Managerial Entrenchment Waves

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Abstract

This paper documents a novel agency cost that arises because managers of potential takeover targets forgo merger opportunities in industry merger waves. We present comprehensive evidence that the entrenchment effect of classified board varies dynamically over time by industry. While the effect is strongly economically significant in years when industries are undergoing a synergistic merger wave, it is muted in years when synergistic industry M&A activity subsides. In wave industry-years, firms without classified board are more than three times as likely to receive a takeover bid compared to firms with classified board. This difference is even larger for less anticipated waves and for firms that also have a high level of takeover protection based on the GIM index of Gompers, Ishii, and Metrick (2003). By contrast, the difference in takeover odds is an order of magnitude smaller and not statistically significant in non-wave industry-years. These results are driven by economic, technological, and regulatory shocks that create economic opportunities to merge in the industry. Overall, our evidence broadens the classical agency view and suggests that the agency cost of classified boards varies significantly over time.

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1 Introduction

Shares of firms with antitakeover provisions trade at a discount relative to shares of other companies in the same industry or market as a whole (Gompers, Ishii, and Metrick (2003), Bebchuk, Cohen, and Ferrell (2009)).[1] The traditional view of this discount is that it reflects a lack of the discipline from the market for corporate control (Manne (1965)): if antitakeover provisions deter takeovers bids, the absence of takeover pressure will lead managers to take self-serving actions that ultimately lower firm value. A challenge for the traditional view has been the lack of direct evidence that antitakeover provisions actually deter takeover bids. Comment and Schwert (1995) find no evidence that poison pills or state-level statutes make a difference for takeover likelihood. Bates, Becher, and Lemmon (2008) find that the 1% difference in takeover likelihood between firms with and without a classified board is too small economically to justify the difference in their value.

The traditional view focuses on a particular type of takeovers – the disciplinary takeovers. However, evidence from the literature on industry merger waves (e.g., Harford (2005), Andrade, Mitchell, and Stafford (2001), Holmstrom and Kaplan (2001)) suggests that a substantial part of wealth creation from mergers is due to synergistic mergers spurred by technology, economic, and deregulation shocks. In this paper, we broaden the traditional agency view and ask whether antitakeover provisions destroy value by deterring *synergistic* bids. In particular, merger synergies are concentrated in time and industry: they arrive in response to economic and regulation shocks, are temporary, and not available to a stand-alone firm. Antitakeover provisions are costly since they give managers the ability to resist takeovers and forgo opportunities for shareholders to benefit from takeover premiums in merger waves when most synergies occur.

Our evidence provides strong support for this view. We use a sample of publicly traded US firms between 1990 and 2007 and focus on the classified board provision which is well-recognized to constitute

[1] Gompers, Ishii, and Metrick (2003) and Bebchuk, Cohen, and Ferrell (2009) show that firms with more antitakeover provisions have lower valuation multiples. An earlier literature studies the shareholder wealth effects of ATPs using short-term event-study methodology, where firms'stock returns are analyzed following the announcements of ATP adoptions or amendments (see DeAngelo and Rice (1983), Linn and McConnell (1983), Malatesta and Walkling (1988) and Ryngaert (1988); see also Bhagat and Romano (2001) for a survey of the literature).

the most significant barrier to takeovers. Our main finding is that firms without a classified board are targeted disproportionately more in years when industries are undergoing synergistic merger waves.[2] In these industry-years, 10.5% of firms with a single class of directors (i.e., no classified board) become the target of a takeover bid, compared to only 3% of firms with classified boards. Thus, in years when industries are undergoing synergistic merger waves, firms with a single class of directors are more than three times as likely to receive a takeover bid compared to firms with classified boards. The wedge in takeover odds is even larger for surprise waves and for firms that also have a high level of takeover protection based on governance indices used in the literature. These indices include the GIM index of Gompers, Ishii, and Metrick (2003) and the E-index of Bebchuk, Cohen, and Ferrell (2009). Finally, the wedge is robust across a battery of different specifications, to using several different definitions of what constitutes an industry merger wave and synergistic M&A activity, and to treating classified board as an endogenous variable. Overall, these findings suggest that antitakeover provisions entrench managers exactly when industry conditions are ripe for value-creating merger opportunities.

While our main result is on the entrenchment effect, that is the difference in takeover odds between firms with classified boards and those with a single class of directors, even more striking evidence comes from examining the level of these odds. Our results indicate that, while firms without classified boards are much more likely to receive a takeover bid in wave industry-years compared to non-wave industry-years, the takeover odds of firms with classified boards are flat over time. Thus, the familiar wave pattern of takeover activity over time is only present in firms without classified board protection. This evidence suggests that when industry merger waves bring synergies and higher target premiums only shareholders of firms without classified board protections are able to take advantage of them. In this sense, antitakeover provisions entrench managers by allowing them to "sit out" industry merger waves.

Overall, our main result implies that the entrenchment effect of antitakeover provisions (ATPs)

[2] We define synergistic merger waves as industry-years with abnormally high merger activity for that industry (see Harford (2005), with the additional requirement that bids are synergistic as in Bradley, Desai, and Kim (1988). See Section 3 for more details on the definition of synergistic merger waves.

varies significantly over time with synergistic merger activity in the industry. This finding has several important implications. First, it shows that the takeover-related agency conflicts emphasized by the literature are particularly severe at times when there are strong economic motives for firms to merge in the industry, suggesting that these are the times when the takeover channel may have most bearing for weakly governed firms. This implication of our results is consistent with Cremers and Ferrell (2011), who document evidence of a more negative valuation effect of ATPs when industry M&A activity is high. While Cremers and Ferrell (2011) focus on the relation of ATPs to firm value, we provide direct evidence from the takeover market on time-variation in the entrenchment effect.

Second, the strong economic significance of our estimates is not at odds with the previous literature that finds a generally weak average effect of ATPs on takeover likelihood (e.g., Bates, Becher, and Lemmon (2008) and Comment and Schwert (1995)).[3] Instead, our results indicate that the small average entrenchment effect previously estimated in the literature masks significant underlying heterogeneity in the relation between ATPs and merger activity. This is the case since the strength of the entrenchment effect of ATPs changes systematically through time by industry. In fact, while we document large estimates for industries that are undergoing a synergistic merger wave, we also find that the entrenchment effect is muted in years when industry M&A activity subsides. In these off-wave industry-years, 3.6% of firms with a single class of directors become the target of a takeover bid in a given year, compared to 3.2% of firms with classified boards. Thus, allowing for heterogeneity across industries proves critical for establishing the entrenchment power of takeover defenses. Our results suggest that researchers could benefit from either interacting ATPs indices with industry-wide measures of the intensity of economic motives to merge or analyzing the effect of ATPs in separate sub-samples.

In our main results, merger waves are identified using a standard approach based on realized merger activity (see Harford (2005)). In our second set of tests, we adopt a different approach that does not rely on ex-post realized activity. Instead, we examine the entrenchment effect in the years

[3] When we pool observations across on- and off-wave industry years, the estimated entrenchment effect of classified board in our sample is 1.3%, same as in Bates, Becher, and Lemmon (2008)).

following industry shocks that are likely to bring about synergistic takeover opportunities, but do not necessarily result in a merger wave. In particular, we consider a wide array of standard industry shocks that have been shown to be significant determinants of firms' economic motives to merge, including economic (Harford (2005)), technological (Andrade et al. (2001)), and regulatory changes in industry fundamentals. If the variation in the entrenchment effect is driven by the diverging interests of target managers and shareholders over industry-wide synergy opportunities, then we expect that the effect should be systematically related to industry shocks that drive economic motives to merge.

For each of these industry shocks, we document that there is an economically large entrenchment effect of classified boards subsequent to an industry shock. In particular, we show that in the year subsequent to an industry shock, the difference in takeover likelihood between firms with and without a classified board is between 6% and 8%, depending on which particular shock is considered. This wedge, which becomes even larger when there is large capital liquidity available at the macro-level, significantly narrows as more years elapse since the initial industry shock. Finally, using a two-stage least squares approach that adds a first stage regression predicting synergistic merger waves with industry shocks, we show that our first result is driven by industry shocks. This approach addresses the potential concern that industry merger waves are endogenous to the incidence of classified board protection in the industry. Overall, our second set of results suggests that when industry conditions are ripe, only shareholders of unprotected firms benefit from the arriving industry synergies. By contrast, classified boards significantly insulate managers from industry shocks that create economic motives for mergers in the industry.

In the third and final set of takeover likelihood tests, we use a dynamic specification to further corroborate the notion that ATPs entrench managers by allowing them to "sit out" synergistic industry merger waves. These dynamic tests consider only firms that actually received a takeover bid and examine whether it takes longer for a firm with a classified board to receive a bid relative to a firm with a single class of directors. We use duration analysis to derive estimates of the relation between classified boards and the timing of takeover bids within any given synergistic merger wave spell. If

classified boards help managers to "sit out" industry waves, then targets that have a single class of directors should be "snatched up" first, while firms with classified boards should receive takeover bids at a significant delay. Consistent with this reasoning, for industries that are undergoing a synergistic merger wave, we document that classified boards reduce the conditional likelihood that a firm receives a takeover bid in any given month by about 1/3 and increase expected time it takes for a firm to receive a takeover bid by about 10 months. Overall, our dynamic tests support the notion that classified boards entrench managers by delaying takeover bid offers, thus allowing them to "wait out" industry merger waves.

Are the entrenchment effects we documented likely to lead to significant costs for shareholders? In order to assess the economic significance of our likelihood estimates, the last part of our analysis considers target premiums and bidder returns. There is theory (e.g., Stulz (1988)) and some evidence supporting the view that ATPs improve target management bargaining position and may allow targets to extract higher takeover premiums especially in concentrated industries (Kadyrzhanova and Rhodes-Kropf (2011)). Thus, the entrenchment effect unambiguously leads to costs for shareholders only if the lower likelihood of receiving an offer for firms with classified boards is not offset by relatively higher premiums in industry merger waves. Our evidence shows that there is significantly weaker variation of the bargaining effect through time by industry. If any, the bargaining effect of classified boards is somewhat stronger off industry merger wave years. Thus, we conclude that our documented entrenchment effects are likely to lead to significant costs for shareholders, since they do not appear to be significantly offset by bargaining effects.

Our study is most closely related to a growing recent governance literature starting from Gompers, Ishii, and Metrick (2003)[4] which focuses on industry interactions (Giroud and Mueller (2010), Cremers and Ferrell (2011), and Kadyrzhanova and Rhodes-Kropf (2011)). Previous papers that follow this industry approach have shown that governance and industry characteristics, such as industry

[4]See also Bebchuk, Cohen, and Ferrell (2009), Bebchuk and Cohen (2005), Faleye (2007) and Cremers and Nair (2003), Masulis, Wang, and Xie (2006).

concentration, are joint determinants of firm value. We share with these papers the focus on industry interactions. Our findings significantly broaden the scope of this literature by focusing on a specific mechanism, namely the market for corporate control, and by highlighting the role of industry shocks that drive firms' economic motives to merge. Our findings also contribute to the classical literature on the market for corporate control[5] by showing that entrenchment effects of ATPs are much larger than had been previously found and that there is a significant time-series and cross-industry variation in the entrenchment effect of ATPs. Overall, our analysis suggests that the governance literature needs to control for the interaction of ATPs and industry shocks.

The remainder of the paper is organized as follows. Section 2 reviews the literature and details the empirical strategy of our industry approach. Section 3 describes the data and the construction of our variables. Sections 4 and 5 present the results of our probit and duration analyses, respectively. Section 6 considers economic significance and Section 7 concludes.

2 Literature Background and Hypothesis Development

While the negative relation between ATPs and firm value is well-established in the governance literature (e.g., Gompers, Ishii, and Metrick (2003), Bebchuk, Cohen. and Ferrell (2009)), the question of whether there are economically large entrenchment effects of ATPs in the takeover market remains open. Addressing this question is important for two main reasons. First, it moves us closer to answering the fundamental question of whether ATPs are a significant source of managerial entrenchment in the takeover market. Second, it has important implications for the governance literature on firm value, as well as the policy debate on corporate governance reform, because it can help us to assess whether the takeover market is a significant channel through which ATPs impact shareholder value.

