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Corporate Takeover Defenses

Finance Working Paper N° 843/2022
May 2023

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ECGI Working Paper Series in Finance

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Abstract

Takeover defenses, also called antitakeover provisions, reflect decades of innovation in the interplay of offensive and defensive tactics in the market for corporate control. This paper summarizes research on how firms use takeover defenses and how defenses affect firm value and operations. Recent evidence shows that defenses convey both costs and benefits that vary across firms and over an individual firm's life – helping to explain the mixed empirical results in many earlier studies. We also review evidence on the extent to which takeover defenses work to forestall takeovers, and the costs and benefits of adding or removing takeover defenses. We conclude by identifying unresolved issues about takeover defenses and questions for future research.

Keywords: Takeover defenses, antitakeover provisions, managerial entrenchment, shareholders' interest, value reversal, lifecycle effects

JEL Classifications: G34, K22, L51

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April 1, 2023

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This paper was written for The Handbook of Corporate Finance, edited by David Denis, 2023.

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Corporate takeover defenses

1. Introduction

Takeover defenses are ubiquitous in corporate life: over 99% of mature firms and 92% of new IPO firms have at least one of the six E-index defenses, and most firms have several.[1] Research about takeover defenses also is widespread, as a Google Scholar search for "takeover defenses" yields more than 70,000 papers and a search for "antitakeover provisions" yields 17,000. Many of these papers examine defenses' uses and effects, while many more use takeover defenses to control for firms' takeover vulnerability or governance characteristics. In this paper we draw from this literature to summarize current knowledge about how takeover defenses are used and how they affect firm value and operations.[2]

One reason takeover defenses are widely studied is that they are easily measured. It is straightforward to observe if a firm has a staggered board or its charter requires a supermajority of shareholder support to approve a merger. Another reason takeover defenses receive attention is that they are central to our understanding of the modern corporation. Mergers and acquisitions are among the most important events in a firm's life and a firm's defenses affect whether and how such acquisitions occur. Theory and evidence indicate that even the threat of outside takeover is a key disciplining force that helps to control the managerial agency problem.[3] Without the possibility of share transfers and outside takeovers, it is unlikely that investors would provide funding for most corporations. Takeovers and takeover defenses therefore help to explain how firms manage their agency problems and why the corporate form of organization has survival value. They reflect, and affect, the answers to questions that lie at the center of corporate governance: On whose behalf is the corporation run? And how do investors, managers, and other stakeholders overcome

[1] The E-index counts the number of six different takeover defenses a firm can have (see Bebchuk, Cohen, and Ferrell., 2009). Data on mature firms is from the Institutional Shareholder Services (ISS) Governance Database from 2007-2021, which tracks S&P 1500 firms and some other large firms. This number falls to 97% of firms from 2007-2016 when correcting misclassifications, mostly to the limits to amend bylaws and charter provisions (see Karthaus, von Meyerinck, and Schmid, 2021, and Section 7.3 below). Data on IPO firms is from all 2,283 firms going public from 1997-2011, per Johnson, Karpoff, and Yi (2022).

[2] This is a large literature and we cannot do justice to all the papers that contribute to it. Rather, we seek a synthesis that, we hope, provides a foundation for future work in the area. For previous surveys, see Sundaramurthy (2000), Burkart and Panunzi (2006) and Straska and Waller (2014).

[3] E.g., see Manne (1965), Alchian and Demsetz (1972), Grossman and Hart (1982), Jensen and Ruback (1983), Tirole (1988), Karpoff and Rice (1989), and Lel and Miller (2015).

complex contracting problems and the risk of opportunism to coordinate their activities in the production process?

2. What is a takeover defense?

In a broad sense, a takeover defense is any action undertaken by a corporation that increases the cost or decreases the benefit to an outsider of acquiring control of the corporation's board and top management. This definition includes actions that firms take to forestall or fight unsolicited takeover bids, such as standstill agreements, share repurchases, selling off assets, and so-called Pacman defenses in which the target firm acquires shares of the bidding company. This broad definition of takeover defenses is of limited use, however, because it also includes most of what firms do to create value or simply survive. Pursuing a positive net present value project, for example, increases the cost of acquiring control because it increases the firm's value.

We therefore focus on a narrower definition for most of this paper: takeover defenses are charter or bylaw provisions, specific board actions, or coverage by state antitakeover laws, that overtly increase the cost of unsolicited takeover bids. These include charter and bylaw rules that require a supermajority of shareholder votes to approve a merger or amend the firm's bylaws, that impose rules on the prices paid for shares in a two-tiered tender offer, that restrict shareholders' abilities to call special meetings, or that require that only a minority of board members stand for election each year. They also include any of several common types of actions that boards sometimes take that have an obvious and direct impact on the cost of acquiring a firm, most notably shareholder rights plans, or poison pills. Appendix A provides descriptions of the most common takeover defenses used in practice and in research. While this narrow definition is more functional, it is not free of ambiguity. As an example, many researchers treat golden parachutes as a type of takeover defense, although as discussed in Section 7, most evidence indicates that golden parachutes facilitate rather than forestall acquisitions.

In addition to takeover defenses that individual firms adopt, many U.S. firms are subject to takeover defenses imposed by the states in which they are incorporated. Firms incorporated in Delaware, for

example, are covered by a so-called business combination law that the Delaware legislature adopted in 1988. Under this law, a firm that acquires a Delaware firm without the prior approval of the target firm's directors is prohibited from merging or selling the target firm's assets until after a three-year waiting period. This law increases the expected cost of acquiring a Delaware firm because many acquiring firms seek to extract value from the acquisition by selling some of the target firm's assets or combining the target firm's operations with those of the acquiring firm.

According to Karpoff and Wittry (2018), 33 states have some version of a business combination law, including Delaware. Other common types of state antitakeover laws include control share acquisition laws (29 states), fair price laws (27 states), poison pill laws (35 states), and directors' duties or constituency laws (35 states), each of which is described in Appendix B. U.S. Supreme and Appellate Court decisions treat these laws as part of each state's authority to regulate firms that are incorporated in the state.[4] A notable feature of most state antitakeover laws, however, is that the laws' provisions can be suspended if the target firm's board of directors approves the takeover bid. Also, most states allow firms to opt out of the law's coverage, or in isolated cases such as laws in Georgia and Tennessee, require that firms opt in to be covered by the law. So, even though the laws are adopted by state legislatures, individual firms' boards have discretion on whether each law applies to their firm. Many state antitakeover laws also are effectively self-adopted for the firms that lobby for the laws.

Researchers use takeover defenses variously to measure shareholder rights (e.g., Gompers, Ishii, and Metrick., 2003), takeover deterrence (e.g., Bebchuk, Cohen, and Ferrell, 2009), or governance quality (e.g., Gabaix and Landier, 2008). In this paper, we treat takeover defenses and indices of takeover defenses as measures of takeover deterrence and not governance quality. A reason to reject the "governance quality" view of takeover defenses is that, as discussed in Section 5, takeover defenses are not uniformly or

[4] E.g., see *CTS Corp. v. Dynamics Corp. of America*, 481 U.S. 69 (1987), *Amanda Acquisition Corp. v. Universal Foods Corp.*, 877 F.2d 496 (1989).

monotonically related to firm value over time or in the cross-section. It would be perverse to claim that a firm with takeover defenses has poor governance quality when the defenses work to shareholders' benefit.[5]

3. A brief history of corporate takeover defenses

3.1. The rise of the modern corporation

Figure 1 illustrates the famous hockey stick-like trend in worldwide GDP per capita over the last 2000 years first reported by British historian Angus Maddison (2001), and that Jonathan Haidt (2015) calls "the most important graph in the world." Historians agree that the rapid upswing in GDP per capita beginning in the early 19th Century reflects economic gains from the Industrial Revolution and international trade, which harnessed technological changes and opportunities for large economies of scope and size.

[Figure 1 about here]

One important but frequently overlooked technological innovation was the use of the corporate form of organization to coordinate large scale and voluntary productive activity such as railroads and steel manufacturing. The corporate form had been used to share investment risk and to finance large scale enterprise as far back as the East India Company in 1600. As Fisch and Solomon (2021) point out, however, most corporate charters in the 17th and 18th Century were for small-scale community endeavors such as churches and cemeteries. This changed with the Industrial Revolution, a central feature of which became the adaptation of the corporate form to exploit new technologies and scale economies. Selling partial ownership rights – shares – enabled entrepreneurs such as Cornelius Vanderbilt to amass large amounts of financial capital to scale up capital-intensive businesses such as steamboat transportation and railroads (e.g., see Stiles, 2009). Corporate charters shifted toward general purpose and profit-seeking entities that could pursue "any lawful commercial activity," including petroleum refining and distribution, steelworks, and finance.

[5] Brown and Caylor (2006) develop an index of governance quality that includes takeover defenses as well as compensation, ownership, board, and audit characteristics. Other indices of governance quality, e.g., Standard and Poor's GAMMA index and ISS' Corporate Governance Quotient (see Tipurić, Dvorski, and Delić, 2020) focus on similar characteristics. These indices have not been used much in the finance literature.

As Fama and Jensen (1983) emphasize, diffuse ownership via the corporate form facilitates risk sharing, specialized risk-bearing, and specialized management – features that are particularly valuable in large scale endeavors. Diffuse ownership, however, also separates owners from managers and exacerbates the managerial agency problem, as managers control day-to-day operational decisions even though shareholders bear the cash flow consequences. Corporations therefore evolved with distinct characteristics – including limited liability, shareholder-elected directors, the free transfer of ownership rights without dissolving the enterprise, and the possibility of external takeover – that help to control agency costs (e.g., see Alchian and Demsetz, 1972).

3.2. Offensive and defensive takeover innovations

Pound (1992) describes how these features of the modern corporation were exploited almost immediately by entrepreneurial investors who sought to gain by assuming control of a firm's shares and changing its operating policies. Hostile takeovers became common by the late 1860s, led by corporate raiders such as Jay Gould and Jim Fiske, who acquired blocks of shares from founders, founding families, and institutions, and leveraged their control through proxy contests. Proxy contests were common by the early 20th Century, enabling W.C Durant to gain control of General Motors in 1915 and John D. Rockefeller, Jr. to oust the Chairman of the Board of Standard Oil of Indiana in 1929.

The rise of the modern corporation and battles for corporate control gave rise to the first takeover defenses, as incumbent managers responded to bidders' innovations in takeover tactics with new defensive tactics. In the 19th Century, managers worked to thwart corporate raiders by moving shareholder meetings, changing the bylaws without notice, and locking up ownership by issuing new shares to friendly investors. By the early 20th Century, managers worked to forestall proxy battles through dual-class recapitalizations, and by the 1950s the threat of proxy battles led to widespread use of classified boards and straight (as opposed to cumulative) voting rules. Fair price provisions and supermajority vote requirements to approve mergers became popular in the 1960s as managers worked to forestall so-called "Saturday night specials,"

the name for short-window tender offers that incentivized shareholders to tender their shares quickly to avoid missing out on the tender offer premium.

Such back-and-forth innovation in offensive and defensive takeover tactics motivated and is intertwined with political backlash as well, including the Sherman Antitrust Act of 1890, the development of antitrust law to limit merger activity in the post-World War II era, the 1968 Williams Act, and state antitakeover laws. Our current landscape of corporate takeover defenses is the outcome of nearly two centuries of such back-and-forth innovation and political response.

To illustrate, Figure 2 displays a timeline of key developments in this process over the past 60 years. Responding to concerns about short-fuse tender offers, in 1968 the U.S. Congress passed the Williams Act to regulate the tender offer process, eventually requiring investors to report toehold investments of 5% or more of a firm's stock and bidders to maintain a tender offer open for a minimum of 20 days. The Williams Act provisions were insufficient for many politicians and managers of influential corporations, and from 1968 until 1982 a total of 38 states passed versions of what are called "first generation" state antitakeover laws. As discussed by Jarrell and Bradley (1980), these laws substantially increased the risks and costs to potential bidders. Correspondingly, the 1970s saw very little additional innovation in defensive tactics and takeover activity was very low (see Smiley, 1981; Gaughan 2011).

