumption is that the short interest in a stock reflects investor's beliefs about mispricing but not about firm growth opportunities (nor front-running or "pairs trading" as part of an investor hedging strategy). Using a large sample of mergers from 1989-2007, they find that firms with high short interest are more likely to engage in stock mergers and less likely to engage in cash mergers. Moreover, stock acquirers with high short interest underperform following merger announcements, and that for stock acquirers, short interest is higher for acquirers than for targets. They conclude that "misvaluation is a strong determinant of merger

decision making".

A potential concern with a direct trade-based instrument for mispricing such as the short interest is that it may reflect investor private information about the underlying stock. For example, Nain & Yao (2013) present evidence that some mutual funds are able to identify acquirers with value-enhancing acquisition opportunities. If the trades are based on firm characteristics, causality cannot be established.

Eckbo, Makaew & Thorburn (2013) address this issue and use aggregate fund flows as an instrument for exogenous variation in acquirer valuations. This instrument is based on the finding of Coval and Stafford (2007) that significant fund outflows temporarily depress stock market prices. In their two-step instrumental variable estimation, the first step uses aggregate fund flows to instrument the firm-specific valuation error proposed by Rhodes-Kropf, Robinson & Viswanathan (2005). These flows cause a general scaling up (for inflows) and down (for outflows) of mutual fund portfolio holdings lagged one period, and are exogenous to the sample acquirers' valuation fundamentals.

Eckbo, Makaew & Thorburn (2013) estimate the probability of bidders using all-stock to pay for the target, with the instrumented valuation error as one of the regressors. They find that bidders are less (not more) likely to use all-stock bids in response to positive exogenous bidder valuation shocks, which rejects the bidder overvaluation ("opportunism") hypothesis. They also show that bidders paying with stock tend to be small non-dividend paying growth companies with low leverage, are more likely to use stock when the bidder and target firms operate in highly complementary industries, and when the target is geographically close—factors that suggest the target is relatively informed about the bidder. They conclude that there is little evidence of a particular role for market mispricing in driving all-stock financed takeovers.

6 AUCTIONS AND TAKEOVER BIDDING

6.1 Takeovers as auctions

Although takeover auctions are complex selling mechanisms (for example, the target board cannot commit to sell prior to a target shareholder vote), standard auction theory has been useful for empirical work designed to understand more fully the takeover process and the behavior of offer premiums. The auction analogy is useful also when the selling process is ultimately in the form of a bilateral merger negotiation: after the target board has placed the firm "in play", it faces fiduciary pressure to accept the highest offer, including from outside bidders attempting to break up merger negotiations. Thus, merger negotiations in a real sense take place in the "shadow" of an auction. The expected shadow auction outcome constitutes an outside threat-point for the merger negotiations (Burkart, Gromb & Panunzi 2000; Betton, Eckbo & Thorburn 2009; Atkas, de Bodt & Roll 2010).

6.2 Toehold bidding

When the auction involves a bidder with a prior ownership in the target (a "toehold"), auction theory suggests that the bidder with the greatest toehold has a competitive advantage and therefore a greater chance of winning the target. The competitive advantage, which is particularly strong in common-value settings, is a consequence of the expected gain from selling the toehold should the toehold bidder lose the auction to a rival bidder (Burkart 1995; Bulow, Huang & Klemperer 1999). This expected gain can then be used to raise the bid in competition with rival bidders.

Betton & Eckbo (2000) examine a large sample of tender offers and find evidence consistent with a toehold-induced competitive advantage: toeholds are associated both with a lower winning offer premium and a greater probability of winning. Moreover, there is some evidence that rival bidders enter the auction with a similar-sized toehold as the initial bidder, perhaps to "level the

playing field". However, toehold benefits notwithstanding, Betton, Eckbo & Thorburn (2009) report that toehold bidding has steadily declined from about 50% of all bidders in the 1980s to only about 5% by 2002.

They develop and test a model in which this decline is an equilibrium outcome of target aversion to toeholds (after all, bidder toehold benefits are transfers from target shareholders). They find evidence that greater expected target resistance costs are associated with lower probability of toehold bidding in *ex post* friendly deals. Moreover, in *ex post* hostile deals, bidders have toeholds in half of the cases and the toeholds are large, as if the bidder expects resistance in those cases and prepares for a fight.