Several papers have studied the entrenchment effect of ATPs in the takeover market (Comment and Schwert (1995), Schwert (2000), and, more recently, Bebchuk, Coates, and Subramanian (2002),

[5]Important contributions are Comment and Schwert (1995), Schwert (1996, 2000), Jensen and Ruback (1983), DeAngelo and Rice (1983), Mikkelson and Partch (1989), and Bates, Becher, and Lemmon (2008).

and Bates, Becher, and Lemmon (2008)). These papers have used a variety of provisions - e.g., poison pill, classified board, etc. - and econometric models. The typical framework is a probit regression of a dummy variable for whether a given firm becomes the target of a takeover bid in a given year on the firm's anti-takeover provisions. This approach leads to a small average difference in the implied probabilities of becoming a takeover target between firms with and without anti-takeover provisions: for example, a typical difference between the takeover probabilities of firms with and without classified boards is about 1 percentage point. Based on these results, Bates, Becher, and Lemmon (2008) conclude that existing estimates represent a challenge for the governance literature: "overall, the evidence is inconsistent with the conventional wisdom that board classification is an antitakeover device that facilitates managerial entrenchment."

Our paper extends the standard probit framework used in the literature and allows for systematic heterogeneity in the entrenchment effect of ATPs through time by industry depending on whether there are economic motives for firms to merge. This extension accomplishes two main goals: first, we offer a new test and new evidence on whether the entrenchment effect of ATPs varies significantly across industries; second, we use our analysis to reassess the question of the extent to which antitakeover provisions entrench managers by shielding them from takeover pressure. In fact, while the literature to date has estimated an *average* entrenchment effect in the takeover market that is homogeneous across years and industries, our tests isolate specific sub-sets of industry-years where there is potentially more scope for takeover-related agency issues to play out. Overall, our extended probit framework enables us to study the entrenchment effect at times when industry-wide synergies become available and, thus, forgone merger opportunities are costly for shareholders.

The question of whether the entrenchment effect of ATPs in the takeover market varies through time by industry is fundamentally an empirical one. Of course, if ATPs are a second-order factor in acquisition decisions, then there is no a priori reason to expect that their effect should be larger or smaller in different industry-years. Alternatively, the entrenchment effect could be either attenuated or strengthened by the arrival of industry-wide synergies. On the one hand, expected gains for acquirers

are likely to be higher when synergistic merger opportunities become available in the industry. This would work in the direction of offsetting the higher acquisition costs of targets with ATPs and, thus, would lead to an increase in the proportion of firms with ATPs that become targets. On the other hand, the potential for value gains for target shareholders is also likely to be higher when synergistic merger opportunities become available in the industry. An agency-based view that managers are reluctant to give up control and ATPs enable them to retain control would imply that, at such times, firms without ATPs should be targeted disproportionately more. Thus, under this agency hypothesis, the arrival of synergistic merger opportunities in the industry strengthens the entrenchment effect of ATPs.

In addition, the agency perspective emphasizes that especially some ATPs, such as a classified board of directors,[6] can induce a delay of up to three-years on acquirers (see, for example, Bebchuk, Coates and Subramanian (2002)). This delay effect would reinforce the agency hypothesis, since delay is likely to be particularly costly for acquirers concerned about missing merger opportunities in a synergistic industry merger wave.

In summary, this reasoning suggests the following novel testable prediction.

Prediction 1 (ATPs and synergistic industry merger waves): The entrenchment effect of ATPs - i.e., the relation between ATPs a firm's likelihood of becoming a takeover target - should vary systematically through time by industry. In particular, the arrival of synergistic merger opportunities in the industry should either attenuate or magnify the entrenchment effect of ATPs, depending on whether or not takeover-related agency problems are heightened.

If the variation in the entrenchment effect of ATPs is driven by the arrival of new merger opportunities in the industry, its magnitude should increase with the degree of the surprise about these new opportunities. In fact, when acquirers partially anticipate that merger opportunities are going to become available, they can start "snatching up" unprotected industry targets, thus attenuating the deterrence effect by the time M&A activity reaches its pick.

[6] A classified board mandates that only a given proportion - typically 1/3 - of the board can be elected each year so that it takes 3 years to turn over the board completely.

Prediction 2 (Anticipation): The variation in the deterrence effect of ATPs through time by industry should be more pronounced for surprise synergistic merger waves.

Finally, waves of industry M&A activity have been shown to be related to several industry-wide shocks, including those related to economic, technological, and regulatory changes in the structure of the industry, which create opportunities for value-creating mergers (Mitchell and Mulherin (1996)). Holmstrom and Kaplan (2001) note that the determinants of merger activity in the 1990s were mostly industry-wide synergies created by growth opportunities in new technologies and markets. Gort (1969) argues that mergers are triggered by economic shocks and Jensen (1988) argues that the sharp rise in interest rates, coupled with the sharp drop in oil prices, were the catalysts of the 1980's restructuring in the oil industry. If the variation of the entrenchment effect is driven by the diverging interests of target managers and shareholders over industry-wide synergy opportunities, then the effect should be systematically related to industry shocks that drive economic motives to merge.

Prediction 3 (Industry shocks): Industry shocks should either attenuate or magnify the entrenchment effect of ATPs, depending on whether or not takeover-related agency problems are heightened.

In summary, our industry approach is to empirically test whether ATPs entrench managers in synergistic industry merger waves, thus effectively letting them sit out these waves of potential value creation. If this is the case, we expect that the entrenchment effect of ATPs should vary systematically through time by industry and be stronger in those industry-years when economic motives to merge are heightened. In the next subsection, we detail our empirical strategy aimed at implementing these tests.

3 Data and Empirical Specification

In order to test whether the relation between ATPs and merger activity varies over time by industry depending on whether there are economic motives for firms to merge, we assemble a dataset that adds

comprehensive information on corporate acquisition attempts to a standard panel of S&P 1500 firms between 1990 and 2006 for which data on anti-takeover provisions is available. For each observed acquisition attempt, we need to define the industry it occurred in and construct empirical proxies for the intensity of the economic motives to merge in the industry. In this section, we first detail our sample selection criteria and then describe our key explanatory variables. Appendix B summarizes the sources and detailed definitions of all the variables.

3.1 Empirical Specification

Our main empirical tests extend the standard probit framework of takeover deterrence (see, for example, Bates, Becher, and Lemmon (2008)) to allow for variation of the deterrence effect of ATPs through time by industry:

$$\Pr(Target_{ikt}) = a_t^j + d_k^j + b_1^j * ATP_{ikt} + b_2^j * X_{ikt} + e_{ijkt} \tag{1}$$

where i denotes firm, j denotes an industry synergistic merger wave regime, k denotes industry, t denotes year, $Target_{ikt}$ is a dummy that equals one if firm i in industry k receives a takeover bid at time t and zero otherwise, ATP_{ikt} is the firm's anti-takeover provisions, and X_{ikt} is a set of standard controls that includes the level of industry concentration, a dummy for high-tech industries, and standard firm and industry controls (e.g., Palepu (1986), Schwert (2000), Bates, Becher, and Lemmon (2008)). Firm controls include (industry-adjusted) sales growth, market-to-book ratio, and size, while industry controls are the industry averages of these firm-level variables.[7] We include year effects, a_t, and industry effects, d_k, to control for average variation in takeover activity over time and across industries (industry dummies address the issue of unobserved heterogeneity across industries). Finally, to allow for potential serial correlation of deals from the same industry, we evaluate statistical significance using robust clustered standard errors adjusted for non-independence of observations within industries (see Wooldridge (2002), p. 275).

We split industry-years into two regimes, on the wave and off the wave, based on the intensity

[7] All firm- and industry-level variables are measured at the the end of the year prior to the bid offer announcement.

of synergistic merger activity in the industry (see detailed description below). Thus, letting $j = 1$ denote on the wave industry-years and $j = 2$ denote off-the-wave industry-years, we effectively obtain the standard probit estimates of takeover likelihood separately in each of the two industry-year sub-samples. The innovation of our specification with respect to previous literature is that equation (1) allows for both intercept and slope coefficients to be industry–year-specific. Our null hypothesis is that the difference between the (slope) coefficients on ATPs between the two sub-samples equals zero - i.e., $b_1^1 = b_1^2$. In addition to the intensity of synergistic merger activity, we use a second proxy for the intensity of economic motives to merge: a dummy variable that takes value of one in years when industries are hit by economic, technological, and regulatory industry shocks (Mitchell and Mulherin (1996), Harford (2005), Maksimovic and Phillips (2001). In the next section we detail our data construction procedure and definitions of these proxies.

In the second part of our analysis, we complement these standard likelihood tests with a dynamic specification based on duration analysis (Cox hazard model). Duration analysis exploits the timing of takeover bids, thus providing additional evidence on whether ATPs entrenchment managers by allowing them to "sit out" synergistic industry merger waves.

3.2 Data

Our sample includes US public corporations covered by the Investor Responsibility Research Center (IRRC) between 1990 and 2006. The IRRC reports about every two years[8] data on a set of 24 governance provisions for firms in the Standard & Poor's 1500 and other major US corporations. We match firm-year observations from IRRC to Compustat and retain those with non-missing book value of assets and exclude financial firms and utilities (SIC codes between 6000 and 6999 and between 4900 and 4999). For years not covered by IRRC, we assume that the classified board provision remains in place if it is present in two adjacent IRRC volume publication dates. If not, we supplement information with SEC filings from Edgar and newspaper article searches from Factiva. The resulting merged IRRC-

[8] The IRRC volumes are published in the following year: 1990, 1993, 1995, 1998, 2000, 2002, 2004, 2006.

Compustat sample consists of 2,584 firms and 16,141 firm-year observations.

3.2.1 Industry shocks and merger waves

Our industry classification is as in Fama and French (1997). In robustness tests, we consider finer 3-SIC industry classifications. We collect historical industry classification data from physical Compustat tapes on an annual basis over our sample period. Kahle and Walkling (1996) emphasize that Compustat SICs lead to significantly more accurate classification than CRSP, an issue that is especially important for studies such as ours that involve cross-industry comparisons. However, a limitation of Compustat with respect to CRSP is that it does not have historical information on SIC, which is why we need to rely on the physical tapes to identify all firms whose primary SICs have changed over our sample period.[9]

We use a standard approach to identify synergistic merger waves at the industry level (see Harford (2005) for a similar definition of industry merger waves and Bradley, Desai, Kim (1988) for a similar definition of synergistic deals). We classify any given industry-year as involving a synergistic industry merger wave if the number of synergistic deals in that year is one standard deviation above the industry time-series median. Synergistic deals are defined as those with positive bidder and target combined wealth effect, where bidder and target combined wealth effect is defined as the value-weighted sum of cumulative abnormal return to the bidder and the target's stock for trading days (-5, +2) relative to the date of the bid.

Based on Eckbo (1983, 1985, 1992) and Song and Walkling (2000), in our baseline analysis we require that waves are relatively unexpected, which we define as those that involve a surprise bid in at least half of the (3-SIC) subsectors within the industry, with surprise bid defined as the first takeover bid after a period of at least 5 months with no acquisition activity in the subsector. This restriction leads to our final sample of 7,895 firm-year observations. In robustness analysis we consider variation by degree of anticipation and robustness to including relatively anticipated waves and to a variety of

[9] We also cross-checked this information for consistency using data from Compact Disclosure.

alternative definitions of what constitutes a synergistic wave.

We also consider a second approach that relies on industry characteristics (shocks), rather than realized merger activity, to construct a proxy for the intensity of economic motives to merge in the industry. We use a wide array of standard industry shocks that have been shown in the literature to be significant determinants of firms' economic motives to merge, including economic (Harford (2005)), technological (Andrade et al. (2001)), and regulatory changes in industry fundamentals. Our proxy for economic shock is based on seven economic variables in each industry-year as in Harford (2005): net income/sales (profitability), asset turnover, R&D, capital expenditures, employee growth, ROA, and sales growth. For each of these variables, we take the industry median of the absolute value of the change in the variable over the year (shock). We then rank (z-score) each industry-year shock relative to the 10-year time series of shock observations for the industry. To avoid multicollinearity from including all these variables in the same model, we use the first principal component from these seven variables as a measure of economic shock factor. An industry-year is considered to involve an economic shock if it is in the upper quartile of the sample distribution of the economic shock factor.