[Figure 2 about here]

This changed in 1982 with a U.S. Supreme Court decision in *Edgar v. MITE Corp*. that effectively invalidated these 38 first generation state takeover laws. The *MITE* decision corresponds to a new wave of innovation in takeover tactics, including junk bond financing of takeover bids, and the start of the 1980s merger wave. It also prompted new defensive tactics, including the first poison pills adopted in 1982 and a wave of second-generation state antitakeover laws that began with Ohio's control share acquisition law in 1982. The 1980s and 1990s saw a sequence of court decisions that further honed the takeover environment, including a 1987 U.S. Supreme Court decision (*CTS Corp. v. Dynamics Corp. of America*) and 1989

Appellate Court decision (*Amanda Acquisition Corp. v. Universal Foods Corp.*) that upheld state takeover laws, and several Delaware Court decisions that upheld the legality of poison pill takeover defenses.[6]

Danielson and Karpoff (1998) and Cremers and Ferrell (2014) document that firms adopted an increasing number of firm-level takeover defenses during the 1980s until, by the 1990s, most publicly traded firms had multiple firm-level defenses. Gompers, Ishii, and Metrick (2003) report that, by 1990, the average firm in their sample of primarily S&P 500 firms had 9 of the 24 provisions that constitute the G-index. Coates (2001), Daines and Klausner (2001), and Field and Karpoff (2002) report that by the 1990s even IPO firms typically had multiple takeover defenses. Johnson, Karpoff, and Yi (2022) find that, in their sample of IPO firms from 1997–2011, the average firm went public with 2.4 of the six E-index provisions.

3.3. Takeover defenses, 1990-2021

Table 1 reports on the percentage of large firms in the Institutional Shareholders Services (ISS) database that have each of the six provisions in the E-index from 1990 through 2021.[7] The 1990-2006 data were collected by the Investor Responsibility Research Center (IRRC) and reported every two to three years, while the 2007-2021 data are updated annually.[8] ISS changed how it counted these provisions in 2007, creating discrete changes in the counts of several provisions. The data nonetheless provide insight into the uses of these six provisions. As also reported by Field and Lowry (2022), the use of classified boards among large firms has declined during the 2000s. Guernsey, Guo, Liu, and Serfling (2022) report that small firms increased their uses of classified boards during this period, but such changes are not picked up in the ISS data because it focuses on larger firms.

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[6] See *Moran v. Household International, Inc.*, 500 A.2d 1346 (Del. 1985); *Paramount Communications, Inc. v. Time, Inc.*, 571 A.2d 1140, 565 A.2d 280 (Del. 1989); *Unitrin, Inc. v. American General Corp*., 651 A.2d 1361 (Del. 1995); *Moore Corp. Ltd. v. Wallace Computer Services, Inc.*, 907 F. Supp. 1545, 1564 (D. Del. 1995). Cain, McKeon, and Solomon (2017) argue that a U.S. District Court decision also was important in establishing the presumed legality of poison pills for most firms; see *Georgia-Pacific Corp. v. Great Northern Nekoosa Corp.*, 728 F. Supp. 807 (D. Me. 1990).

[7] For data on all G-index provisions through 2006, see Table 1 in Karpoff, Schonlau, and Wehrly (2022).

[8] The IRRC data have been acquired and variously controlled by ISS, Riskmetrics, and MSCI, and have been listed on the WRDS platform alternatively under the Riskmetrics and ISS names. Here, we refer to the 1990-2006 data on takeover defenses as the IRRC data and the 2007-2021 data as the ISS data.

The data also reveal a large decrease in the use of poison pills. This could reflect managers' belief that they have access to shadow poison pills and do not need to adopt explicit pills, as argued by Coates (2000) and Catan and Kahan (2016). Or it could reflect a newfound recognition that directors who adopt poison pills incur career costs, as found by Johnson, Karpoff, and Wittry (2022). Eldar and Wittry (2021) find that poison pills became more popular during the COVID pandemic, and that recent pill adoptions include features that differ from previous pills. For example, recently adopted pills are more likely to have low trigger thresholds and shorter sunset provisions.

The uses of golden parachutes, limits on shareholders' ability to amend the corporate charter, and limits on shareholders' ability to amend corporate bylaws all have increased over time, although the counts of all three provisions reflect large discrete changes in 2007 that suggest a change in how these provisions are counted and muddle the interpretation of the data. The use of supermajority vote requirements for mergers is relatively flat over time, but these counts also are affected by a discrete jump in 2007. Section 7 of this paper discusses corrections to these data proposed by Larcker, Reiss, and Xiao. (2015), Karthaus, von Meyerinck, and Schmid (2021), and Frankenreiter, Hwang, Nili, and Talley (2021) that partially reconcile these discrete breaks.

3.4. Current defensive conditions in the takeover market

The legacy of back-and-forth innovation is apparent in several key features of the contemporary market for corporate control. First, nearly all publicly traded firms in the U.S. have at least one takeover defense and most firms have several. As noted in the Introduction, more than 99% of S&P 1500 firms and 92% of new IPO firms have at least one of the six E-index defenses.

Second, firms' defensive tactics are not static, as various defenses become more or less popular over time. Within most firms, however, such changes are slow-moving. Hannes (2006) notes that most firms' takeover defenses are sticky and do not change frequently. Johnson, Karpoff, and Yi (2022) show that, during the first 15 years after a firm's IPO, firms make no changes in their takeover defenses in 94% of all firm-years; firms add defenses in 4.7% of firm-years and remove any defenses in only 1.3% of firm-years.

As a result, for firms up to 15 years old, the best predictor of a firm's takeover defenses is the takeover defenses it had at the time of its IPO.

Third, while individual battles for corporate control can be tumultuous and the innovative process continues, the current legal and innovative environment in the market for corporate control is more stable than during the 1980s and 1990s. Large issues, such as the legal status of poison pills and post-1982 state antitakeover laws, were largely settled in the 1980s. There is widespread agreement that virtually all U.S. firms now have shadow poison pills, i.e., the ability to adopt a poison pill at any time without shareholder approval (e.g., see Coates, 2000). Hedge fund and shareholder activism, new innovations from the late 1980s and 1990s, are now standard in the toolkits of entrepreneurial investors. Denes, Karpoff, and McWilliams (2017) argue that hedge fund activism arose as a low-cost alternative to full-fledged battles for control to settle disputes over how best to manage corporate assets, and as a more effective alternative to non-binding shareholder proposals. Correspondingly, Brav, Jiang, and Li (2021) report that hedge fund activism is associated with increases in the target firms' share values and changes in operations or distributions that are larger than for shareholder proposals and smaller than for full-fledged takeovers.

To be sure, innovations continue in the market for corporate control. For example, hedge funds more frequently cooperate with other activists to increase their bargaining power with target firm managers (e.g., see Brav, Daspupta, and Mathews, 2021). Firms' uses of defensive tactics also continue to adjust. For example, Eldar, Kirmse, and Wittry (2022) document that, increasingly, many poison pills are adopted following interest from activists rather than corporate raiders, and that in recent years such pills have lower triggers and features that specifically target activists, such as acting-in-concert provisions. Such innovations, however, constitute smaller changes compared to previous decades.

Fourth, and despite the widespread use of takeover defenses, the market for corporate control remains robust if cyclical. KPMG reports that 2007, 2015, and 2021 were peak years in M&A activity, topping over $5 trillion in each of those years.[9] We infer that, while takeover defenses enable incumbent managers to

[9] See https://advisory.kpmg.us/articles/2021/blowout-year-global-ma.html.

forestall or delay unsolicited takeover bids, the costs they impose are not, in general, prohibitive. As an example, Twitter's board adopted a poison pill in response to a bid for control by Elon Musk in April 2022, only to agree to acquisition terms 10 days later.[10] One takeaway from the evidence summarized in this paper is that takeover defenses are not acquisition showstoppers that impose a corner solution of zero takeovers. Rather, they are managerial tools that have complex and varied effects on firms' acquisition likelihood, contracting relationships with managers and other stakeholders, and value.

4. Takeover defenses and firm value

Two questions animate most research related to takeover defenses. The first question is whether and how defenses affect shareholder value. This question remains a puzzle because the literature has failed to coalesce around a single answer to it. The second question is how a firm's takeover defenses affect other firm characteristics, including leverage, innovation, the value of cash, corporate fraud, payout policy, and other operating and financial outcomes. We discuss firm value effects in Section 4, and the relation between takeover defenses and other firm outcomes in Section 5.

4.1. The takeover defense puzzle

To the extent takeover defenses are effective, they impede unsolicited takeovers and help incumbent managers keep their jobs. The question that motivates much research about takeover defenses is whether insulating managers is good or bad for shareholders.

4.1.1. Managerial entrenchment

The threat of takeover is a key disciplining force that mitigates the managerial agency problem, and Manne (1965) and Cary (1970) point out that defenses that impede this force can increase agency costs and lower firm value. DeAngelo and Rice (1983) cast this idea – that takeover defenses serve primarily to

[10] See, e.g., https://www.cnn.com/2022/05/17/tech/twitter-elon-musk-timeline/index.html. Musk's acquisition of Twitter closed on October 27, 2022, after a lengthy legal process.

entrench managers to promote their private benefits at shareholders' expense – as the managerial entrenchment hypothesis.

The central empirical prediction of the managerial entrenchment hypothesis is that takeover defenses lower firm value. Many early event studies find support for this prediction. For example, Jarrell and Poulsen (1987) find that supermajority vote provisions, authorization-of-preferred-stock, and classified-board amendments are associated with a significantly negative stock price reaction. Malatesta and Walkling (1988) and Ryngaert (1988) find that poison pill adoptions are associated with decreases in firm value.[11] Karpoff and Malatesta (1989) find that the adoptions of state antitakeover laws are associated with decreases in firm values, a finding supported by several other papers.[12]

Cuñat, Giné, and Guadalupe (2012) use an alternate approach to establish a causal link between takeover defenses and firm value. Using regression discontinuity, they find that governance-related shareholder proposals that receive majority support, including proposals to remove takeover defenses, are associated with significant increases in share values. Souther (2016) uses closed-end mutual funds to identify causal effects and finds that takeover defenses are associated with lower fund values, higher expense ratios, and higher director compensation – all consistent with entrenchment.

Other results also are consistent with entrenchment. Gompers, Ishii, and Metrick (2003), Bebchuk, Cohen, and Ferrell (2009), and Cremers and Ferrell (2014) conclude that Tobin's q is negatively related to the number of defenses a firm deploys. Bebchuk and Cohen (2005), Faleye (2007), Cohen and Wang (2013), and Karakas and Mohseni (2021) conclude that classified boards decrease share values.[13] Masulis, Wang,

[11] Although Catan (2019) finds that the drop in firm value associated with pill adoption occurs before the pill is adopted.

[12] See Ryngaert and Netter (1988), Giroud and Mueller (2010), Schumann (1988), Szewczyk and Tsetsekos (1992), Karpoff and Malatesta (1995), Conner (1989), Sidak and Woodard (1990), Chandy, Foster, Braswell, and Poe (1994), Swartz (1996), Pugh and Jahera (1990, 1995), Alexander, Spivey, and Marr (1997), Mahla (1991), and Nesbitt (1990). Several papers, however, conclude that state antitakeover laws do not decrease share values, including Jahera and Pugh (1991), Romano (1987), Margotta, McWilliams, and McWilliams (1990), Bradley and Schipani (1989), Margotta and Badrinath (1987), and Broner (1987).

[13] These papers are part of a long debate regarding the impact of classified boards on firm value. See also Heron and Lie (2006, 2015), Frakes (2007), Guo, Kruse, and Nohel (2008), Ge, Tanlu, and Zhang (2016), Kim (2016), Amihud and Stoyanov (2017), Cohen and Wang (2017), Amihud, Schmid, and Solomon (2018a, 2018b), Field and Lowry (2022), and Guernsey, Sepe, and Serfling (2022).

and Xie (2007) and Harford, Humphery-Jenner, and Powell (2012) find that firms with takeover defenses are more likely to make value-destroying acquisitions. Harford, Mansi, and Maxwell (2008) find that firms with many defenses and high cash flow tend to have low profitability and valuations. Cuñat, Giné, and Guadalupe (2020) find that shareholder votes to remove a takeover defense increase both takeover likelihood and the takeover premium and infer that defenses lower firm value in part by impeding optimal bidder-target matching.