6.3 Bid jumps and time to second bid

Auction theory also makes predictions about the relation between bidding costs, bid jumps and preemptive bidding (Fishman 1988; Hirshleifer & Png 1989). In Betton & Eckbo (2000), the initial bid in successful single-bid tender offer contests is on average somewhat greater than the first bid in a multi-bid contest, which is consistent with some degree of bid preemption through a greater offer premium. Moreover, the report an average bid jump from the first to the second bid of about 30%, perhaps driven by bidding costs. Atkas, de Bodt & Roll (2010) use various empirical proxies for potential competition and bidding costs, and find that latent competition increases the bid premium offered in negotiated deals and that bidding costs reduce offer premiums.

Betton & Eckbo (2000) and Betton, Eckbo & Thorburn (2008) sort bids for the same target into multi-bid takeover contests. In their definition, starting with the initial bid, a contest ends when six months (126 trading days) have passed without any new offer. In takeover contests where bidders and targets are both publicly traded, the duration from the initial bid until the ``effective" date of the takeover (the day target shareholders approve the merger agreement),

averages about three months.

Betton, Eckbo & Thorburn (2008) report the frequency distribution of the number of weeks from the initial to the second bid for multi-bid contests. In general, the expected time to arrival of a second bid depends on the cost to rival bidders of becoming informed of their own valuation of the target, as well as the time it takes to file a formal offer. For some rival bidders, the initial bid may have been largely anticipated based on general industry developments or prior rumors of the target being in play. In general, the observed time to the second bid sheds light on the likelihood that rival bidders have ready access to the resources required to generate takeover gains. For contests with multiple bidders, the time from the initial to the second bid averages 5.7 calendar weeks (40 trading days) with a median of 3.7 weeks. For contests with only a single bidder making multiple bids (bid revisions), the average time to the first bid revision is 9 weeks (63 trading days) with a median of 7.6 weeks. Thus, the time to the second bid is on average shorter when a rival bidder enters than when the second bid is a bid revision by the initial bidder.

6.4 Bidding with negative outside option

When bidding involves a toehold or a termination agreement, the bidder's outside option is positive if it loses the auction (it gets to sell the toehold or receive a breakup fee). Another interesting setting is when the outside option is negative, as may be the case when the takeover is a response to changing industry conditions (Morellec & Zhdanov 2005; Akdogu 2007; Molnar 2008; Wang 2013). A worsening of the competitive industry equilibrium signaled by a merger can place the unsuccessful bidder at a competitive disadvantage relative to the winner. If the merger announcement signals a significant worsening of the industry's status quo, the net announcement effect of a value-increasing takeover may be negative for the winning bidder—and even more negative for the industry rivals.

6.5 Financial versus strategic bidders

Gorbenko & Malenko (2012) use auction theory and a sample of successful cash tender offers to test whether financial bidders have lower valuations than strategic bidders (since only the latter is in a position to generate synergy gains). Like Boone & Mulherin (2007), they observe that an apparent single-bid public tender offer auction may be preceded by multiple informal bids, and they collect information on the number and type of informal bidders using the deal history in SEC filings.

They find that strategic bidders have higher valuations on average, across all targets. While strategic bidders have higher valuations for targets with higher investment opportunities, financial bidders are willing to pay higher premiums for poorly performing targets. Martos-Vila, Rhodes-Kropf & Harford (2013) argue that financial buyers are better monitors than strategic buyers, and better able to take advantage of "overpriced debt" because PE investments diversify across deals.

6.6 Winner's curse

In common value auctions, bidders must optimally shave their bids (relative their own private valuation signals) in order to avoid the so-called "winner's curse". This adjustment, which is a response to the error in the bidder's private signal, ensures that the maximum bid is such that the expected gain from bidding is nonnegative conditional on winning the auction. This bid adjustment increases with the number of bidders and with the degree of uncertainty in the bidder valuations (McAfee & McMillan 1987).