Technological shocks are defined as in Mitchell and Mulherin (1996) based on capacity utilization in the industry. Our proxy is an index of industry-level capacity utilization from the Federal Reserve's monthly index of industrial production and capacity utilization. We average the monthly data to obtain the annual industry-level capacity utilization value and use the same procedure as for the economic shocks to identify industry-years involving a shock. Finally, regulatory shocks are also standard (e.g., Andrade, Mitchell, and Stafford (2001). Our regulatory shock dummy is defined as taking the value of one in industry-years involving either substantial import tariff reductions (upper quartile of the sample distribution) or a deregulatory event. We obtain annual import tariff data by industry from the NBER trade dataset. The deregulatory events are from the list in Harford (2005).

3.2.2 Antitakeover provisions

We focus our main analysis on the classified board provision. In robustness checks, we consider the role of state- and other firm-level antitakeover provisions. The reason for this choice is that, while firms can employ a number of alternative anti-takeover provisions, M&A practitioners and lawyers as well as the agency literature (see, for example, Daines and Klausner (2001), Bebchuk and Cohen (2005), and Kadyrzhanova and Rhodes-Kropf (2009)) argue that none presents as prohibitive of an expense for prospective acquirers as a classified board. This is the case since a classified board staggers elections of directors into usually three distinct classes with successive annual elections occurring only for a single class of directors. By making it impossible for a hostile bidder to remove a majority of incumbent directors without waiting for a minimum of two elections cycles, classified boards represent a formidable obstacle to a change-in-control bid contested by target management. In addition, classified board is the main anti-takeover provision considered in recent studies that also use the IRRC information such as, for example, Bates, Becher, and Lemmon (2008), which eases comparison of our results with these recent findings in the literature.

3.2.3 Takeover bids

In order to obtain information on both successful and unsuccessful takeover attempts involving IRRC firms, we use the mergers and acquisitions database maintained by Securities Data Corporation (SDC). We account for multi-bid auctions and follow-on bidding as in Bates, Becher, and Lemmon (2008) and filter our sample of bids to include only initial bids for a given target, which are defined as all bids for which there is no bid for the target identified for 365 calendar days before the announcement. Our merged IRRC-Compustat sample is associated with 934 merger and acquisitions transaction reports on SDC between 1990 and 2006. These deals are screened to include only deal forms coded as "mergers", "acquisitions", and "acquisitions of majority interest."[10] We exclude takeovers involving financial bidders and deals in which the bidder holds more than 15% of the target's total shares outstanding

[10] We also exclude exclude spin-off "acquisitions" where the acquirers are the firm's own shareholders.

prior to the takeover announcement. Our sample of takeover bids is then matched to the merged IRRC/Compustat data by calendar year.[11] The final data set consists of 732 takeover bids involving IRRC firms announced between 1990 and 2006.

Panel A of Table 1 presents summary statistics of firm, industry, and takeover deal characteristics in our sample. Sample moments for classified board, firm, and industry characteristics are in line with previous governance studies that use the IRRC sample (e.g., Gompers, Ishii, and Metrick (2003)). Deal characteristics are also comparable to those in previous studies of the market for corporate control (e.g., Mikkelson and Partch (1989), Bates, Becher, and Lemmon (2008), Schwert (2000)). In particular, firms that receive a takeover offer are about 4.9% of the firm-year observations, deals that include stock as a method of payment comprise about 65% of the total number of takeover deals, the incidence of tender offers is about 17%, and about 75% of the deals are completed.

Panel B1 of Table 1 summarizes bid frequency, target and deals characteristics, and industry shocks, delineated by whether the industry-year involves a synergistic merger wave. The statistical significance of differences in means between industry-years that involve such waves and those that do not is indicated by asterisks in the far right column. As expected, bid frequency is significantly higher in industry-years involving a synergistic merger wave. However, only firms with a single class of directors experience a significant and large change in bid frequency between wave and non-wave industry years, with bid frequency being about 4.6% in non-wave industry-years and about 9% in wave industry-years. By contrast, bid frequency for firms with a classified board of directors is around 5% and is not statistically significantly different in wave and non-wave industry years. As a result, in wave industry-years takeover bid frequency for firms with a single class of directors is about twice as large as bid frequency of firms with classified boards, while bid frequencies for these two groups of firms are about the same in off-wave industry-years.

[11] Targets are matched to CRSP/Compustat GVKEY identifiers using reported SDC target CUSIPs. Given variation in SDC and Compustat CUSIP codes we verify positive matches comparing the SDC reported company name against the historical name structure on CRSP. For a subset of targets not matched by CUSIP, we match using the target corporation's name from SDC and the name structure on CRSP.

With the exception of target announcement returns and tender offer frequency, which are both higher in industry-years involving a synergistic merger waves, none of the differences in target and deal characteristics is statistically significant across the two groups. The fact that target premiums are higher on the wave suggests that targets share some of the surplus from synergistic deals. Finally, all our measures of industry shocks are significantly different across the two groups of industry-years, which suggests that these industry shocks give rise to synergistic merger opportunities and is consistent with the standard finding in the literature that industry shocks are catalysts of industry merger waves.

Panel B2 of Table 1 lists five synergistic industry merger waves with the largest total deal value in our sample. Given that we are using a similar methodology to identify industry waves, it is not surprising that all of these five episodes are also classified as waves by Harford (2005). However, it is interesting to note that the motives for these waves reported in Harford (2005) and based on Lexis-Nexis searches all involve economic motives to merge, such as the Telecom Act of 1996 for the Entertainment industry or consolidation and industry growth as outsourcing takes off in the Business Services industry.

4 Baseline probit analysis of the likelihood of receiving a takeover bid

In this section we present the main findings of our study. We show that the relation between classified board and a firm's takeover likelihood clusters through time by industry. In particular, we document that there is an economically significant relation between classified boards and takeover likelihood in years when industries undergo synergistic merger waves, especially when these industry merger waves are relatively unanticipated. By contrast, deterrence is muted in years when synergistic industry M&A activity subsides. Next, we explore the link with the underlying economic determinants of merger gains. We document that the deterrence effect of classified boards is economically significant in years when industries are hit by a variety of economic, technological, and regulatory industry shocks that tend

to increase merger gains. As time lapses from the initial impact of these industry shocks, the effect of classified board declines. Finally, we show that several other ATPs that are commonly included in standard governance indices significantly strengthen the deterrence effect of the classified board provision, but again only on the wave. Overall, these results suggest that ATPs entrench managers by allowing them to sit out synergistic industry merger waves.

4.1 Classified boards and synergistic industry merger waves

Table 2 presents results of our baseline probit analysis of the relation between classified board and the likelihood that a firm receives a takeover bid in any given synergistic industry merger wave year. We estimate equation (1), where the dependent variable takes value of one when a firm receives a takeover bid in a given year. Industries are considered to undergo a synergy wave in any given year if the number of synergistic deals in that year is one standard deviation above the industry time-series median, with industries defined as in Fama and French (1997) and synergistic deals defined as those with positive bidder and target combined wealth effect (CAR (-5,+2)). In addition, we require that waves are relatively unexpected, which we define as those that involve a surprise bid in at least half of the (3-SIC) subsectors within the industry. In subsequent analysis we consider variation by degree of anticipation and robustness to including relatively anticipated waves and to a variety of alternative definitions of what constitutes a synergistic wave. Coefficients are reported as marginal effects calculated at the means of independent variables. Statistical significance is evaluated using robust standard errors clustered at the firm level, which are reported in parentheses.

For the sake of comparison with the previous literature, Column (1) of Table 2 reports results for a pooled regression across all industry-years - i.e., both wave and non-wave ones - which is the standard approach in the literature. The estimates show that the likelihood of receiving a takeover bid is significantly lower for firms with a classified board of directors (t-statistic=2.6). The magnitude of the marginal effect implies that firms with classified boards are about 1.3% less likely to receive a bid in a particular year relative to firms with a single class of directors, which is in line with

previous estimates (e.g., Bates, Becher, and Lemmon (2008)). Estimated coefficients for the firm controls are also as expected, with smaller and relatively underperforming firms more likely to become takeover targets (e.g., Morck, Shleifer, and Vishny (1988), Comment and Schwert (1995)). Overall, considering that the unconditional likelihood of receiving a bid for firms in the sample is about 5%, these results confirm the standard finding in the literature that the deterrence effect of classified board is economically significant, on average, but small compared to the large valuation effects of classified boards documented in the governance literature.

Columns (2) and (3) of Table 2 report the main finding of our study. We estimate equation (1) separately in the two sub-samples of industry-year observations. Column (2) reports results for industry-years that include ("On") synergistic industry merger waves, while Column (3) shows results for all other industry-years ("Off" wave). The results in Column (2) show that the coefficient estimate of the classified board indicator is strongly statistically significant on the wave (t-statistic=3.1). The marginal effect is quite striking and implies that firms with classified boards are about 7.5% less likely to receive a bid in a particular wave industry-year relative to comparable firms with a single class of directors, which is an economically large magnitude considering that the unconditional likelihood of receiving a bid is about 6% on the wave. By contrast, the coefficient estimate of the classified board indicator off the wave (Column (3)) is an order of magnitude smaller and is not statistically significant (t-statistic=0.5). These estimates suggest that board classification represents an economically significant takeover deterrent in years when synergistic industry merger activity is at its peak level, which is consistent with our Prediction 1.

In order to gauge economic significance of these results, the bottom panel of Table 2 displays implied takeover likelihoods for firms with and without classified boards, again for industry-years that include (Column (2)) and those that exclude (Column (3)) synergistic industry merger waves. Two features are noteworthy. First, looking at Column (2), the likelihood that firms with a single class of directors receive a takeover bid on the wave is 10.5%, which is more than three times as large as the likelihood that firms with classified boards become takeover targets (3%). Second, the comparison of Column 2

and Column 3 shows that takeover odds of firms with a single class of directors display significant time variation. In fact, they more than triple on the wave compared to off-the-wave years. By contrast, takeover odds of firms with classified boards are relatively flat across the two sub-samples at around 3%. Putting these two observations together suggests that the classified board provision represents an economically significant impediment to potentially value-increasing merger opportunities that arise at times when industries undergo synergistic merger waves.

Columns (4) and (5) of Table 2 show additional results for industry-years that are on the wave. The results in Column(4) show that our estimates for on the wave industry-years are only a bit smaller when we define waves based on a 24-month, rather than one-year, window. The results in Column (5) take a closer look at time-variation by adding four subsequent years to each synergy wave industry-year and adding to our baseline specification an interaction term between classified board and the number of years since the wave. The coefficient estimate on the interaction term is positive and statistically significant (t-statistic=2.6), suggesting that the relation between classified boards and takeover likelihood is strong in the initial wave years and becomes significantly weaker as activity subsides in the years subsequent to the wave. Based on our estimates, on average the relation weakens by a bit less than 2% per year and, thus, becomes muted by the fourth year after the wave. These results indicate that there is pronounced time-series variation in the relation between classified boards and takeover likelihood.

Finally, Columns (6) and (7) of Table 2 show additional results for off-the-wave industry-years. In particular, we further sub-divide off-the-wave observations between those when M&A activity is high but non-synergistic, and those when overall industry M&A activity - both synergistic and non-synergistic - is low, respectively. The results in Column (6) show that our main result is not driven by high overall M&A activity in the industry. In non-synergistic industry waves, the coefficient on classified board is small, positive, and not statistically significant. This result is consistent with existing theory and evidence on non-synergistic waves driven by over-valuation (e.g., Rhodes-Kropf, Robinson, and Viswanathan (2005), Shleifer and Vishny (2003)), which show that the usual conflict of interest

reverses in waves driven by misvaluation, since passing on merger opportunities might actually be in the interest of target shareholders, but not of target management who might want to take advantage of their overvalued stock. In industry-years of low M&A activity (Column (7)), the relation between classified board and takeover likelihood is weakly negative and not statistically significant. These results indicate that our main finding for industry-years that are off synergistic waves (Column (3)) holds for both low activity industry-years and those with high M&A activity that is not synergistic.

In summary, the results in Table 2 show that the answer to the question of whether there is an economically significant relation between a firm's classified board and its likelihood of becoming the target of a takeover bid depends crucially on whether industries are undergoing synergistic merger waves. In these wave industry-years, firms with a single class of directors are more than three times as likely to become takeover targets as firms with classified boards. As synergistic merger activity subsides, the gap in takeover likelihood between these two types of firms narrows. Finally, the gap is not statistically significant in off-wave years, irrespective of whether overall activity is low or there is non-synergistic activity. Overall, this first set of results suggest that while classified boards entrench management at times when shareholders could benefit the most from synergistic merger opportunities in the industry, these provisions do not appear to play a significant role once synergistic industry M&A activity subsides.