The managerial entrenchment hypothesis is widely accepted by shareholder advisors and institutional investors, who frequently recommend against the adoption of new defenses and against individual directors who are affiliated with the adoption of new defenses. For example, Institutional Shareholders Services (ISS) generally recommends against new defenses and for the removal of existing defenses (ISS, 2021). In its Annual Stewardship Report, Dimensional Fund Advisors (2020) states that, "We intend to vote the shares of the portfolios we manage against poison pills, as well as all directors that put a poison pill in place without first obtaining shareholder approval…" Shareholder advocacy groups echo similar concerns about takeover defenses, as reflected in the Harvard Law School's Shareholder Rights Project that worked to pressure targeted companies to remove classified boards (see Bebchuk and Cohen, 2017; Cremers and Sepe, 2017).

4.1.2. Shareholders' interest

There also is empirical support for the competing view – the shareholders' interest hypothesis – that takeover defenses work primarily to benefit shareholders. Linn and McConnell (1983) find that the adoption of antitakeover amendments (including supermajority vote provisions, fair price provisions, and classified boards) are associated with positive abnormal returns and the removal of such provisions is associated with negative returns. Brickley, Coles, and Terry (1994) find that poison pills are associated with increases in share values at firms with independent boards, and Caton and Goh (2008) find a similar result for firms that do not have many other defenses. Straska and Waller (2010) find that, for firms with certain characteristics including low managerial ownership, Tobin's q is positively related to a firm's number of defenses.

A decrease in the threat of outside takeover can increase firm value via any of three non-exclusive channels. First, defenses can increase managers' ability to extract higher premiums in the event of takeover by solving shareholders' collective action problem in takeover negotiations (see DeAngelo and Rice, 1983; Stulz, 1988; Harris, 1990). Consistent with this channel, Comment and Schwert (1995), Cotter, Shivdasani, and Zenner (1997), and Heron and Lie (2006, 2015) find that poison pills increase firms' expected takeover premiums.[14]

Second, defenses can protect ongoing firm projects that uninformed or myopic investors and bidders undervalue and that would be shut down if the firm were to be acquired (Stein, 1988; Chemmanur and Jiao, 2012).[15] Consistent with this channel, Bhojraj, Sengupta, and Zhang (2017) find that firms with long-term investments have higher values after adopting takeover defenses. Cremers, Litov, and Sepe (2017) find that staggered boards increase value for firms undertaking long-term projects. Eldar and Wittry (2021) and Guernsey, Sepe, and Serfling (2022) document that takeover defenses can be particularly valuable to firms during crisis conditions and economic downturns.

The third channel by which takeover defenses can serve shareholders' interest is by bonding the firm's guarantees to strategic partners, suppliers, managers, and customers that the firm will not change operating policies in ways that harm these counterparties, thereby lowering contracting costs and increasing operating performance (Knoeber, 1986; Shleifer and Summers, 1988; Laffont and Tirole, 1988).[16] Consistent with this channel, Johnson, Karpoff, and Yi (2015), Cen, Dasgupta, and Sen (2016), Cremers, Litov, and Sepe (2017), and Cremers, Litov, Sepe, and Zator (2022) find that firms with important

[14] Heron and Lie (2006, 2015) find that the combination of poison pills with classified boards increases takeover premiums. Again, however, Cuñat, Giné, and Guadalupe (2020) use regression discontinuity to identify causal linkages between shareholder proposals to repeal takeover defenses and takeover premiums, and conclude that a shareholder vote to decrease a firm's takeover defenses causes both an increase in takeover likelihood and a higher expected takeover premium. They infer there is no trade-off between takeover likelihood and premia because firms with fewer defenses attract more bidders who bid up the takeover premium.

[15] Chakraborty and Arnott (2001) propose a variation of this channel in which, without takeover defenses, managers expend too much effort on defensive activities and too little effort on productive activities.

[16] Johnson, Karpoff, and Yi (2015) label this the bonding hypothesis of corporate takeover defenses. It has antecedents in prior arguments that firm-specific investments by managers and trading partners create valuable quasi-rents and potential hold-up problems (Klein, Crawford, and Alchian, 1978; Fama and Jensen 1983), for which takeover defenses are one possible solution (e.g., DeAngelo and DeAngelo 1985).

relationships with large customers or business partners experience increases in value when they adopt defenses. Similarly, Dey and White (2021) find that firms adopt takeover defenses to bond implicit contracts with important employees, and Field and Lowry (2022) find that classified boards are adopted at IPO firms because they provide bonding value.

4.1.3. A puzzle

In their predictions about the overall impact of takeover defenses on shareholder wealth, the managerial entrenchment and shareholder interest hypotheses are mutually exclusive: either takeover defenses add value or subtract value, on average. Therein lies the takeover defense puzzle. The puzzle is that, despite decades of research and numerous investigations, there has been little convergence among research findings to refute the managerial entrenchment or shareholders interest hypothesis in favor of the other. As noted by Burkart and Panunzi (2006, p. 25) "Indeed, there is still little consensus about the effects of takeover defences on shareholder wealth, despite the large number of papers on this topic." In another survey of the literature, Straska and Waller (2014, p. 941) observe that: ". . . [E]vent studies have been largely inconclusive in determining how antitakeover provisions impact shareholder wealth."

4.2. Heterogeneous effects and the value reversal hypothesis

An appealing explanation for the takeover defense puzzle is that takeover defenses have heterogeneous effects on firm value depending on the specific type of defense, firm and industry characteristics, or when the defense is deployed. Bebchuk (2005), for example, proposes that different types of takeover defenses affect firm value in different ways. Cremers, Masconale, and Sepe (2016) argue more specifically that defenses that require shareholder approval (such as supermajority vote provisions and classified boards) tend to increase value, while defenses that do not require shareholder approval (such as poison pills and golden parachutes) tend to decrease value.

Several researchers (e.g., McWilliams, 1990; Brickley, Coles, and Terry, 1994; Cremers, Nair, and Peyer, 2008) propose that the effects of a takeover defense depend on firm characteristics. Johnson, Karpoff,

and Yi (2015) show that takeover defenses are more common at IPO firms that are most likely to benefit from takeover defenses' abilities to bond their contractual guarantees to important counterparties such as large customers and strategic partners. Similarly, Cen, Dasgupta, and Sen (2016) find that defenses are valuable among mature companies that have important counterparty relationships. Cremers, Litov and Sepe (2017), Daines, Li, and Wang (2021), and Field and Lowry (2022) find that classified boards tend to add value among firms whose values rely heavily on innovation and stakeholder relationships, and firms that are characterized by high information asymmetry regarding long-term investments. These findings imply that, for some firms, the benefits of takeover defenses exceed the costs. The benefits accrue particularly to firms that rely on important stakeholder relationships and long-term investments, both of which could be upset if the firm is acquired and its operating strategy changed.

More generally, Johnson, Karpoff, and Yi (2022) argue that takeover defenses confer specific benefits and costs that change with the firm's life cycle. In particular, (a) defenses convey benefits that decline and costs that increase as a firm matures, and (b) takeover defenses are sticky, so firms tend not to shed them even when they become costly. This "value reversal hypothesis" implies that defenses add value when a firm is young and decrease value as the firm ages.

The value reversal hypothesis is illustrated in Figure 3, which characterizes the costs and benefits of deploying takeover defenses. Johnson, Karpoff, and Yi (2022) argue that the bonding benefits tend to be large for young IPO firms because these firms rely heavily on business relationships with important stakeholders that are vulnerable to hold-up problems that are mitigated by takeover defenses. The costs tend to be low for young firms because their managers have large ownership stakes and, as Jensen and Meckling (1976) show, agency costs are negatively related to the size of the manager's ownership stake. For these reasons, the marginal benefit and marginal cost equate at a high level of takeover protection for young firms.

As firms age, the benefits of takeover protection decline and the costs increase. Helwege, Pirinsky, and Stulz (2007), for example, report that managerial ownership tends to decline with firm age, implying that the agency cost of equity increases with firm age. Johnson, Karpoff, and Yi (2022) show that other

measures also indicate that agency costs increase with firm age, as firm age is negatively related to the value of cash, the value of diversifying acquisitions, and the value of having a combined CEO and board chair position. Correspondingly, several proxies for the bonding benefits from takeover defenses – including the value of sales to large customers, durable product sales, and the value of having a CEO-founder – decrease with firm age.

Figure 3 illustrates the effects of such changes as a firm ages: the marginal benefit curve shifts down and the marginal cost curve shifts up, implying a decrease in the optimal level of takeover protection from TD^*_{young} to TD^*_{old}. If firms could adjust their takeover defenses optimally at low cost, they would deploy fewer defenses as they age. Hannes (2004, 2006) and Johnson, Karpoff, and Yi (2022) show, however, that takeover defenses are sticky and rarely removed. In Johnson, Karpoff, and Yi's sample that tracks IPO firms for 15 years, firms remove one or more defenses in only 1.3% of firm-years.

[Figure 3 about here]

As a result of such stickiness, firms tend not to remove takeover defenses even when their costs exceed their benefits. In Figure 3, a firm that retains the takeover defenses it had in place at its IPO (TD^*_{young}) experiences a loss in value associated with having too many defenses compared to its (now) optimal level of TD^*_{old}. This loss consists of a decrease in surplus (area *adg* minus area *bce*) as the optimum shifts from TD_{young} to TD_{old}, plus the loss (area *efh*) from suboptimally remaining at the TD_{young} number of defenses. These losses increase as the firm ages because the benefits decline and the costs increase.

The proposition that takeover defenses convey net benefits that decline with firm age yields more specific predictions than a broad and general statement that takeover defenses yield firm-specific costs and benefits. In particular, takeover defenses convey net benefits that tend to decline with firm age. Therefore, results based on samples of seasoned firms, as in Bebchuk, Cohen, and Ferrell (2009), are likely to support the managerial entrenchment hypothesis, whereas results from samples drawn from younger firms, as in Johnson, Karpoff, and Yi (2015), tend to support the shareholders interest hypothesis. This hypothesis suggests an easy-to-implement solution for researchers who seek to control for the possibility that takeover defenses have heterogeneous effects on different firms, as it implies that firm age is good proxy for such

varying effects. In Johnson, Karpoff, and Yi's (2022) sample, the crossover from positive to negative valuation effects occurs four or five years after a firm's IPO.[17]

5. The use of takeover defenses to identify tests about firm characteristics and operations

5.1. Operating performance, value of cash, bond values, and other outcomes

To the extent that takeover defenses affect firm value, they do so by changing specific financing costs or operational decisions. Many papers investigate such channels, with some finding support for the managerial entrenchment hypothesis while others support the shareholders interest hypothesis. Consistent with managerial entrenchment, Giroud and Muller (2010, 2011) show that the use of takeover defenses is negatively related to operating performance and equity returns, at least in noncompetitive industries. Dittmar and Mahrt-Smith (2007) find that the use of takeover defenses is associated with a decrease in the value of cash holdings, and Harford, Mansi, and Maxwell (2008) find that firms with defenses are more likely to spend cash on acquisitions and investment rather than hold it.[18] Borokhovich, Brunarski, and Parrino. (1997) find that takeover defenses are used by managers who enjoy above-market levels of compensation, and Mazouz and Zhao (2019) find that takeover defenses weaken the positive relation between CEO equity pay and innovation. Duchin and Sosyura (2013) find that social connections between a firm's CEO and their divisional managers are associated with lower investment efficiency among firms with more takeover defenses. These results suggest that, by insulating managers from the discipline of the takeover market, takeover defenses exacerbate the managerial agency problem and degrade firm operations.

Other outcomes are consistent with the view that takeover defenses lower contracting costs by decreasing the likelihood that corporate stakeholders will be harmed by a takeover-related change in firm operations. Chemmanur, Paeglis, and Simonyan (2011), for example, find that takeover defenses increase

[17] Consistent with the value reversal hypothesis, Field and Lowry (2022) and Karakaş and Mohseni (2021) find that classified boards tend to add value for young firms and decrease value for older firms. Kim and Michaely (2019) and Cremers, Lauterbach, and Pajuste (2020) report similar results for dual class shares.