Boone & Mulherin (2008) test the converse implication, that failure to properly correct for the winner's curse causes bidder losses to increase in the degree of competition and valuation uncertainty. Accounting for the endogeneity between bidder returns and competition, they reject the hypothesis that bidder returns are negatively related to takeover competition and uncertainty in

the value of the target. They also fail to find any negative effects of bidding competition on subsequent post-takeover operating performance. Moreover, they investigate the role of investment banks in the takeover process and conclude that prestigious banks hired by the bidder do not promote the winner's curse.

6.7 Offer premiums

The availability of offer prices and deal values on SDC has spurred large-sample studies of takeover premiums. The convention is to measure the offer premium relative an assumed ``no information price'' or target stand-alone value two or three months prior to the first public bid announcement. The choice of this look-back period is typically supported by the time series behavior of average target abnormal stock returns, which in large samples does not appear to rise in anticipation of a future takeover prior to 60 trading days before the initial bid announcement.

In large-sample studies, the winning offer premium typically averages around 40-50% relative to the target price two calendar months before the initial bid announcement. Moreover, multivariate cross-sectional regressions with the offer premium as dependent variable tend to show the following premium behavior:

(1) The initial and final offer premiums are higher after the 1980s; when the bidder is a public company; when the initial bid is an all-cash offer; when the merger agreement includes a target termination agreement; and the greater the dispersion in target financial analyst forecasts.

(2) The initial and final offer premiums are lower the greater the target total equity capitalization prior to the initial bid; when the target's book-to-market ratio (B/M) exceeds the industry median B/M (i.e., when the target is a growth company relative to industry rivals); when the initial bid is a tender offer; when the initial bidder has a positive toehold; and when the bidder receives a shareholder tender agreement from target insiders.

(3) The initial and final offer premiums are unaffected by the presence of a target poison pill; target hostility to the initial bid; target stock liquidity; the presence of multiple bidders; and whether the takeover is horizontal or conglomerate.

This summary list includes regressions reported by numerous studies, most of which do not adjust for endogeneity and self-selection. Thus, the above correlations should be interpreted with caution. The behavior of offer premiums in model-based structural settings is a potent area for future research.

7 HOW LARGE ARE BIDDER TAKEOVER GAINS

7.1 Traditional estimates

The takeover literature conventionally measures shareholder gains from takeover activity using estimates of abnormal stock returns around the first public bid announcement. As reviewed by Jensen and Ruback (1983), Andrade, Mitchell, and Stafford (2001), and Betton, Eckbo, and Thorburn (2008), large-sample studies consistently show the following: (1) gains to target shareholders are both economically and statistically large, (2) bidder gains are on average statistically indistinguishable from zero, and (3) the value-weighted sum of bidder and target gains is positive on average.

Figure 2 shows that this conclusion also holds for the 18,500 publicly traded bidders available on the Thomson SDC merger database over the period 1980-2012, to my knowledge the largest such sample in the takeover literature to date. The sample is restricted to U.S. targets where the form of the deal is either merger or acquisition of a majority interest. Stock returns are from CRSP and cumulative abnormal stock returns are shown relative to the initial control bid for the target firm.[9]

[9] The event study requires at least 100 days of trading in the 255 trading days ending 42 days before the announcement of the initial control bid. Abnormal returns are the prediction errors of the one-factor market model with a value-

This evidence suggests a competitive market for corporate control that transfers most, if not all, of the rents from the takeover activity to the seller, with acquirer shareholders on average barely breaking even after transaction costs. However, there are also alternative interpretations for bidder firms.

7.2 Measurement issues: relative size and partial anticipation

Estimating bidder takeover gains is subject to econometric difficulties. First, the typical target is about one-tenth the size of the bidder, and so even if the two firms share takeover gains equally, the measured percentage bidder return is by construction one-tenth that of the target return. Since the normal variation in the dollar value of bidder equity is also larger, identifying merger-induced expected synergy gains in bidder returns can be a bit like looking for a needle in a haystack. Consistent with this measurement issue, cross-sectional regressions with bidder announcement returns as dependent variables typically show bidder gains increasing in the relative size of the target (Eckbo & Thorburn 2000; Fuller, Netter & Stegemoller 2002; Moeller, Schlingemann & Stulz 2004).