Anticipation Table 3 presents results on variation by the degree to which industry merger waves are unanticipated, or 'surprise waves.' Based on Prediction 2, we expect to see larger effects for surprise waves since acquirers are less likely to be "snatching up" unprotected targets in advance of the time when synergistic merger activity peaks in the industry. The full set of firm and industry controls – size, market-to-book, and sales growth, as well as industry concentration and high tech status - and year and industry effects are included in the estimation, but since there is little change from the coefficients presented in Table 2, firm controls are omitted in this table and the subsequent ones for brevity. All specifications are for industries that undergo a synergy wave in any given year, which are

defined as those for which the number of synergistic deals in that year is one standard deviation above the industry time-series median, with industries defined as in Fama and French (1997) and synergistic deals defined as those with positive bidder and target combined wealth effect (CAR (-5,+2)). In the panel to the left (Columns (1)-(4)), we include waves with a smaller degree of surprise than those in Table 2 (share of subsectors with a surprise bid in the top three quartiles), while in the panel to the right (Columns (5)-(8)) we consider waves with a higher degree of surprise (share of subsectors with a surprise bid in the top quartile). Surprise bid is defined as in Table 2. Coefficients are reported as marginal effects calculated at the means of independent variables. Robust standard errors clustered at the firm level are in parentheses.

The estimates in Columns (2) and (6) of Table 3 show that the negative relation between classified board and takeover likelihood is stronger for waves with a higher degree of surprise. In industry-years that include more anticipated waves, the estimate for classified board in Column (2) implies a difference in takeover likelihood between firms with classified boards and those with a single class of directors of about 6%, which is both statistically and economically significant, but lower than its counterpart in Table 2. By contrast, in industry-years that are in the top quartile of surprise wave, the estimated coefficient on the classified board indicator in Column (6) implies that firms with classified boards are about 10% less likely to receive a bid relative to firms with a single class of directors. In addition, their implied takeover likelihood is only about 1%. These results are confirmed by the estimates in Columns (4) and (8) that add four years subsequent to each wave and consider the richer specification with an interaction term between classified board and years since the onset of the wave. Finally, the estimates in Columns (3) and (7), show that the degree of anticipation of industry merger activity is not a significant factor off the wave, since the estimated coefficients for the classified board indicator remain not statistically significant and are stable across samples.

Overall, the evidence in Table 3 suggests that the degree to which synergistic industry merger waves are unanticipated significantly reinforces the negative relation between classified board and takeover likelihood on such waves. This cross-sectional feature of the empirical relation between classified board

and takeover likelihood is consistent with Prediction 2 and supports the agency interpretation that classified boards protect target managers from the arrival of synergistic merger opportunities in the industry.

4.2 Classified boards and industry shocks

In this subsection, we provide additional evidence that there is a large entrenchment effect of classified board at times when synergistic merger opportunities arise in the industry. Rather than relying on the intensity of synergistic M&A activity in the industry to identify these industry-years, we take a complementary approach. Tables 4 and 5 present results on changes in the entrenchment power of classified boards in response to several industry shocks that are well-recognized to drive economic motives to merge in the industry, including economic (Harford (2005)), technological (Andrade et al. (2001)), and regulatory shocks. If classified boards protect target managers from the arrival of synergistic merger opportunities in the industry, then whenever industries are hit by shocks that create such merger opportunities we would expect to see a significantly larger increase in takeover likelihood for firms with a single class of directors. Consequently, the difference in the takeover likelihood of firms that have classified boards and those that do not should widen in response to industry shocks (Prediction 3). This gap should further widen in years with higher macroeconomic liquidity. Finally, we verify that our finding on industry merger waves continues to hold in a simultaneous equation setting that treats industry merger waves as endogenously arising in response to industry shocks.

Table 4 presents our evidence on the relation between industry shocks and takeover likelihood for firms with classified boards and those with a single class of directors. We estimate probit regression (1) in a five-year window subsequent to an industry shock, with the dependent variable equal to one if a firm receives a takeover bid in a given year and the full set of firm and industry controls, as well as year and industry effects included (coefficients omitted for brevity). Columns (1), (2), and (3) report results for three sets of shocks (done iteratively), which are defined as industry-years subsequent to a large (upper quartile of industry time-series) change in economic, technological and regulatory fundamentals.

Columns (5), (6), and (7) report results for non-shocked industry-years. Columns (1) and (5) report results for the economic shock factor, Columns (2) and (6) report results for technological shocks, and Columns (3) and (7) report results for regulatory shocks. Industries are as in Fama and French (1997) and industry-years are included if they are defined as surprise in Table 2. Reported coefficients are marginal effects and robust standard errors clustered at the firm level are in parentheses.

The estimates in Table 4 show that there is an economically significant relation between classified boards and takeover likelihood in years when industries are hit by economic, technological, and regulatory shocks. Depending on which particular shock is considered, the estimates for the classified board indicator in Columns (1)-(3) imply that the takeover likelihood of firms with classified boards is between 6% and 8% lower than firms with a single class of directors in the year subsequent to an industry shock. This gap significantly narrows as more years elapse since the industry shock.

Notably, the largest gap in takeover odds between firms with classified boards and those with a single class of directors is in response to regulatory shocks. In the first year subsequent to these shocks, firms with a single class of directors are almost seven times as likely to receive a takeover bid than firms with classified boards. By contrast, Columns (5)-(7) of Table 4 show that the relation between classified board and takeover likelihood is weak and mostly statistically insignificant in industries that are not hit by shocks.

In order to provide more perspective on economic significance of our findings, the two rows at the bottom of Table 4 show that the implied takeover likelihood of firms with a single class of directors doubles or triples upon impact of industry shocks, going from as little as 3.6% to as much as 9.4%. However, takeover likelihood of firms with classified boards is relatively insensitive to these shocks, hovering between 1.4% and 2,7%. Overall, these results show that merger opportunities created by industry shocks accrue disproportionately to firms with a single class of directors. As such, this evidence suggests that classified boards constitute a significant impediment to potentially value-enhancing merger opportunities created by changes in industry fundamentals.

As industry-wide economic, technological, and regulatory shocks are unlikely to be affected by

firm-level antitakeover provisions, we can use the industry shocks as instruments and treat synergistic industry merger waves in Table 2 as an endogenous variable. Instead of using the definition of synergistic waves of Table 2, we now run a first-stage probit regression analogous to Harford (2005), with the dependent variable taking value of one in any given year when the number of deals is one standard deviation above the industry time-series median. We then consider synergistic those wave industry-years that are predicted by our three industry shocks. The estimates reported in Columns (4) and (8) for shocked and non-shocked industries, respectively, confirm our main finding in Table 2, that there is a strong negative relation between classified boards and takeover likelihood only in wave industry-years.

The results in Table 5 show that macroeconomic liquidity reinforces industry shocks in magnifying the entrenchment effect of classified boards. The table replicates the analysis on the sample of shocked industry-years in Table 4 by sub-splitting these industry-years depending on whether macroeconomic liquidity is high (Columns (1)-(4)) or low (Columns (5)-(8)). Liquidity is considered to be high in industry-years when the spread between the average interest rate on commercial and industrial (C&I) loans and the Federal Funds rate is low (below its time-series median) and the industry M/B ratio is above its time-series median, and low otherwise. The intuition behind this test is based on the evidence in Harford (2005), who shows that industry shocks are more likely to translate into a wave if macroeconomic liquidity is high. Based on this intuition, we expect to see a larger wedge between the takeover odds of firms with classified boards and those of firms with a single class of directors whenever industry shocks are accompanied by high macroeconomic liquidity.

Consistent with this intuition and irrespective of which industry shock is considered, the estimates for the classified board indicator in Columns (1)-(3) of Table 5 imply that the difference in takeover likelihood between firms with classified boards and those with a single class of directors is even larger when industry shocks hit at times of high liquidity. In these high-liquidity industry years, industry shocks lead to an average difference in takeover likelihood of up to 10.7%, which significantly declines as time elapses since the shocks. In addition, the two bottom rows of the table show that, in high-

liquidity industry-years, implied takeover likelihood is as large as 11.7% for firms with a single class of directors and as low as 0.5% for firms with classified boards. These results stand in contrast to those for industry-years with low liquidity, when the classified board indicator remains statistically significant, but is much smaller in magnitude.

In summary, the evidence in Tables 4 and 5 suggests that economic, technological, and regulatory industry shocks significantly reinforce the negative relation between classified board and takeover likelihood. Consistent with Prediction 3, this evidence supports the agency interpretation that classified boards insulate managers of potential targets from industry- and economy-wide shocks that create opportunities for value enhancing mergers in the industry.

4.3 Other antitakeover provisions

In this sub-section we examine the argument that is often made in the governance literature (e.g., Bebchuk, Cohen, and Ferrell (2009)) that the power of classified boards as a takeover deterrent is strengthened when combined with other ATPs. In fact, while previous studies find that other ATPs, such as poison pills or state anti-takeover status, are on average more weakly related to takeover likelihood than classified boards, there is to date limited evidence on whether these other provisions strengthen the deterrence effect of classified boards.

Table 6 explores this conjecture. We use the same probit specification as the takeover likelihood regression in Columns (2) and (3) of Table 2. Columns (1)-(5) report results for industry-years on synergy waves. Columns (6)-(10) report results for all other industry-years. The main explanatory variable is an indicator that takes value of one for firms that have both a classified board of directors and, done iteratively, a high level of protection based on three indices of ATPs that are commonly employed in the governance literature or two other types of ATPs that have been the focus of previous studies: Columns (1) and (6) show results for the dummy of classified board combine with a value of the GIM index of Gompers, Ishii, and Metrick (2003) exceeding 9 provisions (sample median); Columns (2) and (7) refer to the combination with a value of the E index of Bebchuk and Cohen

(2003) exceeding 2 provision (sample median); Columns (3) and (8) consider values of the Delay index used in Gompers, Ishii, and Metrick (2003) and Kadyrzhanova and Rhodes-Kropf (2010) exceeding 2 provisions; all indices are net of classified board. Finally, classified board combined with the poison pill provision, which has been widely studies starting with Comment and Schwert (1995), is in Columns (4) and (9), and with states of incorporation with at least four takeover statues in Columns (5) and (10). Coefficients are reported as marginal effects calculated at the means of independent variables and robust standard errors clustered at the firm level are in parentheses.

In wave industry-years, the estimates for classified board combined with other ATPs (Columns (1) through (5)) are higher than the ones for the classified board indicator in Column (2) of Table 2, a result that holds robustly across different sets of provisions. For example, the coefficient estimate of the indicator for classified board combined with a high level of protection based on the GIM index is strongly statistically significant on the wave (t-statistic=2.2). The marginal effect implies that firms with classified boards and high GIM index are about 9.3% less likely to receive a bid in a particular wave industry-year relative to comparable firms with a single class of directors and low GIM index, which is an economically large magnitude considering that the unconditional likelihood of receiving a bid is about 6% on the wave. Notably, only state antitakeover statutes do not appear to significantly enhance the deterrence effect of classified boards, which is consistent with these state-level provisions being substitutes, rather than complements, of firm-level ones. By contrast to the results on the wave, the coefficient estimates of the indicator variable for classified board combined with other ATPs off the wave (Columns (6)-(10)) remain small and not statistically significant (t-statistic=0.1 for the GIM index). Although not statistically significant, only the combination with delay provisions appears to increase the deterrence effect of classified board even off the wave, a result which is consistent with the evidence in Kadyrzhanova and Rhodes-Kropf (2011) that classified board and delay provisions have a stronger relation with outcomes in the takeover market than any other ATPs. Overall, the estimates in Table 6 suggest that board classification when combined with other ATPs represents an even stronger takeover deterrent in years when synergistic industry merger activity is at its peak level.

4.4 Robustness

Table 7 reports results of five sets of robustness checks for our baseline estimates. We estimate the same probit regression (1) that a firm receives a takeover bid as in Table 2, and include the full set of firm and industry controls – size, market-to-book, and sales growth, as well as industry concentration and high tech status - and year and industry effects are included in the estimation. Columns (1)-(3) report results for observations on an industry synergy wave. Columns (4)-(6) report results for all other industry-years. All specifications add observations for four subsequent years to each industry-year and allow for the effect of the classified board provision on takeover likelihood to vary with the number of years since the most recent industry synergy wave, which is the same specification as in Column (5) of Table 2. Coefficients are reported as marginal effects and robust standard errors clustered at the firm level are in parentheses.