[18] However, Fich, Harford, and Yore (2022) find that the value of cash increases in firms for which takeover protection helps to bond commitments to counterparties.

operating performance and firm value among firms with high-quality managers. Klock, Mansi, and Maxwell (2005) and Chava, Livdan, and Purnanandam (2009) find that a firm's use of takeover defenses is associated with a lower cost of debt financing and bank loans. Asbaugh-Skaife, Collins, and LaFond (2006) find that takeover defenses are associated with higher credit ratings, and Cremers, Nair, and Wei (2007) find that takeover defenses are associated with lower bond yields. Relatedly, Francis, Hasan, John , and Waisman (2010) find that bond values are positively related to a firm's use of takeover defenses and that firm leverage is negatively related to the firm's takeover defenses. These results imply that takeover defenses help to protect bondholders from an increase in financial risk and/or expropriation from shareholders – events that become more likely in the event of takeover – thereby increasing bond values.

Several papers examine the relation between takeover defenses and innovation, with mixed results. O'Connor and Rafferty (2012) conclude that the relation is insignificant. In contrast, Meulbroek, Mitchell, Mulherin, Netter, and Poulsen (1990), Mahoney, Sundaramurthy, and Mahoney (1997), and Chemmanur and Tian (2018) find that firms with defenses spend less on R&D and innovate less, while and Mazouz and Zhao (2019) find that managerial incentives to innovate are less effective in the presence of takeover defenses. Similarly, Atanassov (2013) and Karpoff and Wittry (2018) find that corporate innovation decreases when firms are covered by antitakeover laws, although they differ in which laws are important. Keum (2021), however, finds some results in Atanassov (2013) and Karpoff and Wittry (2018) are sensitive to the empirical specification, such as the level of clustering and the inclusion of higher dimensional fixed effects. Keum (2021), Becker-Blease (2011), and Humphery-Jenner (2014) conclude that takeover defenses are positively related to innovation.[19]

The mixed evidence regarding various operational outcomes mirrors the evidence regarding takeover defenses' valuation effects that is summarized in Section 4. This evidence yields further support for the view that takeover defenses convey benefits and costs that vary across firms. It seems likely these various

[19] Keum (2021) also finds that firms covered by antitakeover laws are more likely to pursue value-destroying acquisitions. But here too, the evidence is mixed, as Carline and Gogineni (2021) conclude that defenses are associated with fewer but more profitable acquisitions.

operational outcomes (including operating performance and innovation) follow lifecycle effects, but these remain unexplored topics.

5.2. Takeover defenses and empirical identification

Takeover defenses and firm outcomes are endogenous to the firm's underlying competitive environment, so it is challenging to make causal inferences about the effects of a firm's takeover defenses. Many early papers in this area achieve identification by measuring stock price reactions to news about a firm's takeover defenses. This can work if financial markets are reasonably semi-strong form efficient because stock price reactions provide an unbiased measure of investors' beliefs about the valuation effect of the news. A problem arises, however, if the exact nature of the news event is difficult to pin down. As an example, Bizjak and Marquette (1998) find that shareholder proposals to rescind poison pills are associated with a stock price decline. Is this news that poison pills add value and that rescinding them would decrease value? Or is the news that private negotiations to amend the firm's governance collapsed and the firm is likely to endure a costly battle with the proposal proponents?

As an alternate approach, Cuñat, Giné, and Guadalupe (2012, 2020) use regression discontinuity tests that exploit somewhat arbitrary differences in vote support for governance-related shareholder proposals to make causal inferences about takeover defenses' effects on firm value, takeover likelihood, and takeover premiums. Other researchers rely on court decisions that impose exogenous changes on some firms' takeover defenses (e.g., Cohen and Wang 2013, Heron and Lie 2015, Amihud and Stoyanov 2017), or use instrumental variables to examine plausibly arbitrary changes in firms' takeover defenses (e.g., Karpoff, Schonlau, and Wehrly 2017).

State antitakeover laws form the basis of a popular identification strategy because these laws impose plausibly exogenous takeover protections without any overt action by the firm's managers. Karpoff and Wittry (2018, Table A1) cite 81 papers that use state antitakeover laws to investigate a wide variety of outcomes. These outcomes include leverage (Garvey and Hanka 1999), employee wages and plant productivity (Bertrand and Mullainathan, 1999, 2003), payouts (John, Knyazeva, and Kyyazeva., 2015;

Bhattacharya, Li, and Rhee, 2016), firm risk (Gormley and Matsa, 2016; Bhargava, Faircloth, and Zeng, 2017), corporate social responsibility (Flammer, 2018), firms' information environments (Armstrong, Balakrishnan, and Cohen, 2012), and stock market liquidity (Pasquariello, 2022), to name but a few.

Using state laws to identify exogenous variation in firms' takeover defenses, however, raises new challenges. Catan and Kahan (2016) make the most blistering critique of this literature, based on the view that all firms have costless and unambiguously effective shadow poison pills at their disposal.[20] The implication of this view is that state antitakeover laws do not offer any incremental takeover protection, to any firms. Any empirical correlation between a firm's coverage by a state antitakeover law and a change in firm outcomes must therefore be spurious, and inferences derived from antitakeover laws are specious.

Cain, McKeon, and Solomon (2017) also argue that state antitakeover laws are not adopted in an institutional vacuum but reject the view that shadow poison pills render other defenses irrelevant. They use fitted values from an empirical model of hostile acquisition likelihood to construct a "Takeover Index" that is based on several important court decisions, state antitakeover laws, macroeconomic conditions, and firm characteristics. Karpoff and Wittry (2018) also argue that the incremental impact of a state antitakeover law depends on the affected firms' institutional and legal context. Contrary to Catan and Kahan (2016), however, Karpoff and Wittry (2018) argue that firms acquire a variety of takeover defenses precisely because they expect each to provide incremental takeover defense. They propose that legal context frequently can be treated as an omitted variable problem by including controls for the presence of first-generation state antitakeover laws, other second-generation state antitakeover laws, firm-level defenses, important court decisions, whether the firm lobbied for passage of the law, and whether the firm opted in or out of coverage by the law. Karpoff and Wittry (2018) show that the results of some – but not all – previous tests that use state antitakeover laws to measure a firm's takeover defense are sensitive to the inclusion of these controls.

[20] This view of shadow poison pills is discussed further in Section 7.a.

The use of state antitakeover laws to identify tests faces additional challenges, too. Baker (2022) shows that previous results are sensitive to improvements in difference-in-difference empirical methods. Using simulations, Spamann and Hu (2022) show that clustering standard errors by state of incorporation – a common practice – yields biased standard errors that over reject the null hypothesis of no relation. The problem arises because of extremely unequal cluster sizes, especially the concentration of Delaware firms.

Despite such challenges, researchers continue to use antitakeover laws to examine the effects of changes in firms' takeover defenses on a variety of outcomes. Many papers now include controls for the legal context in which state antitakeover laws are adopted, and some also incorporate Baker's (2022) and Spamann's (2022) concerns about difference-in-difference tests and clustered standard errors.[21]

Heath, Ringgenberg, Samadi, and Werner (2022) offer another criticism of the literature that uses state antitakeover laws to identify empirical tests. They note that a purely data-mining use of state laws to examine the effects of takeover protection on many different firm outcomes is subject to the multiple tests problem, and they propose researchers apply more stringent t-statistic thresholds to infer statistical significance. At face value, this argument does not apply to tests of hypotheses that explicitly are motivated by theory, but it raises a question over whether researchers collectively but unwittingly engage in a data-mining exercise when state laws are used to uncover empirical relations between takeover protections and an increasing number of firm outcomes.

6. Takeover defense dynamics

While many papers examine how takeover defenses affect firm value and operations, there is not much research on when and why firms add or remove defenses. Karpoff and Wittry (2018) note that state-antitakeover laws have smaller effects when firms have other defenses, implying that firm-level defenses

[21] For example, see Pasquariello (2022). See also John, Knyazeva, and Knyazeva, (2015), Amore and Bennedsen (2016), Bhattacharya, Li, and Rhee (2016), Caton, Goh, Lee, and Lin (2016), Gao, Li, and Ma (2021), Gormley and Matsa (2016), Huang, Ozkan, and Xu (2022), Iskenderoglu (2021), John, Li, and Pang (2017), Loderer, Stulz, and Waelchli (2017), Fich, Harford, and Yore (2022), Keum (2021), and Tang (2018).

substitute for state antitakeover laws[22]. Cuñat, Giné, and Guadalupe (2012) find that firms react to successful shareholder proposals to drop a takeover defense by adding a different defense, suggesting that firm managers have an optimal level of takeover protection in mind.

Johnson, Karpoff, and Yi (2022) use the idea that takeover defenses convey benefits and costs that can change over time to examine the conditions when firms remove a defense. In general, firms tend to remove takeover defenses when the costs of takeover defense are high or the benefits are low, subject to the cost of removal. In particular, the likelihood of removing a defense increases with proxies for the cost of entrenchment based on the value of cash holdings and the value of diversifying acquisitions. The likelihood of removing a defense decreases with proxies for the bonding-related benefits of having a defense, including the value of sales to large customers and the value of having a CEO-founder. The likelihood of removing a defense also is negatively related to a composite measure of the aggregate value of a firm's takeover defense based on several proxies for costs and benefits.

Evidence that takeover defenses are sticky and infrequently removed implies that there are costs to removing a defense. Coates (2001) notes that, in general, shareholders favor fewer defenses than managers do. But Hannes (2005, 2006) and Choi and Min (2018) note that shareholders face collective action, free-riding, and information heterogeneity problems in organizing to remove existing defenses even when the defenses become costly. Consistent with these ideas, Johnson, Karpoff, and Yi (2022) find that the likelihood a firm will remove a defense is negatively related to proxies for the cost of shareholders' collective action and information heterogeneity. Firm characteristics that most increase the likelihood of removing a takeover defense include having a hedge fund investor and being targeted by the Harvard Shareholder Rights project.

[22] Other evidence indicates that the substitutability between firm- and state-level provisions is not perfect. For example, Fich, Harford, and Yore (2022) find results that contrast sharply with those in Dittmar and Mahrt-Smith (2007) regarding antitakeover provisions and cash holdings. Such discrepancies may be due in part to life-cycle effects or to differences in voluntarily adopted provisions at the firm-level compared to provisions imposed on firms by state-level regulation.

Overall, this evidence implies a costly-adjustment process: the net benefits of having takeover defenses decline over time for many firms, but firms shed defenses only when the defenses become very costly and the cost of mobilizing shareholder support to remove the defense is not prohibitive.

7. Criticisms: How effective are takeover defenses?

For a takeover defense to be effective, it must decrease the likelihood the firm will be acquired. In this section, we evaluate theoretical arguments that takeover defenses and takeover defense indices are ineffective. We then turn to empirical measures of the effectiveness of individual defenses and highlight recent attempts to improve the quality of takeover defense data.

7.1. The theory of shadow poison pills

The first poison pills were created in 1982, shortly after the U.S. Supreme Court effectively invalided 38 first-generation state antitakeover laws in *Edgar v. MITE*. A Delaware Supreme Court decision in 1985 and a federal district court decision in 1990 upheld defensive uses of poison pills, and subsequent decisions further refined the conditions under which poison pill defenses are valid.[23] In 2000, Coates (2000) noted that these decisions grant virtually all U.S. firms the right to adopt a poison pill at any time, even during a contested takeover battle. Furthermore, poison pills appear to be extremely effective takeover defenses, as they seemingly are costless to deploy and impose prohibitive costs on outside bidders. Thus, and whether or not a firm has an explicit poison pill in place, virtually all firms have shadow poison pills that are immediate, costless, and extremely effective takeover deterrents.