A second measurement issue arises due to partial anticipation of deal activity. Event-induced stock returns such as CAR(-1,1) measure only the unanticipated component of the total economic effect of the event. Given the difficulty in predicting target firms, and since being a target is a one-time event, partial anticipation does not play much of a role in measuring target gains (as shown in Figure 2 above, the initial bid announcement is a significant surprise event for the average target). Many large bidder firms are frequent acquirers, however, which may cause market anticipation of future acquisition activity and associated bidder stock price adjustments long before the actual takeover events. Such priors would attenuate the surprise effect of the bid announcement.

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weighted market index.

In an early study of this attenuation bias, Schipper & Thompson (1983) show that the announcement of entire acquisition programs, which causes the market to capitalize the value of future acquisitions, significantly increases the equity market value of the announcing companies. Moreover, Song & Walkling (2000) and Cai, Song & Walkling (2011) find that bidder announcement returns are significantly greater when they follow a "dormant" (inactive) acquisition period.

Furthermore, Betton, Eckbo, Thompson & Thorburn (2013) show that bidder takeover gains are increasing in the target stock price runup prior to the bid announcement. This cross-sectional correlation is as predicted when (1) total takeover gains are positive and pre-bid takeover rumors inform the market about this total, and (2) the bidder and target firms share in the total gains.

7.3 Changes in bidder stand-alone value

A third measurement issue arises because a given takeover bid announcement may provide new information not only about expected takeover synergies but also about the stand-alone value of the bidder firm. As discussed above, takeovers are driven by industry dynamics, and the growing evidence of significant intra-industry wealth effects of merger announcements suggests that bid announcements inform investors about important aspect of the changing state of the industry. As the industry equilibrium changes, so does the bidder stand-alone value, undermining the typical interpretation of statistics such as the bidder CAR(-1,0) as reflecting takeover synergies only.

To illustrate, suppose losing the acquisition attempt to an industry rival places the initial bidder at a competitive disadvantage. The market reaction to the initial bid announcement then involves first lowering the stand-alone value of the bidder (conditional on losing) and adding the expected synergy gains (conditional on winning). While the takeover in this case is value-increasing for the winning bidder, the net announcement effect may be positive or negative depending on the size of the decrease in bidder stand-alone value. The empirical challenge is to

properly estimate the successful acquirer's counter-factual stand-alone value (i.e. if the bid had failed).

Wang (2013) presents a particularly interesting analysis of this challenge. He first implements the quasi-experimental approach also used by Savor & Lu (2009), Seru (2011) and Masulis, Swan & Tobianski (2012): here, the counter-factual stand-alone value of successful acquirers is identified using the abnormal returns to acquirers in exogenously failed bids (exogenous to acquirer's actions). In his sample, failed acquirers earn significantly negative CARs averaging -8% from bid announcement to bid withdrawal (successful acquirers earn CARs averaging 2%), suggesting that acquirer takeover gains are substantial and bid failure is costly. This is consistent with the findings of Masulis, Swan & Tobianski (2012), who use exogenously failed bids as well to net out a possible stand-alone revelation bias.

Wang (2013) also identifies successful acquirers' counter-factual stand-alone values in a structural estimation of a dynamic search model. In this model, firms endogenously self-select to pursue takeovers in order to "catch up with their competitors", which results in a negative revelation effect of some bid announcements. The structural estimation (simulated to match key data moments) suggests that the negative revelation effect may be as large as -16% (and a positive synergy effect of 12%). In sum, traditional bidder gains estimates, which overlook the revelation of a negative stand-alone value change, may seriously underestimate true bidder takeover gains.

8 CONCLUSIONS AND FUTURE DIRECTIONS

The takeover literature has substantially advanced our understanding of the interplay between industrial organization and ``who buys who" in the drive for increased productive efficiency. As if to exploit comparative advantage in production, pairs of bidders and targets are matched up and

down the supply chain, within industry clusters, and to promote product differentiation. The prospect of being acquired by a larger firm (with scale-economies in later-stage production development, marketing and distribution) incentivizes smaller firms to innovate more intensely.