First, Rows [1], [2], and [3] show that the result is robust to using different definitions of synergistic merger activity and relaxing the requirement that waves are unanticipated. In particular, Row [1] shows that our baseline estimates are little changed when we define as synergistic activity those industry-years in which the number of all-cash deals is one standard deviation above industry time-series median. Based on the arguments in Harford (2005), all cash deals are less likely to be subject to over-valuation issues. The estimates on the wave remain large when we consider an even weaker definition of synergistic activity that only excludes all stock deals (Row [2]). Finally, when we relax the requirement that synergy waves are relatively unanticipated and include all such waves, Row [3] shows that the magnitude of the estimated coefficient on the classified board indicator is lower, which is consistent with the results in Table 3, but our main result that there is a significant negative relation between classified boards and takeover likelihood only on the wave continues to hold.

Second, Rows [4] and [5] show that our results are robust to using different definitions of the industry merger wave indicator. In particular, Row [4] shows that our result of a significant negative relation between classified board and takeover likelihood continues to hold even under the milder definition of wave based on industry merger activity above time-series median. Row [5] shows that the result is

actually much stronger when we use a more narrow definition of wave based on activity above time-series median plus two standard deviations. This set of robustness checks further corroborates our interpretation of the result that classified boards allow managers to sit merger waves out, and, thus, firms with a single class of directors benefits disproportionately more of the merger opportunities that arise in an industry wave.

Third, Row [6] shows that our result is robust to using a finer industry classification based on the three-digit SIC level, rather than the one based on Fama and French (1997). Fourth, Rows [7] and [8] show robustness to using a more general specification that adds interaction terms between classified board and industry controls. This robustness check addresses the concern that these industry controls may be significantly different on and off the wave and, thus, a failure to control for their interaction with classified boards may be driving our results. We consider two versions of this more general specification, one that includes the interaction of the classified board with industry concentration (Row [7]) and one that include interactions of classified board with all industry controls (Row [8]). These two sets of robustness checks suggest that our result is not driven by any particular choice of industry aggregation nor by the failure to control for potential heterogeneity in the effect of classified board across industries with different levels of concentration or other industry controls.

Fourth, Row [9] shows robustness to treating classified board as an endogenous variable. We use an instrumental variable approach. For an instrument to be valid, it should not directly affect takeover likelihood, and should be a significant determinant of classified board. Based on Bates, Becher, and Lemmon (2008), we instrument for board classification using board size, since firms with large boards of directors are more likely to have a classified board, but board size is not otherwise obviously related to takeover likelihood.[12] The first-stage F-tests reject the null that the instruments are jointly insignificant in the first-stage regressions and our specification passes the Sargan overidentification test, suggesting that our instruments are valid and relevant. The coefficient estimates for the second-stage are close

[12] Since the IRRC database, our main data source for board size, contains information starting from 1996, we retrieve all missing firm information from Compact Disclosure database.

to the OLS estimates reported in Table 2, which suggests that potential endogeneity concerns with classified board are unlikely to be driving our baseline estimates.

Finally, it is possible that shareholders of firms with a classified board may still benefit from the arrival of industry synergies if such firms are more likely to become acquirers, rather than targets. Row [10] shows that this is not the case and board classification is not significantly associated with a greater likelihood of making a takeover bid during synergistic merger waves. Combined with our main estimates on the likelihood of receiving a takeover bid in Table 2, these results suggest that managers of firms with classified boards tend to stay out of the heightened takeover activity during industry merger waves, thereby reducing the opportunities for the firms' shareholders to benefit from synergies that arise in an industry wave.

5 Duration analysis of the likelihood of receiving a takeover bid

In this section we present additional evidence consistent with the notion that classified boards allows managers to sit out industry merger waves. We do so by analyzing the timing of takeover bids within industry merger waves. Since our baseline probit regressions do not take into account the timing of the takeover bids, we need to examine our data in dynamic duration framework that explicitly takes into account the fact that takeover bids are received by different targets at earlier or later stages of each wave spell. Within each industry merger wave spell, if acquirers start out with "snatching up" targets that have a single class of directors, then those firms with classified boards that do receive takeover bids should do so with a significant lag or delay with respect to the other firms in the industry.

Columns (1) to (3) of Table 8 present the results of a Cox proportional hazard model, which is a parsimonious semiparametric model and a common choice for modeling duration.[13] In this duration framework, the dependent variable is time-to-takeover, which measures the time (number of months) between the initial surprise bid in the industry and the time when any given firm becomes the target

[13] For robustness, we also used a fully parametric Weibull model and obtained similar results (avaliable upon request).

of a takeover bid.[14] All definitions, including industry classifications and synergy waves, are as in Table 2, to which we refer the reader for details. The full set of firm and industry controls – size, market-to-book, and sales growth, as well as industry concentration and high tech status - and year and industry effects are included in the estimation. Column (1) reports results for all firms. Columns (2) and (3) report results for observations on and off a synergistic industry merger wave, respectively. Robust standard errors clustered at the firm level are in parentheses.

The estimates of the timing of any given takeover bid in the industry as a function of targets' classified board in Columns (1) to (3) of Table 8 show that classified board is associated with a significant decrease in the hazard of receiving a takeover bid, but only in years when industries are undergoing synergistic merger waves. For these industry-years, the hazard ratio in Column (2) is around 66%, indicating that classified board reduces the conditional likelihood that a firm receives a takeover bid in any given month by about 1/3. By contrast, the relation between classified board and takeover hazards is much weaker and not statistically significant in either the entire sample (Column (1)) or in off-the-wave industry-years. These results suggest that firms with classified boards become takeover targets at significantly later stages of industry merger waves.

Columns (4) to (6) of Table 8 offers a complementary perspective on the timing of receiving a takeover bid by replicating the hazard analysis using OLS regressions of the time-to-takeover, where the dependent variable is the number of months it takes for any given firm to receive a takeover bid. Column (4) reports results for all firms, while Columns (5) and (6) report results for observations on and off a synergistic industry merger wave, respectively. For wave industry-years, the estimates in Column (5) show that there is a significant positive relation between classified board and a firm's time-to-takeover, which is highly statistically significant (t-statistic=3.1). Our estimates imply that classified boards increase the average time it takes for a firm to receive a takeover bid by about 10

[14] Formally, we estimate a Cox proportional hazard model: $h_i(t) \equiv$ Pr(firm i in industry k receives a takeover offer in time t | firm i has not received a takeover offer before time t) $= h_0(t)\exp^{\beta IPCB_{ijt}+\gamma X_{ijt}+\eta_j+\nu_t+\varepsilon_{jt}}$. The model allows the baseline hazard to vary nonparametrically over time. Panel A of Table 7 reports the coefficients $\hat{\beta}$ (coefficients on controls are suppressed and available upon request). Corresponding estimate of hazard ratio (relative risk) of takeover is $\exp^{\hat{\beta}}$, which is reported in square brackets. A value of 1 for the hazard ratio indicates that the variable neither raises nor lowers the expected hazard rate.

months with respect to firms with a single class of directors. In line with the results of the duration analysis, Column (6) confirm that the relation between classified board and time-to-takeover is much weaker and not statistically significant off the wave.

In summary, our duration estimates suggest that, on average, classified boards lengthen by almost a years the time it takes for any given firm to receive a takeover bid in industries that are undergoing synergistic merger waves. This evidence further supports an agency interpretation since it shows that firms with a single class of directors are quicker to take advantage of potential synergies that become available at the earlier stages of industry merger waves.

6 Is sitting out waves costly for shareholders? Analysis of target and bidder wealth effect of takeover bids

In this section we explore whether there is a bargaining effect of classified boards in industries that are undergoing synergistic merger waves. It is well-understood that classified boards may improve target management's bargaining position vis-a-vis acquirers, thus enabling target firms to extract takeover premiums (for example, Stulz (1988) argues that takeover defenses lead to higher target premiums by allowing management to fend off opportunistic offers). Thus, a potential concern with an agency interpretation of our main result is that the benefits shareholders may derive through a bargaining channel may mitigate the losses from deterrence (Schwert (2000) finds a positive although weak relation between poison pill provisions and target premiums; Bates, Becher, and Lemmon (2008) show evidence that classified board negatively affects bidder returns).[15] In addition, since the agency perspective holds that classified boards are a source of entrenchment costs for shareholders, we need to assess target shareholder wealth in order to answer the important economic question of whether our documented entrenchment effect of classified boards is indeed costly for shareholders.

The analysis in Table 9 addresses these issues by estimating changes in target and bidder share-

[15] See also Comment and Schwert (1995) and Ryngaert (1988). Bhagat and Romano (2002) is a survey.

holder wealth at the announcement of a takeover bid. We use OLS regressions with the dependent variable given by the cumulative abnormal return to target shareholders (Columns (1)-(3)) or bidder shareholders (Columns (4)-(6)) for trading days (-2, +2) relative to the date of the takeover bid announcement. CARs are calculated using standard event study methodology (see MacKinlay (1997) for a detailed review) relative to the market model. All definitions, including industry classifications and synergy waves, are as in Table 2, to which we refer the reader for details. The full set of firm and industry controls – size, market-to-book, and sales growth, as well as industry concentration and high tech status - and year and industry effects are included in the estimation. In addition, we include controls for deal characteristics, including an indicator variable that takes the value of one if the method of payment includes bidder's equity, an indicator variable that takes the value of one if the deal is completed, and an indicator variable that takes the value of one if the bid is in the form of a tender offer. Robust standard errors clustered at the firm level are in parentheses.

Columns (1) to (3) of Table 9 summarize regressions of target announcement period returns. Column (1) reports results for all industry-years. Columns (2) and (3) report results for industry-years on and off a synergistic merger wave, respectively. Both on and off the wave, the coefficients associated with target classified board are small and not significantly different from zero. In the overall sample, there is a positive but not statistically significant relation between target shareholder CARs and target classified board. In addition, target announcement CARs are higher for completed deals and tender offers and are negatively correlated with target firm size and equity bids. All these results for the overall sample are consistent with previous studies. Overall, the evidence on the link between target shareholder wealth and target classified board is rather weak and is not significantly strengthened by separating out on and off the wave industry-years.

Columns (4) to (6) of Table 9 consider the determinants of announcement period bidder CARs. Results in Column (4) are for all industry-years, while those in Columns (5) and (6) are for industry-years on and off a synergistic merger wave, respectively. On the wave, the coefficient of target classified board is negative, but small and not significantly different from zero. The coefficient is more negative

and, instead, statistically significant off the wave (t-statistic=2.1). In the overall sample, there is a negative and statistically significant relation between bidder shareholder CARs and target classified board (t-statistic=3.3). In addition, bidder announcement returns are significantly lower for equity bids and for larger bidder firms. These results for the overall sample are all consistent with previous studies. For example, Bates, Becher, and Lemmon (2008) also find evidence of a negative relation between bidder CARs and target classified board. Overall, the evidence is consistent with bidders giving up some of the total surplus when negotiating with targets that have a classified board of directors, which is consistent with a bargaining story. However, the bargaining effect is only significant in off the wave industry-years and, thus, it is unlikely to counter the deterrence effect of classified boards in industry-years that are on the wave.

Overall, the evidence in Table 9 shows that potential bargaining benefits from classified boards are unlikely to offset their entrenchment costs in years when industries are undergoing synergistic merger waves. The results should not be interpreted as indicating that there is no evidence of a bargaining effect of classified board. Rather, our evidence indicates that the relation between classified boards and target and bidder CARs better fits a bargaining story in industry-years that are off the wave. Thus, we conclude that classified boards are a likely source of entrenchment costs for shareholders of firms that end up sitting out industry merger waves.

7 Conclusion

This paper shows that the deterrence effect of classified board clusters through time by industry. In particular, we find a significant deterrence effect in years when industries are undergoing a synergistic merger wave. Our main finding is that, while the difference in takeover likelihood between firms with and without a classified board is small on average, in years when industries undergo synergistic merger waves this difference is large and statistically significant. In particular, in these industry-years, firms with a single class of directors are more than three times as likely to receive a takeover bid compared

to firms with classified boards (10.5% vs 3%, respectively). This wedge is robust across a battery of different specifications, to using several different definitions of what constitutes an industry merger wave and synergistic M&A activity, and to treating classified board as an endogenous variable.