The implication of this argument is striking: the instant and free availability of a show-stopping poison pill makes other takeover defenses largely irrelevant. Coates (2000), Klausner (2013), and Catan and Kahan (2016) point out that, at the margin, a small number of other defenses offer some incremental

[23] See *Moran v. Household International, Inc.*, 500 A.2d 1346 (Del. 1985); *Georgia-Pacific Corp. v. Great Northern Nekoosa Corp.*, 728 F. Supp. 807 (D. Me. 1990). *Paramount Communications, Inc. v. Time, Inc.*, 571 A.2d 1140, 565 A.2d 280 (Del. 1989); *Moore Corp. Ltd. v. Wallace Computer Services, Inc.*, 907 F. Supp. 1545, 1564 (D. Del. 1995).

takeover deterrence. Most importantly, a classified board can be relevant because it requires an outside bidder to win two consecutive board elections to gain control of the target firm's board to rescind the poison pill – thus imposing a significant delay on an acquisition. This argument has led some researchers to argue that classified boards are the only meaningful observable takeover defense and that other defenses are irrelevant (e.g., Bates, Becher, and Lemmon, 2008). Citing the availability of shadow poison pills, Klausner (2013) argues that the G-index and E-index do not measure takeover deterrence, arguing that finance researchers make "…the common mistake of assuming that the number of takeover defenses is a relevant measure of exposure to takeovers." Catan and Kahan (2016) extend this to argue that state antitakeover laws have no incremental defense over and above a shadow poison pill combined with a classified board and claim that empirical results showing relations between state antitakeover laws and firm outcomes must be spurious.

This view has received pushback. One issue for a minority of firms is that shadow poison pills are available if the firm has blank check preferred stock or other authorized but unissued securities that are required to implement a poison pill.[24] In addition, Cain, McKeon, and Solomon (2017) propose that several firm characteristics and legal decisions contribute to a firm's takeover vulnerability in addition to shadow poison pills. Karpoff and Wittry (2018) argue that the large amount of evidence indicating that various defenses are related to firm value and other outcomes is difficult to square with the notion that these defenses are all irrelevant. They also question the assumptions that shadow pills have ironclad legal status and that pills are costless to implement.[25] As an example of cost, Johnson, Karpoff, and Wittry (2022) show that directors experience negative career consequences when they adopt poison pills. These considerations – that poison pills are unavailable to some firms, can be costly to implement, and may not offer ironclad takeover protection – contradict the view that only shadow pills offer relevant takeover protection. Given

[24] The data in Figure 4, Panel B indicate that only 7% of large firms do not have blank check preferred stock.
[25] Scholars have identified several Delaware court decisions dating from 1985 to 2010 that affect firms' uses of poison pills, and Bebchuk and Jackson (2014) argue that a pill's legal status is still vulnerable to the challenge that it conflicts with the 1968 Williams Act.

the dueling theoretical considerations, whether any takeover defenses offer takeover protection is an empirical matter.

7.2. Criticisms of takeover defense indices

An additional consideration is that indices of takeover defenses can be poor measures of a firm's takeover defenses even if their constituent provisions convey protection against unwanted takeovers. Many researchers (e.g., Klausner, 2013) point out that the G-index and E-index weight each constituent provision equally, even though different provisions surely provide different amounts of takeover protection. It also seems likely that the marginal impact of any one provision depends on the presence or absence of other provisions, as some provisions likely act as substitutes and others as complements.[26]

Researchers also disagree on which provisions to include in a composite measure of takeover defense. Gompers, Ishii, and Metrick (2003) formulate the G-index as a measure of shareholder rights, although many researchers use it as a measure of takeover defense. Field and Karpoff (2002) use an index of 10 provisions, and Cremers and Nair (2005) propose an alternative takeover index (ATI) of five provisions. Bebchuk, Cohen, and Ferrell (2009) argue that the E-index consists of the six provisions that most effectively deter takeovers, while Cremers, Masconale, and Sepe (2016) argue that only three of the E-index provisions relate to entrenchment. Cain, McKeon, and Solomon (2017) propose a Takeover Index that combines firm- and state-level defenses, firm characteristics, and important court decisions. Others argue that takeover protection is best measured using only a single characteristic. For example, Borokhovich, Brunarski, and Parrino (1997) focus on supermajority vote provisions. Other researchers (e.g., Bates, Becher, and Lemmon, 2008) focus on only classified boards, arguing that, because all firms have shadow poison pills, only classified boards offer incremental defense. Bhagat, Bolton, and Romano

[26] See Danielson and Karpoff (1998), Bhagat, Bolton, and Romano (2008), and Gillan, Hartzell, and Starks (2011). Several papers in the management literature discuss possible substitution and complementarity effects of governance and monitoring provisions, including takeover defenses, including Rediker and Seth (1995), Aguilera, Filatotchev, Gospel, and Jackson (2008), Schepker and Oh (2013), and Misangyi and Acharya (2014).

(2008) argue that director ownership serves as a better proxy for governance, including the strength of a firm's defense.

7.3. Which specific takeover defenses affect acquisition likelihood?

Which, if any, takeover defenses provide takeover deterrence is ultimately an empirical question. Early test results find no meaningful relation between the G-index and takeover likelihood, consistent with criticisms of the G-index (see Core, Guay, Rusticus, 2006; Bates, Becher, and Lemmon, 2008; Kadyrzhanova and Rhodes-Kropf, 2011; Sokolyk, 2011; Goktan, Kieschnick, and Moussawi, 2018). Bates, Becher, and Lemmon (2008) argue that these findings "... challenge the common perception that these [G-index] factors, independently or as indexed, provide a reliable proxy for managerial entrenchment or a firm's exposure to the market for corporate control."

However, these early findings do not account for the endogeneity of takeover defenses and takeover likelihood. Firms may acquire defenses because they face a high likelihood of being acquired, thus obscuring inferences about the causal effects of takeover defenses on acquisition likelihood. Replicating previous results, Karpoff, Schonlau, and Wehrly (2017) also find no statistically significant relation between takeover likelihood and the G-index or E-index in tests that do not control for endogeneity. Using two different types of instrumental variables to account for endogeneity, however, they find that both the G-index and E-index are negatively related to takeover likelihood. They also report that the O-index, which consists of provisions in the G-index but not the E-index, is negatively related to takeover likelihood. These results imply that these indices can be used as measures of a firm's takeover defenses, but only in tests that control for the endogeneity of these defenses. Similarly, Cuñat, Giné, and Guadalupe (2020) use a regression discontinuity design to address endogeneity concerns and find that successful shareholder proposals to remove takeover defenses cause a significant increase in takeover likelihood.

How about the individual provisions that constitute these indices? Several papers investigate the effectiveness of individual takeover defenses. Ambrose and Megginson (1992), for example, conclude that "Blank check preferred stock authorizations are the only common takeover defense significantly

(negatively) correlated with acquisition likelihood." Pound (1987) and Borokhovich, Brunarski, and Parrino (1997) find that fair price and supermajority vote provisions are negatively related to takeover likelihood. Sokolyk (2011) finds that the combination of a classified board and poison pill is negatively related to takeover likelihood, while golden parachutes are positively related to takeover likelihood. Goktan and Kieschnick (2012) find that dual class shares, unequal voting rights, classified boards, and fair price provisions are negatively related to takeover likelihood, while golden parachutes are positively related to takeover likelihood.

Once again, however, these early tests do not account for the endogeneity of each individual takeover defense and acquisition likelihood. Karpoff, Schonlau, and Wehrly (2022) use a combination of OLS, instrumental variable 2SLS, limited information maximum likelihood (LIML), probit, and bivariate probit tests to make inferences about which individual provisions are significantly related to takeover likelihood while taking endogeneity into account. They conclude that at most 11 of the 24 G-index provisions, including two of the six E-index provisions, are negatively related to takeover likelihood, while golden parachutes are positively related.[27] Furthermore, takeover indices such as the G-index, E-index, Cremers and Nair's (2005) alternate takeover index, and Field and Karpoff's (2002) group of 10 provisions, are negatively related to acquisition likelihood only to the extent they include one or more of these 11 provisions. Because the G-index and E-index also include provisions that are not significantly related to takeover likelihood (and include golden parachutes with the wrong sign), these indices yield noisy measures of a firm's takeover defenses. Such measurement noise in the G-index and E-index can affect empirical inferences: Karpoff, Schonlau, and Wehrly (2022) show that a firm's unconditional takeover premium is not significantly related to the G-index or E-index, whereas it is significantly and negatively related to an index based on the 11 provisions that are negatively related to takeover likelihood.

[27] In their most strict tests, only four provisions are consistently negatively related to acquisition likelihood (supermajority vote requirements for mergers, directors' duties provisions, fair price provisions, and unequal voting rights), while one provision (golden parachutes) is consistently and positively related to takeover likelihood.

Together, these results have four implications. First, only some of the provisions that are included in indices such as the G-index and E-index provisions are negatively related to takeover likelihood. Second, the G-index and E-index are correlated with takeover deterrence in tests that control for endogeneity, but only because they include some of the provisions that empirically are negatively related to takeover likelihood. These indices include other provisions, and provisions such as golden parachutes with the wrong sign, that make them noisy measures of takeover defense, and this noise can affect empirical inferences. Third, as first reported by Machlin, Choe, and Miles (1993), Sokolyk (2011) and Goktan and Kieschnick (2012), golden parachutes are positively related to takeover likelihood. Golden parachutes should therefore be excluded from indices such as the E-index, or included with the opposite sign. Fourth, firms receive takeover protection from a variety of takeover defenses and not only from shadow poison pills and/or classified boards. It is important to point out, however, that the evidence on the effectiveness of individual takeover defenses is thin and suggests that the relations between some defenses and acquisition likelihood are not stable over time. These findings also are subject to concerns about data quality, as discussed below.

7.4. Data quality

A potentially important criticism is that the takeover defense data used by most researchers are inconsistent and filled with errors. The large discrete jumps in counts of the E-index provisions in 2007, as reported in Table 1, reflects inconsistency and suggests the potential for large error rates. Figure 4 reports on counts over time for several takeover defenses that are in both the 1990-2006 IRRC and 2007-2021 ISS datasets. Panel A of Figure 4 reports on the six E-index provisions, while Panel B reports on seven additional provisions that are in the G-index. The data series splice together without jumps for several provisions, including classified boards and straight (not cumulative) voting. The counts for several other provisions, however, suggest large discrepancies in how these provisions are counted and classified. It is unlikely, for example, that the true percentage of large firms with limitations on shareholders' ability to amend the corporate charter increased from 3% in 2006 to 86.7% in 2007. Rather, there probably was a change in how this provision was counted.

[Figure 4 about here]

In addition to such inconsistencies, both the 1990-2006 and 2007-2021 datasets contain numerous errors. Larcker, Reiss, and Xiao (2015) find widespread coding errors when comparing the 1990-2006 IRRC data with SharkRepellent data and firm SEC filings from the EDGAR website, primarily for golden parachute and supermajority vote provisions. Karthaus, von Meyerinck, and Schmid (2021) rely on SharkRepellent and hand-collected data to document additional mistakes in the 2007-2016 ISS data, particularly for provisions that limit shareholders' abilities to amend corporate charters and bylaws.[28] The mistakes are not trivial. For example, Karthaus, von Meyerinck, and Schmid (2021) report that the percentage of firms in 2016 that limited shareholders' abilities to amend bylaws was 38.8%, far lower than the 89.5% of firms as indicated by the ISS data. Frankenreiter, Hwang, Nili, and Talley (2021) hand collect data from firms' corporate charters and also document large errors in these databases.[29]

Larcker, Reiss, and Xiao (2015) report updated E-index summary statistics for the 1990–2006 period after correcting for errors, while Karthaus, von Meyerinck, and Schmid. (2021) report corrected counts for the 2007–2016 period. Table 2 reports on E-index counts after incorporating these corrected data. The changes from Table 1 are substantial. In general, Larcker, Reiss, and Xiao (2015) show that the IRRC counts of provisions from 1990-2006 are too low, and the corrected counts in Table 2 indicate that firms' E-index values are generally larger than reported in the standard IRRC database for 1990–2006. Karthaus, von Meyerinck, and Schmid (2021) show that the ISS counts of provisions from 2007–2016 are generally too high, and the corrected counts indicate that firms' E-index values are smaller than reported in the ISS database for 2007–2016. The counts of limits on amendments to charters and bylaws are particularly overstated, with significant miscounts for the other provisions as well. Though discrete jumps remain in the percentages of firms with individual provisions (e.g., limits to amend charter provisions) from 2006 to 2007,

[28] There appear to be mistakes in other databases that track takeover defenses, as well. For example, Eldar, Kirmse, and Wittry (2022) note that hand-collected data on poison pills from SEC filings differ from data available from SDC Platinum, including poison pill terminations that are coded as adoptions.