The competitive drive to establish a comparative advantage in production has proven resilient in the face of regulatory barriers, and to speed up when those barriers come down, creating wave-like patterns in industrial merger activity. The process of ``eliminating deadwood" is observed directly in the form downsizing excessively diversified businesses, and in the restructuring of firms in economic or financial distress. Studies tracing individual plant sales find direct evidence that buyers tend to be more efficient plant-operators than sellers whether the parent is healthy or in financial difficulty. Possibly to take advantage of this efficiency gain, restructuring under the protection of Chapter 11 bankruptcy in the U.S. has over the past decade increasingly used the sales mechanism to resolve conflicts among claimholders, an interesting area for further research.

Moreover, the distribution of merger-induced wealth effects for the merging firms' rivals, upstream suppliers and downstream customers suggests that takeovers tend to promote economic efficiency rather than accumulation of market power (of the type traditionally concerning antitrust authorities). However, further research is needed that estimate industry wealth effects of merger activity within the industry clusters (as defined by network theory and text-based product analysis) in order to identify more precisely the sources of efficiency (synergy) gains.

As to the takeover mechanism, it is supported by a professional middlemen and a set of standardized deal terms. The sales process attracts takeover bids which have been shown in several respects to confirm to the predictions of rational bidding theory. This process has also allowed targets seeking a merger partner to initiate deals – rather than waiting around for a suitor – at an unprecedented rate. Over the past decade, deals involving public targets are initiated by the target

board as often as by the bidder. An interesting research question is whether this high rate of seller-initiated takeovers reflects the virtual “lock-down” of independent companies afforded by today’s strong takeover defenses. With bidders on the fence, sellers may have to go on the offence.

Finally, the recent takeover literature has revisited interesting theoretical issues using new and more powerful test methodologies. For example, are deal terms in takeovers “market driven”? Here, the most recent tests tend to reject ``behavioral” theories in favor of rational determination of both the takeover premium and the choice of payment method. Also important, econometric advances suggest that bidder takeover gains, traditionally estimated to be small (insignificantly different from zero after transaction costs), may be much greater when the estimation also accounts for how industry dynamics may alter bidder stand-alone values (absent a takeover). Finding ways to accurately estimate the counter-factual bidder stand-alone value change in successful merger deal present an interesting and important challenge for future takeover research.

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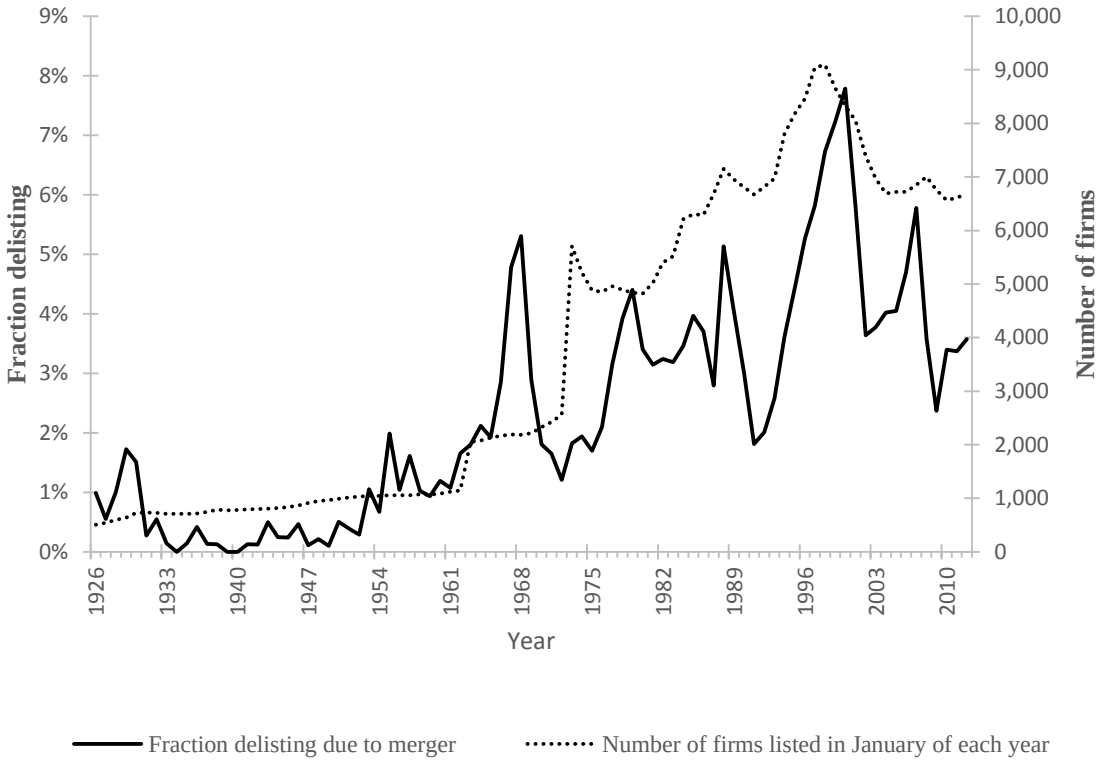