Overall, our analysis suggests that takeover bid deterrence can potentially explain a large fraction of the difference in firm value between firms with and without classified boards. The mechanism we highlight is novel to the literature: antitakeover provisions such as a classified board allow managers to sit out industry merger waves and as a result shareholders lose out on opportunities to benefit from takeover premiums in merger waves when most synergies occur. Our main result implies that the effect of classified board on firm value should vary significantly over time with merger activity in the industry. Consistent with this implication, Cremers and Ferrell (2011) find that the value difference between firms with and without antitakeover provisions is time-varying and concentrated in periods with high industry M&A activity. Our results provide strong support for the findings in Cremers and Ferrell (2011) by documenting direct evidence from the takeover market on time-variation in the bid deterrence effect of classified boards. As such, our findings broaden the classical agency view by highlighting that industry shocks and, in general, industry-wide factors that drive economic motives to merge exacerbate managerial entrenchment costs for shareholders.

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Appendix B. Variable Definitions

The variables used in this paper are extracted from four major data sources: SDC Platinum, IRRC, COMPUSTAT, and CRSP. For each data item, we indicate the relevant source in square brackets. The specific variables used in the analysis are defined as follows:

- Governance [IRRC]:
  - Classified board is a dummy indicating that the firm employs the governance feature.
  - GIM-index is the sum of all antitakeover provisions in a firm's charter that varies between 0 and 24 (Gompers, Ishii, and Metrick (2003)).
  - E-index is the sum of six provisions: staggered boards, limits to shareholder bylaw amendments, limits to shareholder charter amendments, supermajority requirements for mergers, poison pills, and golden parachutes (Bebchuk, Cohen, and Ferrell (2004)).
  - Delay index is the sum of four provisions: blank check, special meeting, written consent, and classified board (Gompers, Ishii, and Metrick (2003)).
  - Poison pill is a dummy indicating that the firm employs the governance feature.
  - State antitakeover provisions index is the sum of all antitakeover statutes in the firm's state of incorporation. The index is from Bebchuk and Cohen (2003).
- Industry synergy waves: Industry-years are considered to undergo a synergy wave if the number of deals with positive bidder and target combined wealth effect (CAR (-5,+2)) in that year is one standard deviation above the industry time-series median. Industries are defined according to Fama and French (1997). In addition, we require that the synergy wave is subsequent to a surprise bid in at least half of subsectors within the industry, with surprise bid defined as the first takeover bid after a period of at least 5 months with no acquisition activity in the subsector.
- Industry economic shocks:

- Deregulation is a dummy indicating industry-years identified as having undergone regulatory changes due to either substantial (upper quartile of the sample distribution) import tariff reductions or a deregulatory event in the preceding year. The deregulatory events are from Harford (2005). Import tariffs by industry are from the NBER trade dataset.
- Capacity utilization is an index of industry-level capacity utilization from the Federal Reserve's monthly index of industrial production and capacity utilization. The monthly data was averaged to obtain the annual industry-level capacity utilization value. For each industry-year, we compute the absolute value of the change in capacity utilization over the year (shock). We then rank (z-score) these capacity utilization shocks relative to the 10-year time series of shock observations for the industry. An industry-year is considered to be on the wave if it is in the upper quartile of the sample distribution of the capacity utilization shock factor.
- Economic shock factor is defined as the first principal component of seven economic variables in each industry-year as in Harford (2005): net income/sales (profitability), asset turnover, R&D, capital expenditures, employee growth, ROA, and sales growth. For each of these variables, we take the industry median of the absolute value of the change in the variable over the year (shock). We then rank (z-score) each industry-year shock relative to the 10-year time series of shock observations for the industry. An industry-year is considered to be on the wave if it is in the upper quartile of the sample distribution of the economic shock factor.

- Outcomes:
  - Takeover likelihood: the probability that a firm in the merged IRRC-Compustat sample receives a takeover bid. [SDC Platinum]
  - Number of months: number of months that it takes a firm in the merged IRRC-Compustat sample to become target of a takeover bid within five years after a dormant period. [SDC

Platinum]

- Target CAR: the cumulative abnormal return to the stock of the target of a takeover bid for trading days (-2, +2) relative to the date of the bid [SDC Platinum and CRSP]. Abnormal returns are calculated using the CAPM benchmark based on the market model obtained using CRSP daily returns for the (-241,-41) window.
- Bidder CAR: the cumulative abnormal return to the stock of the bidder for trading days (-2, +2) relative to the date of the bid [SDC Platinum and CRSP]. Abnormal returns are calculated using the CAPM benchmark based on the market model obtained using CRSP daily returns for the (-241,-41) window.

- Firm and industry controls:
  - Industry size is defined as mean of Assets among all firms in the same three-digit SIC group for each year, where Assets is defined as log of the book value of assets (item 6), deflated by CPI in 1990. [Compustat]
  - Industry market-to-book is defined as mean of Market-to-book among all firms in the same three-digit SIC group for each year, where Market-to-book is defined as the market value of assets divided by the book value of assets (item 6). Market value of assets equals the book value of assets plus the market value of common equity less the sum of the book value of common equity (item 60) and balance sheet deferred taxes (item 74). [Compustat]
  - Industry sales growth is defined as mean of Sales growth among all firms in the same three-digit SIC group for each year, where Sales Growth is defined as change in sales (item 12) from year $t-1$ to t, scaled by sales in year $t-1$. [Compustat]
  - Industry concentration is the four-firm concentration ratio defined as the ratio of the sales of four firms with largest market share to total industry sales. [Census Bureau]
  - High-tech industries are defined following Loughran and Ritter (2004) as those in SIC codes 3571, 3572, 3575, 3577, 3578, 3661, 3663, 3669, 3674, 3812, 3823, 3825, 3826, 3827, 3829,

3841, 3845, 4812, 4813, 4899, 7370, 7371, 7372, 7373, 7374, 7375, 7378, and 7379.

- Deal Controls:
  - Stock offer: a dummy variable that takes the value of 1 if the method of payment includes bidder equity, 0 otherwise. [SDC]
  - Tender offer: a dummy variable that takes the value of 1 if the bid is in the form of a tender offer. [SDC]
  - Completed deal: a dummy variable that takes the value of 1 if the target was successfully taken over without more than a one year interval between bids. [SDC]

Appendix C. Tables and Figures

Table 1: Summary Statistics

The sample is a panel of 1,485 firms from IRRC in the 1990 to 2006 period on and off industry synergy wave years. Industry-years are considered to undergo a synergy wave if the number of deals with positive bidder and target combined wealth effect (CAR (-5,+2)) in that year is one standard deviation above the industry time-series median. Industries are defined according to Fama and French (1997). In addition, we require that the synergy wave is subsequent to a surprise bid in at least half of subsectors within the industry, with surprise bid defined as the first takeover bid after a period of at least 5 months with no acquisition activity in the subsector. Variable definitions are provided in Appendix B. Levels of significance are indicated by *, **, and *** for 10%, 5%, and 1%, respectively.

Panel A: Summary statistics

Variable	Mean	Median	Std Dev
Classified board	0.59	1	0.48
Net GIM	7.94	8	2.34
Wave Characteristics			
Synergy wave	0.25	0	0.41
Share of subsectors with a surprise bid	0.38	0.38	0.26
Firm Controls			
Size (Log of Assets)	6.97	6.87	1.34
M/B	1.86	1.51	1.26
Sales growth	0.10	0.07	0.28
Industry Controls			
Industry size	6.96	6.88	1.06
Industry M/B	1.84	1.65	0.79
Industry Sales Growth	0.09	0.08	0.12
Concentration	0.10	0.06	0.10
High-tech	0.07	0	0.26
Deal Characteristics			
Bid frequency	5.06%	0	21.91%
Target CAR [-2,+2]	20.40%	17.46%	23.84%
Bidder CAR [-2,+2]	-3.23%	-2.02%	9.21%
Stock offer	0.651	1	0.477
Tender offer	0.172	0	0.378
Completed deal	0.747	1	0.435

Panel B: Summary Statistics by Wave

Panel B1: Bid Frequency and Target Characteristics by Wave

Variable	On Synergy Wave (1)	Off Synergy Wave (2)	Difference of means (1)-(2)
Probability a firm receives a takeover bid in a given year			
All Firms	5.98%	4.81%	1.18**
Firms without Classified Board	8.92%	4.63%	4.29***
Firms with Classified Board	4.34%	4.91%	-0.56
Target & Deal Characteristics			
Size (Log of Assets)	6.98	6.96	0.02
M/B	1.83	1.65	0.18
Sales Growth	0.08	0.05	0.03
Target CAR [-2,+2]	22.75%	18.51%	4.24**
Bidder CAR [-2,+2]	-0.09%	-0.09%	0.00
Stock Offer	0.610	0.556	0.05
Tender Offer	0.193	0.136	0.06*
Completed Deal	0.756	0.741	0.02
Industry Shocks			
Economic shock factor	0.228	-0.026	0.25***
Shock to capacity utilization	0.054	0.043	0.01***
Deregulation	0.130	0.082	0.05***

Panel B2: Top 5 industry synergy waves in the sample

Fama-French Industry	Year	Number of bids in SDC	Share of subsectors with a surprise bid
Business Services	1999-2000	1187	0.42
Healthcare	1995-1997	910	0.67
Wholesale	1997-1998	787	0.71
Retail	1995-1996	357	0.67
Entertainment	1997-1999	271	0.67

Table 2: Baseline Probit Analysis of the Likelihood of Receiving a Takeover Bid

This table uses probit models to contrast the effect of the classified board provision on the likelihood of receiving a takeover bid in and outside of industry synergy wave years. The dependent variable is equal to one if a firm receives a takeover bid in a given year. Industry-years are considered to undergo a synergy wave if the number of deals with positive bidder and target combined wealth effect (CAR (-5,+2)) in that year is one standard deviation above the industry time-series median. Industries are defined according to Fama and French (1997). In addition, we require that the synergy wave is subsequent to a surprise bid in at least half of subsectors within the industry, with surprise bid defined as the first takeover bid after a period of at least 5 months with no acquisition activity in the subsector. Column (1) reports results pooled across all industry-years in the sample. Columns (2) and (3) split the sample in Column (1) into observations on and off an industry synergy wave, respectively. Column (4) allows for synergy wave to last for 24 months, and Column (5) adds observations for four additional years for each industry synergy wave in Column (4) and allows for the effect of the classified board provision on takeover likelihood to vary with the number of years since the most recent synergy wave. Columns (6) and (7) split the off synergy wave sample in Column (3) into industry-years corresponding to high and low non-synergistic M&A activity, respectively. Classified board is an indicator for the firm's usage of the provision. Years is the difference between current year t and the year in which the most recent synergy wave in the industry occurred. Controls include firm and industry size (log of total assets), market-to-book, and sales growth. In addition, we control for GIM index net of classified board, industry concentration and a dummy for high tech industries. All controls are measured at the beginning of the year. The estimates of industry controls and net GIM are omitted from the table for brevity and are available upon request. Year and industry dummies are included in all regressions. Coefficients are reported as marginal effects calculated at the means of independent variables. Marginal effects and standard errors of interaction terms in Column (5) are computed as in Ai and Norton (2003). Robust standard errors clustered at the firm level are in parentheses. Variable definitions are provided in Appendix B. Levels of significance are indicated by *, **, and *** for 10%, 5%, and 1%, respectively.