[29] Frankenreiter, Hwang, Nili, and Talley have made these data freely available for researchers at www.publiccompanycharters.com, and have indicated to us that they currently are expanding the dataset by hand-collecting bylaws and bylaw amendments.

the correction of the coding mistakes in the IRRC and ISS data works to smooth the aggregated E-index counts across the 1990-2006 and 2007-2021 databases.

These results indicate that researchers need to be careful not only about which provisions to include in an index of takeover defense, but also about the data they use. One of the questions for future research discussed in Section 9 is whether and to what extent the use of more accurate data will affect empirical inferences about corporate takeover defenses.

7.5. Alternate ways to defend against unwanted takeover attempts

This paper focuses on takeover defenses as they are most frequently defined and used in the research literature, e.g., provisions in the G-index. We want to acknowledge, however, that firms can pursue a wide range of strategies to deter or defeat unsolicited takeover bids. A partial list of such strategies includes the following actions:

(i) Restructurings. Dann and DeAngelo (1988) examine changes in asset and ownership structure undertaken to forestall an acquisition and find that those changes are associated with share value declines. Jarrell and Poulsen (1988) show that dual-class recapitalizations in the 1986-87 period that presumably were undertaken to forestall takeover threats also were associated with share price declines. Bagwell (1991) argues that share repurchases can serve as a takeover deterrent, but Billett and Xue (2007) find a positive relation between takeover likelihood and open market share repurchases.

(ii) Managerial ownership. Cheng, Nagar, and Rajan (2005), for example, find that managerial ownership is a substitute for takeover protection afforded by state antitakeover laws.

(iii) ESOPs. Employee stock option plans can place large voting share blocks in the hands of trustees who are likely to oppose takeover bids that threaten incumbent employees' jobs. Gordon and Pound (1990) and Chaplinksy and Niehaus (1994) find that ESOPs created to defend against acquisitions are effective takeover deterrents and lower share values.

(iv) Cross-listing. Tsang, Yang, and Zheng (2021) propose that cross-listings increase the cost to potential bidders and therefore insulate firms from unwanted bids, and find that the likelihood that a firm cross-lists in a foreign country increases with its threat of takeover.

(v) Disclosure. Zhao, Allen, and Hasan (2013) propose that poor voluntary disclosure serves as a substitute for explicit takeover defenses because opacity increases the cost to outside bidders.

8. Takeover defenses at non-U.S. firms

Several papers examine the effects of takeover defenses on the operations and performance of firms outside of the U.S., although also with mixed results. For example, Kabir, Cantrijn, and Jeunink (1997) find that Dutch firms are more likely to adopt defenses when they have diffuse ownership and infer that the defenses insulate managers from the threat of takeover. Also suggesting entrenchment, Mbanyele (2021) finds that takeover defenses are associated with less innovation in firms from six countries in Asia. Drobetz and Momtaz (2020), in contrast, find that German firms' uses of defenses, particularly supermajority vote provisions, are associated with value-increasing acquisitions, suggesting that defenses encourage better long-term investments. Aggarwal, Erel, Stulz, and Williamson (2009) construct an index of 44 governance provisions to compare the governance of U.S. and non-U.S. firms. By this index, only 12.7% of non-U.S. firms have better governance than U.S. firms. However, only seven of the 44 provisions are similar to the types of provisions used by most researchers to examine a firm's takeover defenses, including supermajority vote requirements to approve mergers and limitations on the right to act by written consent. Aggarwal, Erel, Stulz, and Williamson's (2009) inference about governance quality relies more on such other characteristics as ownership, compensation, and board structure.

One reason there is relatively little research on takeover defenses outside of the U.S. is that non-U.S. firms have fewer takeover defenses than U.S. firms. This is partly because corporate ownership tends to be more concentrated outside of the U.S. (Kim, 2013), decreasing the threat of outside takeover, and also because of different legal rules affecting the market for corporate control. For example, U.S. law grants relatively wide discretion to corporate directors and officers under the business judgment rule, including

several Delaware Supreme Court cases in the 1980s that cemented the board's role as a "guardian" of shareholder interests rather than simply a "gatekeeper" (Hill, 2010).[30] As a result, the board and managers of U.S. firms face relatively few restrictions in their responses to unsolicited takeover bids, and there is a high threshold before management's actions are considered preclusive, coercive, or interfering with the shareholder franchise (Gilson and Kraakman, 1989). These court decisions established the board's right to adopt various defensive provisions, even after a bid (Coates, 2000), and ultimately, to "just say no" to unsolicited takeover bids (Bebchuk, Coates, and Subramanian, 2002).

The laws and regulations affecting many non-U.S. firms, in contrast, impose more restrictions on managers and directors' responses to takeover bids. Modeled after the United Kingdom's City Code on Takeovers and Mergers, the 13th European Directive of Takeovers requires "board neutrality" (Hopt, 2014) and explicitly prohibits any "frustrating board actions" (Klancnik, 2021).[31] The Australian Takeovers Panel, passed in 2000, has a similar policy (Hill, 2010). As a result, takeover defenses such as poison pills are illegal in Australia, the United Kingdom, and many EU member countries. Canada allows defenses but regulations impose restrictions on their use (Morck 2010). For example, Podolny (2009) points out that courts and securities regulators have capped the duration of any poison pill to 45–60 days while the firm seeks alternative offers. Even classified boards provide little takeover deterrence in countries such as Australia, Canada, and the U.K., because there are no limits on special meetings and shareholders can remove directors without cause at any time (Hill, 2010; Morck, 2010; Karpoff, Litov, and Wittry, 2022). Thus, an outside bidder who gains voting control can call a special meeting and replace the board, nullifying the defensive capability of the classified board.

[30] E.g., *Unocal Corp vs. Mesa Petroleum Corp.*; *Revlon, Inc v. MacAndres & Forbes Holdings, Inc.; Paramount Communications Inc. v. Time Inc.*

[31] Germany and the Netherlands have exercised an option to opt out of the "no frustrating actions" mandate (Mukwiri, 2020), thus granting incumbent managers more discretion to fight unwanted takeover bids (while France and Italy opted out of certain provisions meant to facilitate foreign acquisitions). Even in Germany, however, firms use fewer defenses than in the U.S. Drobetz and Momtaz (2020) report a mean E-index of 1.44 for German firms in the early 2010s, which is about half the number for the average U.S. firm in the same period (Karthaus, von Meyerinck, and Schmid, 2021).

The regulatory regimes in Japan and China are like those in Europe. Japan's judicially developed "primary purpose" rule and China's legislative "no damaging lawful interests of the target" clause are comparable to the EU's no frustrating actions provision (Koh, Nakahigashi, Puchniak, 2020; Huang, 2005). Firms in Japan have access to a version of the U.S. poison pill, called a pre-warning rights plan (PRP), that many firms adopted in the late 2000s.[32] However, shareholders are deeply involved in triggering such plans, and moreover, these plans appear to be "heading towards extinction" (Koh, Nakahigashi, Puchniak, 2020).

Lack of data likely contribute to the relative lack of research on takeover defenses outside of the U.S. ISS, FactSet, and Shark Repellent provide data on many U.S. firms' takeover defenses. Data on non-U.S. firms, on the other hand, is mostly limited to hand-collected provisions for individual countries, and most of these efforts seek to measure governance quality as opposed to takeover defense per se.[33]

9. Questions for further research

Takeover defenses affect how firm managers are subject to oversight and discipline via the external market for corporate control. The research summarized here also highlights how defenses affect firms' contracting relationships with its counterparties. Takeover defenses therefore will continue to play an important role in research that extends our understanding of firm organization and performance. We conclude by identifying six questions for further research in this area.

1. How good are the data, and do previous data errors matter?

Research on corporate takeover defenses is only as good as the data. Larcker, Reiss, and Xiao (2015), Karthaus, von Meyerinck, and Schmid (2021), and Frankenreiter, Hwang, Nili, and Talley (2021) show that there are large error rates in the most popular takeover defense databases that have been used to establish many of the results summarized in this paper. Improving data quality could cause a reassessment of some

[32] Koh, Nakahigashi, Puchniak (2020) point out that Japan's pre-warning rights plans have not been court-tested.
[33] E.g., see Tipurić, Dvorski, and Delić (2020), Drobetz and Momtaz (2020); Koh, Nakahigashi, Puchniak (2020); Nsour and Al-Rjoub (2022).

previous results. It is also essential for future research about corporate takeover defenses, including the questions below.

2. What explains the takeover defense puzzle?

Despite dozens of papers and multiple surveys, the literature has yet to reach consensus on the basic question of whether takeover defenses tend to serve shareholders' interests or entrench managers at shareholders' expense. This is the takeover defense puzzle. We propose this puzzle arises because takeover defenses have heterogeneous and offsetting effects that are not identified in many prior tests. A classified board, for example, can increase the cost of an unsolicited takeover bid and thereby entrench managers. But it also can help the board of directors avoid costly disruptions or opportunistic hold-ups of the firm's counterparties as board members turn over. These effects can also differ across firms. Future research can help to unpack the multiple, heterogeneous, and changing effects of different types of defenses across firms and over the life of a firm.

3. Are there lifecycle effects, and what are the drivers?

One potential resolution to the takeover defense puzzle is that defenses confer benefits that tend to decrease, and costs that tend to increase, as a firm matures. This lifecycle or value reversal hypothesis of takeover defenses provides structure to the more general proposition that takeover defenses convey benefits and costs that are heterogeneous across firms and/or time. It provides a framework to analyze takeover defenses' specific costs and benefits, and implies that researchers can use firm age to control for the heterogeneous and changing influences of takeover defenses on firm value.

4. To what extent are other outcomes affected by lifecycle effects?

In addition to firm value, previous research investigates the influence of takeover defenses on operating performance, innovation, compensation, CEO turnover, dividend policy, investment, leverage, accounting statement quality, workplace safety, environmental performance, and other outcomes. As noted

in Section 5, however, these tests also yield mixed inferences about how takeover defenses work to improve or degrade firm performance. Future research can gain greater insight into these various outcomes by considering how takeover defenses can have heterogeneous effects on different firms, and even the same firm as it matures.

5. Can we identify the unique effects of different takeover defenses, and how they interact?

Most prior research on corporate takeover defenses treats each defense as having effects that are identical and additive to all other defenses. This is especially true of tests that use takeover defense indices such as the G-index or E-index. Including the E-index on the right-hand side of an empirical model implies that a classified board influences the outcome variable in the same way as a poison pill or supermajority vote requirement to amend the firm's bylaws – and that this influence is the same whether or not the firm also has a poison pill or supermajority vote requirement to amend the firm's bylaws.

We conjecture that all researchers know this assumption is false but employ it anyway to make their tests tractable. Prior research does not show, however, whether this assumption is important for empirical inferences. New research can better identify how each type of takeover defense affects a firm's takeover likelihood and how this effect depends on the firm's other defenses. Such information can be used to better specify tests that examine how a firm's defensive posture affects other outcomes. It also can inform debates over which takeover defenses are particularly effective in forestalling or fending off unsolicited takeover bids.

6. What are the consequences for managers and directors who adopt defenses?

To the extent takeover defenses affect firm value and operations, they are relevant to investors. Do the labor markets for managers and directors incentivize them to adopt defenses optimally? That is, do managers who adopt value-decreasing defenses experience decreases in compensation or fewer labor market opportunities? Does the optimal use of a defense – say, to bond counterparty contracts or to extract a higher takeover premium – increase a manager's labor market opportunities? Alternatively, do

informational or other frictions keep managers and directors from internalizing the consequences of their uses of takeover defenses?

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Figure 1: Worldwide GDP per capita and the rise of the modern corporation

This figure depicts world GDP per capita output for the last two millennium. The data are taken from three sources. Data from 1990 through 2019 is from the World Bank's constant 2017 International $ World GDP series found here: https://data.worldbank.org/indicator/NY.GDP.MKTP.PP.KD. Data before 1990 are from backwards extended World Bank data based on growth rates from the Madison project. See http://www.ggdc.net/maddison/oriindex.htm for more information. Data on world population are taken from *Our World in Data* (see https://ourworldindata.org/grapher/population). A similar depiction first appeared in Maddison (2001).