Figure 1: Annual fraction of all publicly traded (CRSP) firms in January of each year which delists due to merger during the year, 1926–2012.

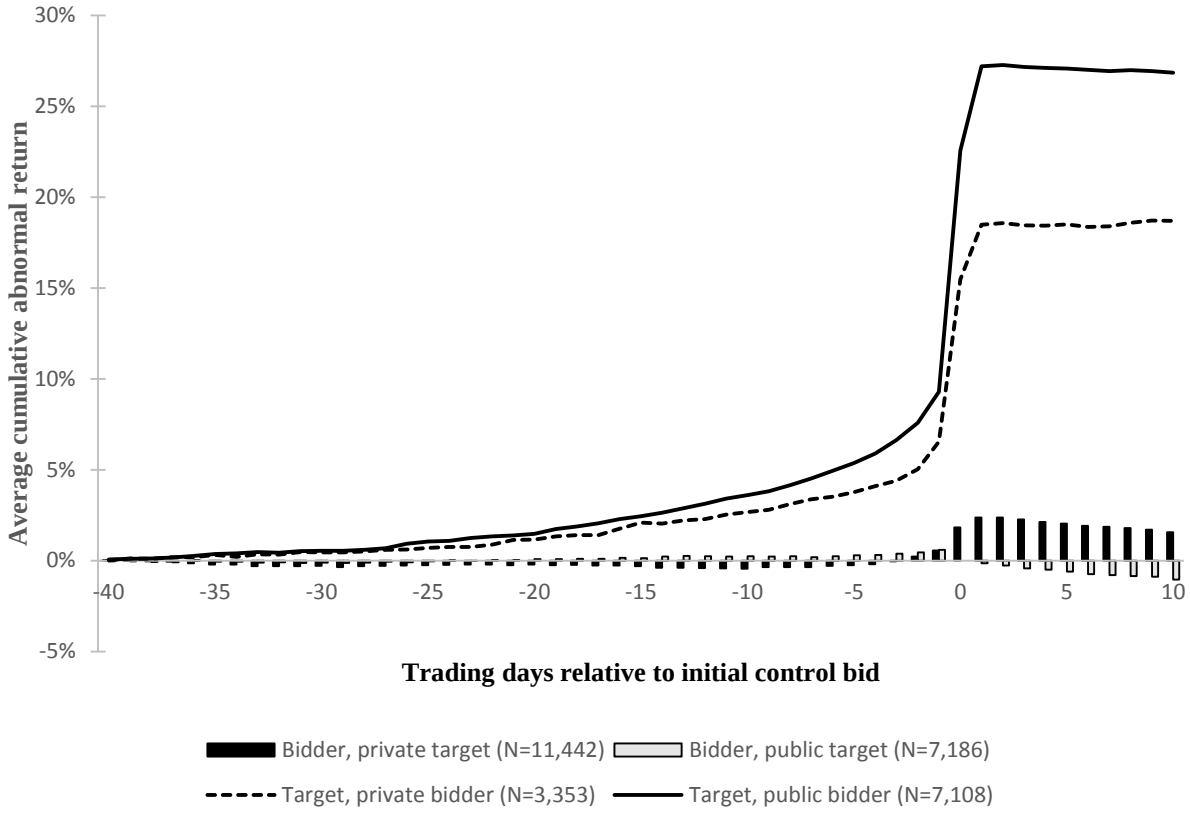

Figure 2: Percent cumulative average abnormal stock returns to U.S. targets and initial bidders from day -40 through day 10 relative to the initial control bid (day 0), 1980-2012.

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