	All	Synergy Wave is		On Synergy Wave Only		Off Synergy Wave Only	
		On	Off	24–month waves	+4 yrs post-wave	High non-synergistic activity	Low activity
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Classified Board	-0.013**	-0.075***	-0.003	-0.062***	-0.064***	0.010	-0.008
	(0.005)	(0.024)	(0.006)	(0.022)	(0.019)	(0.019)	(0.006)
Years					-0.019***		
					(0.007)		
Classified Board* Years					0.018**		
					(0.007)		
Assets	-0.004***	-0.006***	-0.003**	-0.006***	-0.004***	-0.003***	-0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
M/B	-0.011***	-0.033**	-0.008**	-0.025***	-0.006***	0.003	-0.010**
	(0.003)	(0.014)	(0.004)	(0.009)	(0.002)	(0.009)	(0.005)
Sales Growth	-0.010	-0.023	-0.033***	-0.020	-0.001	-0.019**	-0.017
	(0.013)	(0.036)	(0.013)	(0.020)	(0.015)	(0.008)	(0.014)
Year & Industry F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7895	1525	6370	2281	4522	2304	4066
Pseudo-R^2	0.08	0.14	0.11	0.09	0.06	0.12	0.10
Implied takeover probabilities for firms with and without classified board							
No Classified Board	0.043	0.105	0.036				
Classified Board	0.030	0.030	0.032				

Table 3: Probit Analysis of the Likelihood of Receiving a Takeover Bid: Variation by Degree of Surprise

This table uses probit models to explore how results in Table 2 vary with the degree of anticipation of the industry synergy wave. The dependent variable is equal to one if a firm receives a takeover bid in a given year. Industry-years are considered to undergo a synergy wave if the number of deals with positive bidder and target combined wealth effect (CAR (-5,+2)) in that year is one standard deviation above the industry time-series median. Industries are defined according to Fama and French (1997). In Columns (1)-(4) we require that the synergy wave is subsequent to a surprise bid in a lower share of subsectors than in Table 2 (i.e., we exclude the lower quartile of the sample distribution). In Columns (5)-(8) we require that the synergy wave is subsequent to a surprise bid in a higher share of subsectors than in Table 2 (i.e., we include only the upper quartile of the sample distribution). Surprise bid is defined as the first takeover bid after a period of at least 5 months with no acquisition activity in the subsector. Columns (1) and (5) report results pooled across all industry-years in the samples. Columns (2) and (3) and Columns (6) and (7) split the sample in Columns (1) and (5) into observations on and off an industry synergy wave, respectively. Columns (4) and (8) allow for synergy wave to last for 24 months and add observations for four additional years for each industry synergy wave and allow for the effect of the classified board provision on takeover likelihood to vary with the number of years since the most recent synergy wave. Classified board is an indicator for the firm's usage of the provision. Years is the difference between current year t and the year in which the most recent synergy wave in the industry occurred. Controls include firm and industry size (log of total assets), market-to-book, and sales growth. In addition, we control for industry concentration and a dummy for high tech industries. All controls are measured at the beginning of the year. The estimates of industry controls are omitted from the table for brevity and are available upon request. Year and industry dummies are included in all regressions. Coefficients are reported as marginal effects calculated at the means of independent variables. Marginal effects and standard errors of interaction terms in Columns (4) and (8) are computed as in Ai and Norton (2003). Robust standard errors clustered at the firm level are in parentheses. Variable definitions are provided in Appendix B. Levels of significance are indicated by *, **, and *** for 10%, 5%, and 1%, respectively.

	Low Surprise				High Surprise			
	All	Synergy Wave		On Synergy Wave	All	Synergy Wave		On Synergy Wave
		On	Off	+4 yrs post-wave		On	Off	+4 yrs post-wave
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Classified Board	-0.015**	-0.061**	-0.006	-0.047***	-0.035***	-0.099***	-0.004	-0.085***
	(0.007)	(0.030)	(0.007)	(0.018)	(0.012)	(0.039)	(0.020)	(0.033)
Years				-0.012*				-0.009
				(0.007)				(0.012)
Classified Board* Years				0.020***				0.021**
				(0.007)				(0.010)
Year & Industry F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm & Industry controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10782	3063	7719	6480	3572	682	2890	2165
Pseudo-R^2	0.12	0.16	0.06	0.07	0.13	0.21	0.06	0.11
Implied takeover probabilities for firms with and without classified board								
No Classified Board	0.048	0.094	0.040		0.067	0.107	0.036	
Classified Board	0.033	0.033	0.034		0.032	0.008	0.031	

Table 4: Probit Analysis of the Likelihood of Receiving a Takeover Bid: Industry Shocks

This table uses probit models to contrast the effect of the classified board provision on the likelihood of receiving a takeover bid in and outside of industry merger waves preceded by major economic shocks. The dependent variable is equal to one if a firm receives a takeover bid in a given year. Columns (1)-(4) report results for industry-years with high (upper quartile of industry time-series) level of economic fundamentals in the preceding year. Columns (5)-(8) report results all other industry-years. Economic fundamentals proxying for industry shocks are: first principal component of absolute value of changes in industry median ROA, profitability, asset turnover, R&D, capital expenditures, sales growth, and employee growth (Columns (1) and (5)), absolute value of changes in industry capacity utilization (Columns (2) and (6)), a dummy variable for regulatory changes due to either import tariff reductions or deregulation (Columns (3) and (7)), and the portion of industry synergy wave predicted by all of the above industry shocks (Columns (4) and (8)). Industries are defined according to Fama and French (1997). Industry-years included in the sample have a surprise bid in at least half of subsectors within the industry, with surprise bid defined as the first takeover bid after a period of at least 5 months with no acquisition activity in the subsector. All specifications add observations for four subsequent years to each industry-year and allow for the effect of the classified board provision on takeover likelihood to vary with the number of years since the most recent industry shock. Classified board is an indicator for the firm's usage of the provision. Years is the difference between current year t and the year in which the most recent economic shock in the industry occurred. Controls include firm and industry size (log of total assets), market-to-book, and sales growth. In addition, we control for industry concentration and a dummy for high tech industries. All controls are measured at the beginning of the year. The estimates of industry controls are omitted from the table for brevity and are available upon request. Year and industry dummies are included in all regressions. Coefficients are reported as marginal effects calculated at the means of independent variables. Marginal effects and standard errors of interaction terms are computed as in Ai and Norton (2003). Robust standard errors clustered at the firm level are in parentheses. Variable definitions are provided in Appendix B. Levels of significance are indicated by *, **, and *** for 10%, 5%, and 1%, respectively.

	Up to 4 years after an industry shock				All other years			
Variable	Econ Shock Factor (1)	Capacity Utili-zation (2)	Dere-gula-tion (3)	2SLS Wave (4)	Econ Shock Factor (5)	Capacity Utili-zation (6)	Dere-gula-tion (7)	2SLS Wave (8)
Classified Board	-0.061***	-0.070***	-0.080***	-0.059***	-0.014	-0.015	-0.016*	-0.014*
	(0.020)	(0.026)	(0.028)	(0.022)	(0.009)	(0.015)	(0.009)	(0.014)
Years	-0.028*	-0.056***	-0.009	-0.019*	-0.028***	-0.033***	-0.027***	-0.031***
	(0.016)	(0.015)	(0.016)	(0.011)	(0.008)	(0.012)	(0.006)	(0.011)
Classified Board*	0.027***	0.042**	0.043**	0.043***	0.011	0.012	0.012	0.005
Years	(0.012)	(0.017)	(0.021)	(0.013)	(0.009)	(0.014)	(0.011)	(0.013)
Year & Industry F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1126	1082	1004	1034	6769	3803	6891	6861
Pseudo-R^2	0.11	0.18	0.21	0.21	0.15	0.16	0.17	0.17
Implied takeover probabilities for firms with and without classified board								
No Classified Board	0.084	0.086	0.094	0.083	0.041	0.036	0.055	0.039
Classified Board	0.023	0.016	0.014	0.024	0.027	0.021	0.039	0.025

Table 5: Probit Analysis of the Likelihood of Receiving a Takeover Bid: Industry Shocks and Liquidity

This table uses probit models to explore how results in Table 4 for on the wave years vary with the amount of capital liquidity in the economy. The dependent variable is equal to one if a firm receives a takeover bid in a given year. Capital liquidity is considered to be high in industry-years when the spread between the average interest rate on commercial and industrial (C&I) loans and the Federal Funds rate is low (below its time-series median) and the industry M/B ratio is above its time-series median. Columns (1)-(4) report results for high capital liquidity industry-years. Columns (5)-(8) report results for all other industry-years. Industries are defined according to Fama and French (1997). Industry-years included in the sample have a surprise bid in at least half of subsectors within the industry, with surprise bid defined as the first takeover bid after a period of at least 5 months with no acquisition activity in the subsector. All specifications add observations for four subsequent years to each industry-year and allow for the effect of the classified board provision on takeover likelihood to vary with the number of years since the most recent industry shock. Classified board is an indicator for the firm's usage of the provision. Years is the difference between current year t and the year in which the most recent economic shock in the industry occurred. Controls include firm and industry size (log of total assets), market-to-book, and sales growth. In addition, we control for industry concentration and a dummy for high tech industries. All controls are measured at the beginning of the year. The estimates of industry controls are omitted from the table for brevity and are available upon request. Year and industry dummies are included in all regressions. Coefficients are reported as marginal effects calculated at the means of independent variables. Marginal effects and standard errors of interaction terms are computed as in Ai and Norton (2003). Robust standard errors clustered at the firm level are in parentheses. Variable definitions are provided in Appendix B. Levels of significance are indicated by *, **, and *** for 10%, 5%, and 1%, respectively.

	High Liquidity				Low Liquidity			
Variable	Econ Shock Factor (1)	Capacity Utili-zation (2)	Dere-gula-tion (3)	2SLS Wave (4)	Econ Shock Factor (5)	Capacity Utili-zation (6)	Dere-gula-tion (7)	2SLS Wave (8)
Classified Board	-0.086***	-0.107**	-0.083**	-0.091***	-0.028**	-0.075*	-0.038**	-0.018
	(0.032)	(0.054)	(0.040)	(0.032)	(0.014)	(0.039)	(0.022)	(0.020)
Years	-0.005	-0.043***	-0.003	-0.044**	-0.006	-0.028**	0.004	0.046
	(0.020)	(0.017)	(0.017)	(0.020)	(0.015)	(0.031)	(0.020)	(0.020)
Classified Board*	0.034**	0.050***	0.050**	0.068***	0.007	0.005	0.016	0.016
Years	(0.017)	(0.019)	(0.024)	(0.023)	(0.010)	(0.026)	(0.014)	(0.015)
Year & Industry F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	625	561	511	548	501	521	493	486
Pseudo-R^2	0.11	0.18	0.21	0.21	0.15	0.16	0.17	0.17
Implied takeover probabilities for firms with and without classified board								
No Classified Board	0.100	0.117	0.088	0.108	0.050	0.110	0.053	0.049
Classified Board	0.014	0.010	0.005	0.017	0.022	0.035	0.015	0.031

Table 6: Probit Analysis of the Likelihood of Receiving a Takeover Bid: Other Governance Mechanisms

This table uses probit models to explore whether the effect of the classified board provision on the likelihood of receiving a takeover bid in and outside of industry synergy wave years varies with the strength of the firm's other takeover defenses. The dependent variable is equal to one if a firm receives a takeover bid in a given year. Industry-years are considered to undergo a synergy wave if the number of deals with positive bidder and target combined wealth effect (CAR (-5,+2)) in that year is one standard deviation above the industry time-series median. Industries are defined according to Fama and French (1997). In addition, we require that the synergy wave is subsequent to a surprise bid in at least half of subsectors within the industry, with surprise bid defined as the first takeover bid after a period of at least 5 months with no acquisition activity in the subsector. Columns (1)-(5) report results for observations on an industry synergy wave. Columns (6)-(10) report results for all other industry-years. A firm is considered to have strong takeover defenses if its GIM index exceeds 9 (sample median) in Columns (1) and (6), its E index exceeds 2 (sample median) in Columns (2) and (7), its Delay index exceeds 2 in Columns (3) and (8), it has a poison pill provision in Columns (4) and (9), and its state of incorporation mandates at least four takeover defense measures in Columns (5) and (10). All takeover defense indexes are net of the classified board provision. Classified board is an indicator for the firm's usage of the provision. Controls include firm and industry size (log of total assets), market-to-book, and sales growth. In addition, we control for industry concentration and a dummy for high tech industries. All controls are measured at the beginning of the year. The estimates of industry controls are omitted from the table for brevity and are available upon request. Year and industry dummies are included in all regressions. Coefficients are reported as marginal effects calculated at the means of independent variables. Robust standard errors clustered at the firm level are in parentheses. Variable definitions are provided in Appendix B. Levels of significance are indicated by *, **, and *** for 10%, 5%, and 1%, respectively.