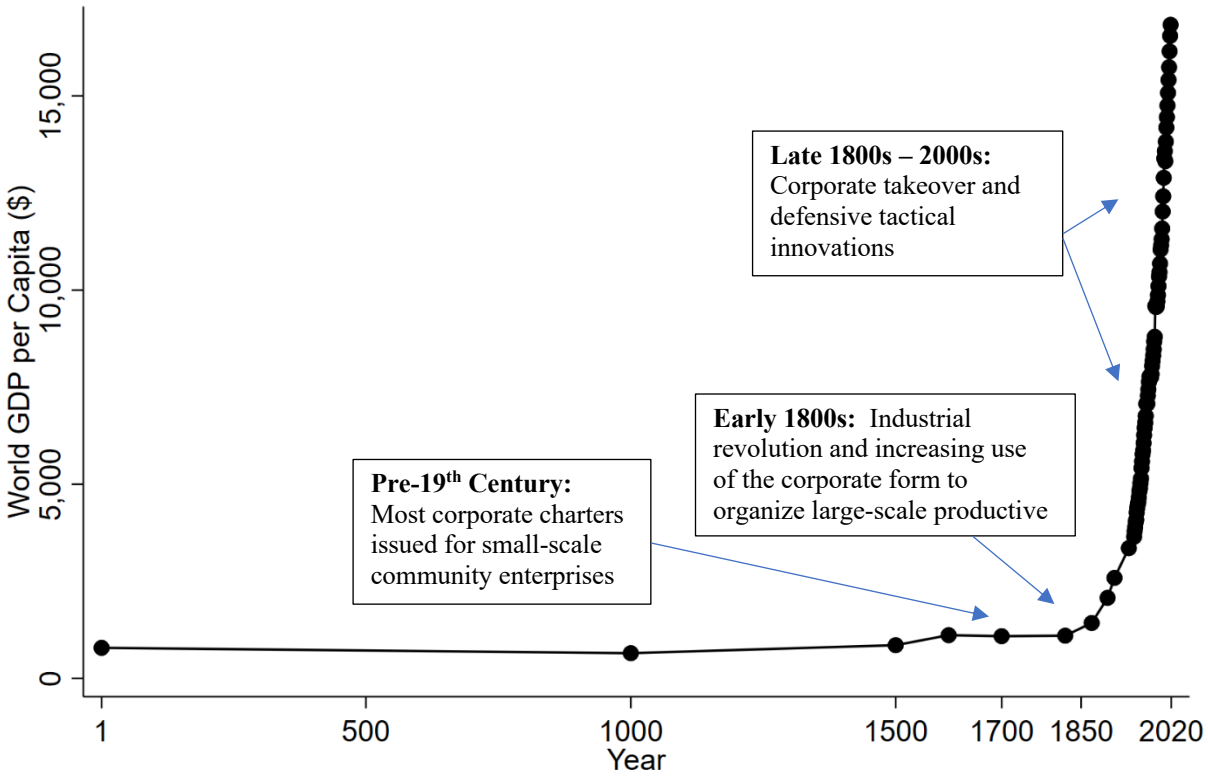


Figure 2: Key innovations in the U.S. market for corporate control, 1960s – 2022

This timeline identifies several important offensive and defensive innovations in the U.S. market for corporate control from the 1960s through current times. Offensive innovations include short-fuse tender offers ("Saturday night specials"), junk bond financing, shareholder activism, and hedge fund activism. Defensive innovations include federal and state legislation and several important court decisions, in addition to specific takeover defenses adopted by individual firms. See Jarrell and Bradley (1980) for an analysis of first-generation state antitakeover laws, and Karpoff and Wittry (2018) for a discussion of second-generation state antitakeover laws. (We refer to all antitakeover laws passed after the 1982 *Edgar v. MITE* decision as "second-generation.") Important U.S. Supreme Court decisions include *Edgar v. MITE Corp*., which effectively overturned pre-existing first-generation state antitakeover laws, and *CTS Corp. v. Dynamics Corp. of America* (1987), which upheld a second-generation state antitakeover law (Indiana's control share acquisition law). *Amanda Acquisition Corp. v. Universal Foods Corp.* was a 1989 Appellate Court ruling that upheld another second-generation state antitakeover law (Wisconsin's business combination law). Important Delaware court decisions include *Moran v. Household International, Inc.*, 500 A.2d 1346 (Del. 1985); *Paramount Communications, Inc. v. Time, Inc.*, 571 A.2d 1140, 565 A.2d 280 (Del. 1989); and *Unitrin, Inc. v. American General Corp*., 651 A.2d 1361 (Del. 1995). Other important court decisions that are not depicted in the timeline include *Moore Corp. Ltd. v. Wallace Computer Services, Inc.*, 907 F. Supp. 1545, 1564 (D. Del. 1995) and *Georgia-Pacific Corp. v. Great Northern Nekoosa Corp.*, 728 F. Supp. 807 (D. Me. 1990).

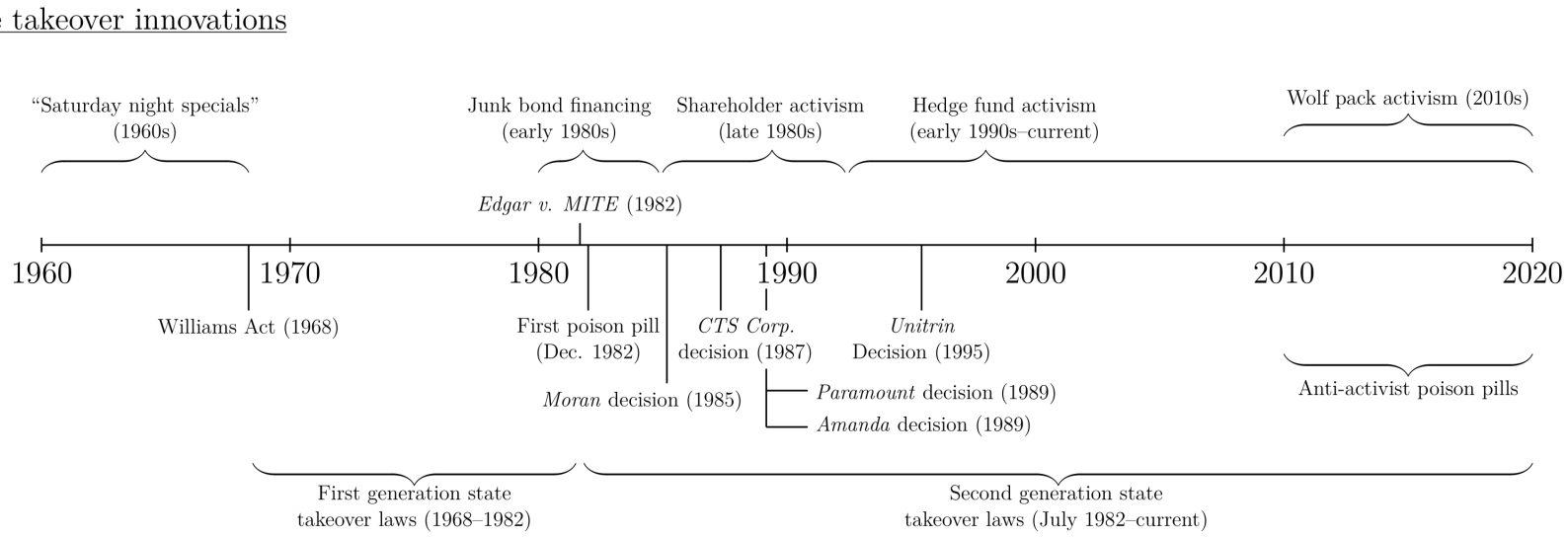


Figure 3: The value reversal, or lifecycle, hypothesis of the value of corporate takeover defenses

This figure illustrates how firm-specific benefits and costs of takeover defense tend to change as a firm matures. The cost of takeover protection reflects the agency cost of equity and tends to increase as a firm matures because managerial ownership tends to decline. The bonding benefits of takeover protection tend to decrease because, for most firms, the value of its business relationships with specific large customers, suppliers, and strategic partners tends to become a smaller fraction of the firm's overall value as it grows. Figure 3 illustrates the effects of such changes as a firm ages: the marginal benefit curve shifts down and the marginal cost curve shifts up, implying a decrease in the optimal level of takeover protection from TD^*_{young} to TD^*_{old}. If the firm does not remove any of the takeover defenses it had in place at its IPO (TD^*_{young}), it experiences a loss in value associated with having too many defenses compared to its (now) optimal level of TD^*_{old}. This loss consists of a decrease in surplus (area *adg* minus area *bce*) as the optimum shifts from TD_{young} to TD_{old}, plus the loss (area *efh*) from suboptimally remaining at the TD_{young} number of defenses. These losses increase as the firm ages as the benefits decline and the costs increase further.