	On the Wave					Off the Wave				
SB=1 &	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
High GIM-Index (GIM of at least 10)	-0.093**					-0.008				
	(0.043)					(0.017)				
High E-Index>=2		-0.099**					-0.003			
		(0.041)					(0.009)			
High Delay-index>=2			-0.089*					-0.035		
			(0.050)					(0.021)		
Poison Pill				-0.095***					-0.013	
				(0.034)					(0.009)	
State Laws					-0.075**					-0.001
					(0.035)					(0.015)
Year & Industry F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1525	1525	1525	1525	1525	6370	6370	6370	6370	6370
Pseudo-R^2	0.18	0.18	0.27	0.17	0.20	0.10	0.16	0.10	0.16	0.12

Table 7: Probit Analysis of the Likelihood of Receiving a Takeover Bid: Robustness

This table presents estimates of the probit regressions that a firm receives a takeover bid as in Table 2. Columns (1)-(3) report results for observations on an industry synergy wave. Columns (4)-(6) report results for all other industry-years. All specifications add observations for four subsequent years to each industry-year and allow for the effect of the classified board provision on takeover likelihood to vary with the number of years since the most recent industry synergy wave. In Rows [1] and [2], high synergistic activity is defined as industry-years in which the number of all-cash (Row [1]) or some cash (Row [2]) deals is one standard deviation above industry time-series median. Row [3] reports estimates of the likelihood that a firm receives a takeover bid in any year, without requiring that the synergy wave is also unanticipated. In Rows [4] and [5], high synergistic activity is defined as industry-years in which the number of deals with positive bidder and target combined wealth effect (CAR (-5,+2)) is above industry time-series median (Row [4]) or two standard deviations above industry time-series median (Row [5]). Row [6] reports results for all industry variables measured at the three-digit SIC level. Rows [7] and [8] report results for regressions that include interaction of the classified board provision with industry concentration (Row [7]) and interaction of the classified board provision with all industry controls (Row [8]). Row [9] shows robustness to treating classified board as an endogenous variable using board size as an instrument (Bates, Becher, and Lemmon (2008)). Row [10] reports results for regressions of the likelihood of being an acquirer. Controls are as in Table 2. The estimates of these controls are omitted from the table for brevity and are available upon request. Year and industry dummies are included in all regressions. Coefficients are reported as marginal effects calculated at the means of independent variables. Marginal effects and standard errors of interaction terms are computed as in Ai and Norton (2003). Robust standard errors clustered at the firm level are in parentheses. Variable definitions are provided in Appendix B. Levels of significance are indicated by *, **, and *** for 10%, 5%, and 1%, respectively.

		On the Wave			Off the Wave		
		Classified Board	Years	Classified Board* Years	Classified Board	Years	Classified Board* Years
		(1)	(2)	(3)	(4)	(5)	(6)
[1]	All Cash Wave	-0.061***	-0.034***	0.029***	-0.017	-0.021**	0.004
		(0.021)	(0.010)	(0.010)	(0.013)	(0.009)	(0.012)
[2]	Non All stock Wave	-0.050***	-0.061***	0.034**	-0.013	-0.034***	0.005
		(0.020)	(0.015)	(0.017)	(0.012)	(0.010)	(0.011)
[3]	All synergy waves	-0.045**			-0.008		
		(0.020)			(0.006)		
[4]	Wave defined as activity	-0.032**	-0.050***	0.023**	-0.014	-0.010	-0.006
	above median	(0.014)	(0.009)	(0.011)	(0.014)	(0.012)	(0.013)
[5]	Wave defined as activity	-0.116***	-0.071*	0.090**	-0.015	-0.045***	0.007
	above median+2sd	(0.044)	(0.041)	(0.043)	(0.011)	(0.008)	(0.010)
[6]	SIC3	-0.042**	-0.036*	0.031**	-0.019	-0.028***	0.006
		(0.021)	(0.023)	(0.015)	(0.013)	(0.010)	(0.012)
[7]	Control for interaction of CB	-0.081**	-0.064***	0.047**	-0.027*	-0.038***	0.003
	with industry HHI	(0.037)	(0.020)	(0.019)	(0.017)	(0.009)	(0.011)
[8]	Control for interaction of CB	-0.090**	-0.063***	0.053**	-0.029*	-0.038***	0.002
	with all industry controls	(0.041)	(0.020)	(0.020)	(0.017)	(0.009)	(0.011)
[9]	2SLS	-0.052***	-0.023***	0.015**	-0.020	-0.033***	0.006
		(0.018)	(0.009)	(0.007)	(0.014)	(0.011)	(0.013)
[10]	Likelihood of being	0.023	0.001	0.005	0.098*	-0.012	-0.006
	an acquirer	(0.061)	(0.025)	(0.028)	(0.053)	(0.018)	(0.016)

Table 8: Duration Analysis of the Likelihood of Receiving a Bid

This table uses duration models to contrast the effect of the classified board provision on the timing of receiving a takeover bid in and outside of industry synergy wave years. The dependent variable is time-to-takeover, which measures the number of months between the surprise bid in and the time the firm becomes the target of a takeover bid. Industry-years are considered to undergo a synergy wave if the number of deals with positive bidder and target combined wealth effect (CAR (-5,+2)) in that year is one standard deviation above the industry time-series median. Industries are defined according to Fama and French (1997). A surprise bid is defined as the first takeover bid after a period of at least 5 months with no acquisition activity in the subsector. Columns (1)-(3) report estimates of the following Cox proportional hazard model: $h_i(t)=h_0(t)\exp^{\alpha CB_{ijt}+\delta X_{ijt}+\eta_j+\nu_t+\varepsilon_{jt}}$ where $h_i(t)$ is time-t hazard of the ith firm, $h_0(t)$ is the baseline hazard at time t, CB_{ijt} is indicator for firm i's classified board, X_{ijt} is a set of firm and industry controls, η is an industry time-invariant effect, ν is a year-invariant fixed effect, and ε is a random error term. A value of 1 for the hazard ratio indicates that the variable neither raises nor lowers the expected hazard rate. Columns (4)-(6) report estimates of the following OLS regressions of the number of months to receiving a takeover bid: $Months_{ijt}=\alpha CB_{ijt}+\delta X_{ijt}+\eta_j+\nu_t+\varepsilon_{jt}$, where $Months_{ij}$ equals the number of months between the surprise bid in subsector j and the date firm i receives a takeover bid, CB_{ijt}, X_{ijt}, η, and ν are as in Columns (1)-(3), and ε is a random error term. Column (1) and (4) reports results for all firms. Columns (2) and (5) report results for observations on an industry synergy wave. Columns (3) and (6) report results all other industry-years. Controls are as in Table 2. The estimates of these controls are omitted from the table for brevity and are available upon request. Year and industry dummies are included in all regressions. Robust standard errors clustered at the firm level are in parentheses. Variable definitions are provided in Appendix B. Levels of significance are indicated by *, **, and *** for 10%, 5%, and 1% respectively.

	Cox Hazard Rate Model			Number of Months to Takeover (OLS)		
	All	On the Wave	Off the Wave	All	On the Wave	Off the Wave
Variable	(1)	(2)	(3)	(4)	(5)	(6)
Classified Board	-0.111	-0.405***	-0.068	4.586***	9.774***	2.922
	(0.088)	(0.146)	(0.120)	(1.599)	(3.203)	(2.019)
	[0.895]	[0.667]	[0.934]			
Assets	-0.005**	-0.004**	-0.006**	0.242	0.828	0.148
	(0.002)	(0.002)	(0.003)	(0.596)	(1.372)	(0.715)
M/B	0.003**	0.003	0.006**	-1.789***	-1.486**	-2.237**
	(0.001)	(0.002)	(0.003)	(0.627)	(0.766)	(1.300)
Sales Growth	-0.006	-0.002	-0.007	1.854	1.756	2.618
	(0.008)	(0.006)	(0.015)	(2.916)	(1.922)	(1.442)
Implied Hazard Rate Effect	10.51%	33.30%	6.57%			
Year & Industry F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Industry controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	395	96	299	395	96	299

Table 9: Abnormal Returns around Announcement of Takeover Bids

This table presents estimates of the effect of the classified board provision on takeover bid announcement returns to targets and bidders in takeover offers in and outside of industry synergy wave years. Industry-years are considered to undergo a synergy wave if the number of deals with positive bidder and target combined wealth effect (CAR (-5,+2)) in that year is one standard deviation above the industry time-series median. Industries are defined according to Fama and French (1997). In addition, we require that the synergy wave is subsequent to a surprise bid in at least half of subsectors within the industry, with surprise bid defined as the first takeover bid after a period of at least 5 months with no acquisition activity in the subsector. The reported estimates are from the following regressions: $CAR_{ijt}=\alpha CB_{ijt}+\delta X_{ijt}+\eta_j+\nu_t+\varepsilon_{jt}$, where CAR_{ijt} is the cumulative abnormal return to target (Columns (1)-(3)) or bidder (Columns (4)-(6)) i in industry j for trading days (-2, +2) relative to the date of the bid, CB_{ijt} is indicator for the target classified board, X_{ijt} is a set of target and target industry controls (measured at the end of the fiscal year before the bid) and deal controls, η is an industry time-invariant effect, ν is a year-invariant fixed effect, and ε is a random error term. Abnormal returns are measured relative to the market model. Column (1) and (4) reports results for all firms. Columns (2) and (5) report results for observations on an industry synergy wave and Columns (3) and (6) report results all other industry-years. Controls include target and target industry size (log of total assets), market-to-book, and sales growth. In addition, we control for industry concentration and a dummy for high tech industries. Deal controls include an indicator variable that takes the value of one if the method of payment includes bidder's equity, an indicator variable that takes the value of one if the deal is completed, and an indicator variable that takes the value of one if the bid is in the form of a tender offer. The estimates of industry controls are omitted from the table for brevity and are available upon request. Year and industry dummies are included in all regressions. Robust standard errors clustered at the firm level are in parentheses. Variable definitions are provided in Appendix B. Levels of significance are indicated by *, **, and *** for 10%, 5%, and 1%, respectively.

	Target CAR (-2,+2)			Bidder CAR (-2,+2)		
	All	On the Wave	Off the Wave	All	On the Wave	Off the Wave
Variable	(1)	(2)	(3)	(4)	(5)	(6)
Classified Board	0.006	-0.005	0.023	-0.023***	-0.014	-0.029**
	(0.021)	(0.028)	(0.024)	(0.007)	(0.018)	(0.014)
Assets	-0.036**	-0.053*	-0.022**	-0.008**	-0.008	-0.008**
	(0.015)	(0.027)	(0.009)	(0.003)	(0.006)	(0.004)
M/B	-0.006	0.013	-0.011	-0.009	-0.016	-0.001
	(0.009)	(0.016)	(0.009)	(0.007)	(0.013)	(0.005)
Sales Growth	0.089**	0.136**	0.049	0.004	0.015	-0.007
	(0.037)	(0.065)	(0.043)	(0.013)	(0.032)	(0.024)
Stock Offer	-0.052**	-0.041	-0.057*	-0.051***	-0.041**	-0.058***
	(0.025)	(0.046)	(0.034)	(0.011)	(0.017)	(0.019)
Tender Offer	0.065**	0.046	0.075**	0.008	0.029	-0.014
	(0.032)	(0.060)	(0.035)	(0.011)	(0.025)	(0.015)
Completed Deal	0.073**	0.041	0.101***	0.002	0.006	0.007
	(0.033)	(0.063)	(0.026)	(0.023)	(0.034)	(0.030)
Year & Industry F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Industry controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	395	96	299	395	96	299

Figure 1: Takeover Likelihood over Industry Merger Waves

This figure shows how implied takeover likelihood changes over the duration of an industry synergy wave from two years before to five years after the onset of the wave. Red bars correspond to implied takeover likelihoods for firms without classified board provision. Blue bars correspond to implied takeover likelihoods for firms with classified board provision. The probabilities are calculated from the regression coefficients in Column 2 of Table 2, with all control variables evaluated at their means. Year 0 on the horizontal axis corresponds to the onset of an industry synergy wave defined as an industry-year in which the number of deals with positive bidder and target combined wealth effect (CAR (-5,+2)) is one standard deviation above the industry time-series median. Industries are defined according to Fama and French (1997). In addition, we require that the synergy wave is subsequent to a surprise bid in at least half of subsectors within the industry, with surprise bid defined as the first takeover bid after a period of at least 5 months with no acquisition activity in the subsector. See Table 2 for details of the estimation.