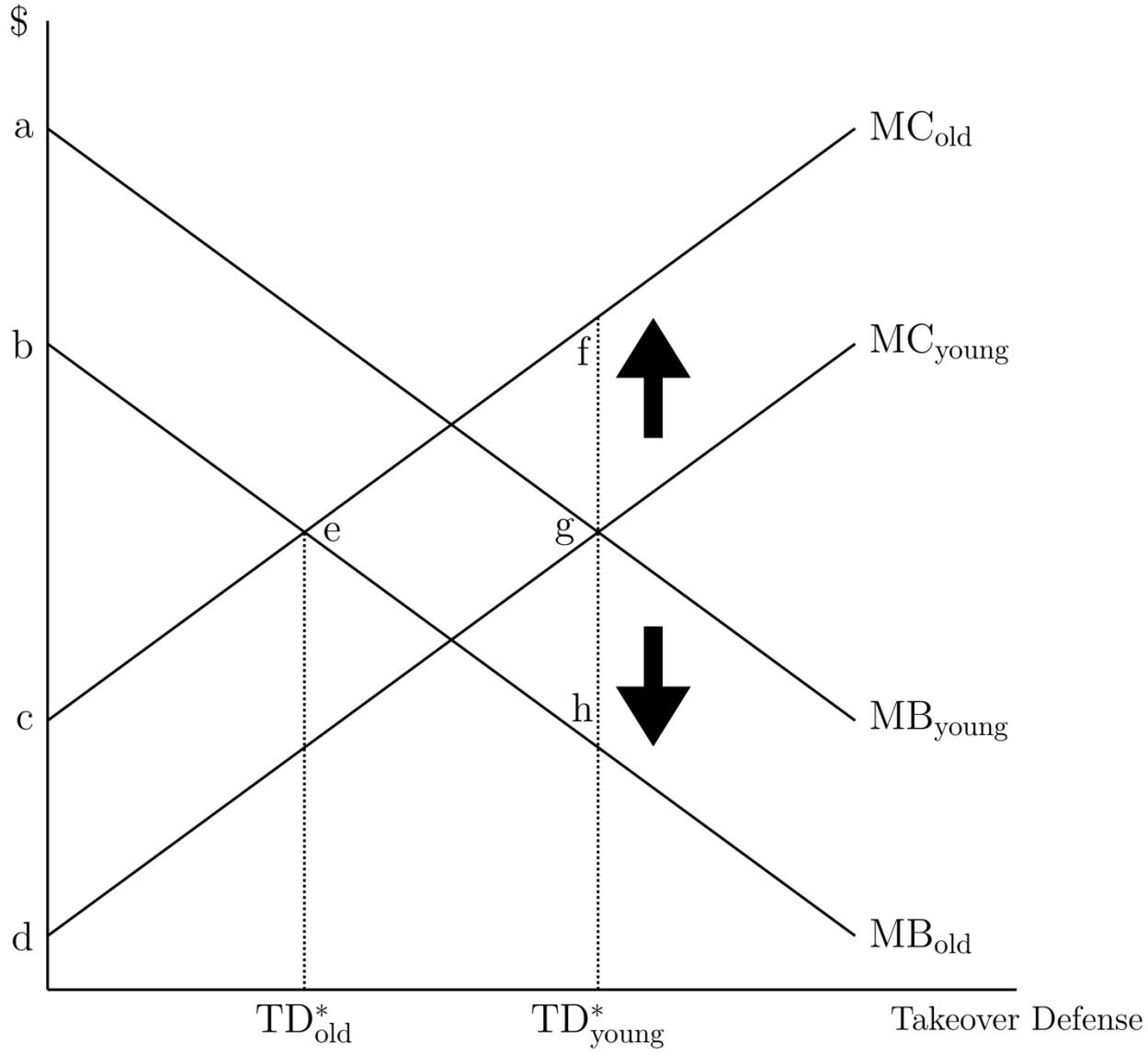
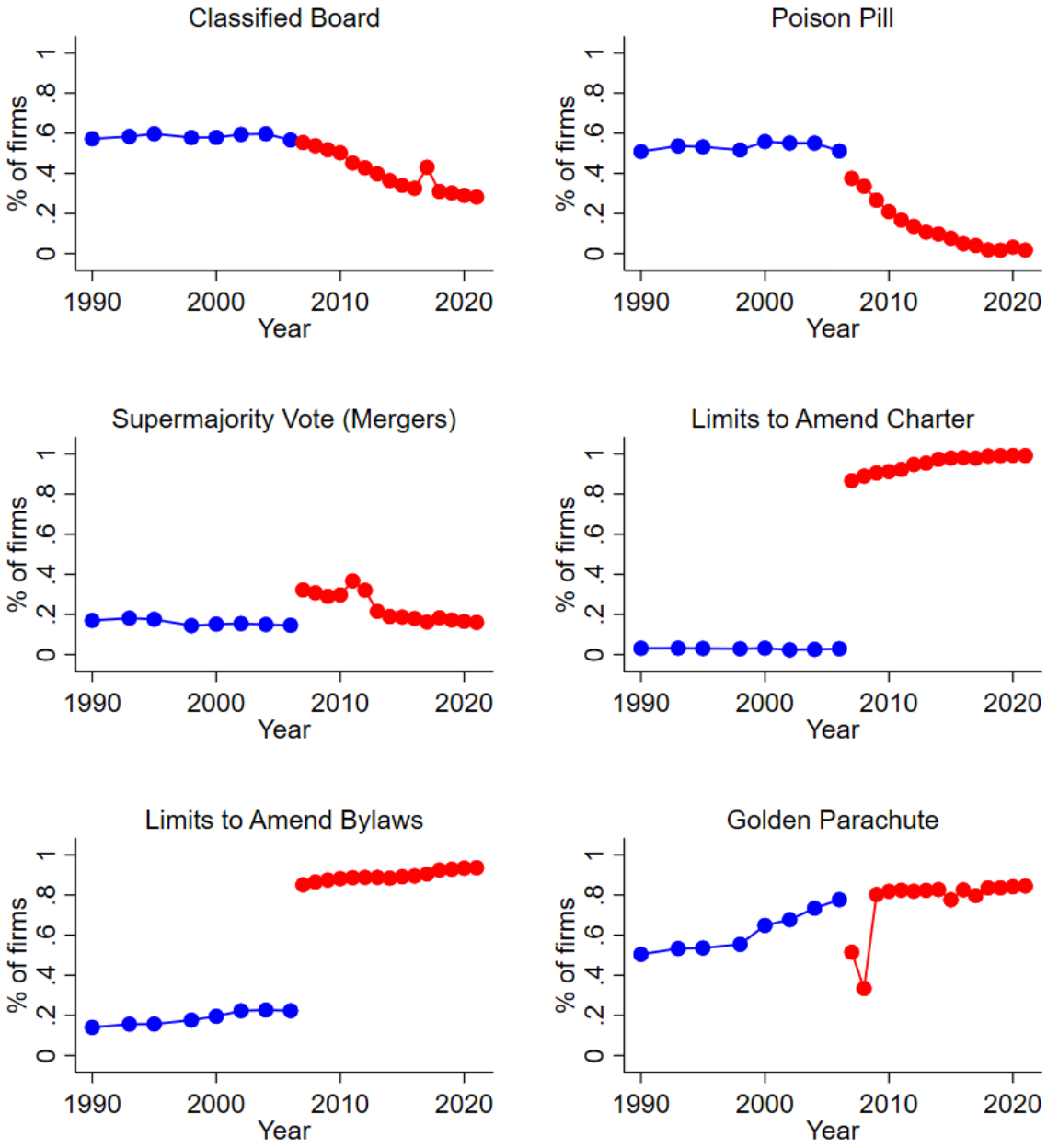


Figure 4: Percentage of firms with each of 13 takeover defenses, 1990-2021
Each graph reports on the percentage of firms in the 1990-2006 ISS database (in blue) and the 2007-2021 IRRC database (in red) for each of the 13 G-index provisions that are included in both databases. (The original G-index has 24 provisions, but only 13 are included in the 2007-2021 IRRC data.) Panel A reports on the six provisions that constitute the E-index and Panel B reports on seven provisions that are in what Straska and Waller (2014) call the O-index (i.e., in the G-index and not in the E-index). The discrete jumps for some provisions, e.g., limits on shareholders' ability to amend the corporate bylaws suggest that the two databases count the provision differently.

Panel A: The six E-Index provisions



Panel B: Seven O-Index Provisions
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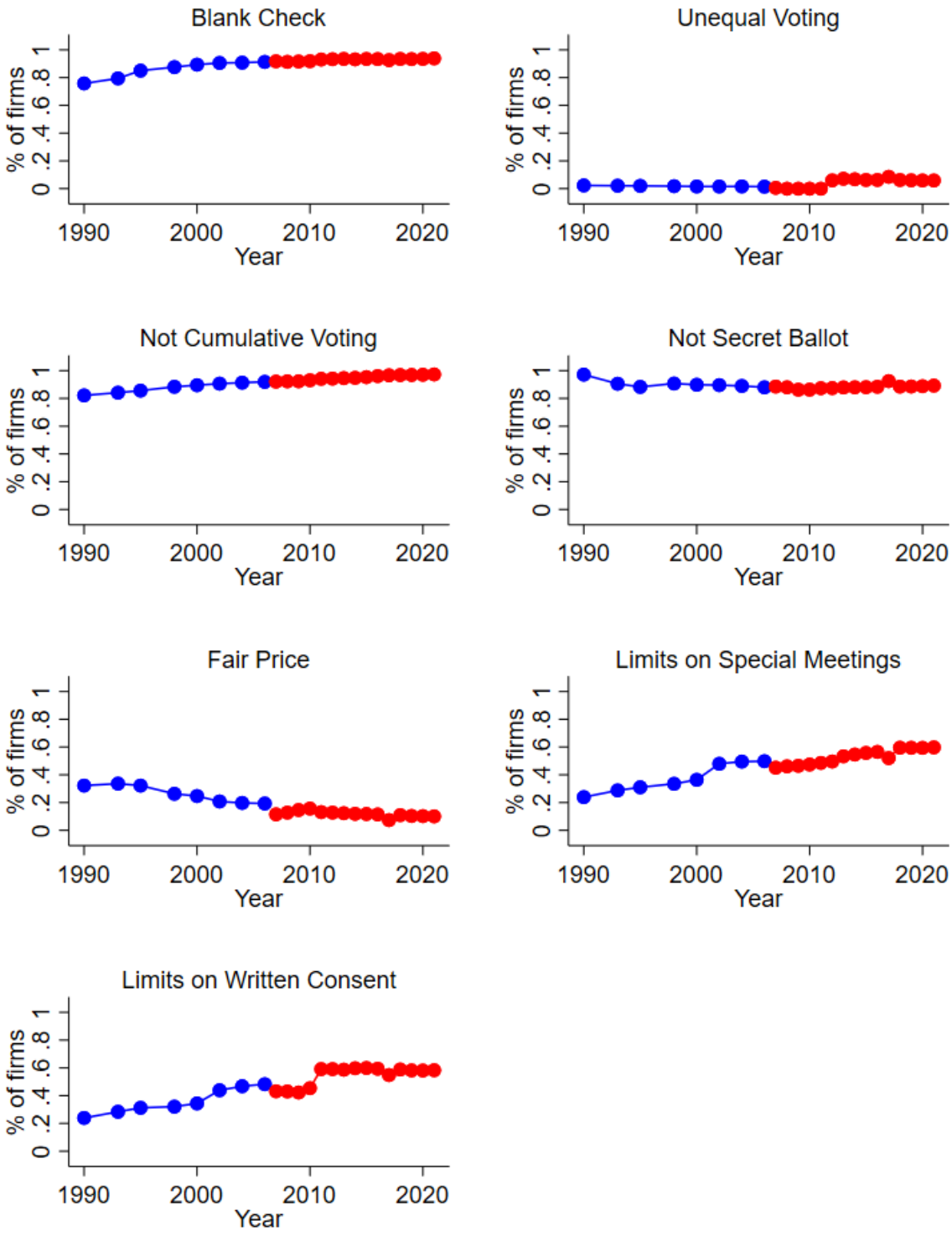

Table 1: Summary of E-index data as reported on WRDS

This table reports summary information on the fraction of firms that have each of the six E-index provisions from 1990 through 2021. Data for 1990 – 2006 are from the ISS Legacy Data that are available via WRDS. Data for 2007-2021 are from IRRC data, also available via WRDS, that are updated annually. This table reports summary of the data as reported, whereas Table 2 (below) reports on data with corrected values as pointed out by Larcker, Reiss, and Xiao (2015) and Karthaus, von Meyerinck, and Schmid (2021).

		Percentage of firms with the following provisions:						Percentage of firms with at least:				
Year	Number of firms	Classified Board	Poison Pill	Supermajority Vote (Merger)	Limits to Amend Charter	Limits to Amend Bylaw	Golden Parachute	2 Provisions	3 Provisions	4 Provisions	5 Provisions	Average E-Index
Panel A: IRRC (ISS Legacy Data) Governance Data												
1990	1,467	57.2%	50.9%	17.0%	3.1%	14.0%	50.4%	61.1%	34.6%	12.7%	3.2%	1.93
1993	1,463	58.4%	53.7%	18.2%	3.2%	15.7%	53.3%	63.7%	37.5%	13.8%	3.1%	2.02
1995	1,496	59.7%	53.2%	17.6%	3.1%	15.7%	53.6%	63.9%	37.4%	14.2%	2.5%	2.03
1998	1,913	57.8%	51.6%	14.4%	2.9%	17.7%	55.4%	62.4%	36.7%	13.0%	2.3%	2.00
2000	1,887	57.9%	55.8%	15.2%	3.2%	19.6%	64.9%	67.2%	42.0%	15.8%	2.9%	2.16
2002	1,894	59.4%	55.1%	15.5%	2.4%	22.3%	67.7%	70.0%	42.9%	17.1%	3.2%	2.22
2004	1,982	59.7%	55.1%	15.0%	2.6%	22.7%	73.4%	72.5%	44.8%	17.4%	2.9%	2.28
2006	1,896	56.6%	51.2%	14.6%	3.0%	22.4%	77.6%	71.4%	42.9%	16.6%	2.5%	2.25
1990-2006	3,631	58.3%	53.4%	15.8%	2.9%	19.1%	63.0%	66.9%	40.2%	15.2%	2.8%	2.12
Panel B: ISS Governance Data												
2007	1,431	55.3%	37.5%	32.2%	86.7%	85.0%	51.5%	94.5%	77.3%	48.4%	23.5%	3.48
2008	1,460	53.8%	33.6%	30.8%	88.9%	86.5%	33.4%	93.6%	71.0%	40.3%	19.1%	3.27
2009	1,476	51.8%	26.6%	29.0%	90.4%	87.5%	80.2%	97.4%	84.1%	54.8%	24.8%	3.66
2010	1,477	50.2%	20.9%	29.7%	91.2%	88.2%	81.9%	97.5%	83.9%	53.5%	23.5%	3.62
2011	1,470	45.2%	16.7%	36.7%	92.2%	88.6%	82.4%	97.8%	86.5%	53.5%	20.9%	3.62
2012	1,497	42.8%	13.6%	32.1%	94.7%	88.8%	81.9%	98.2%	85.8%	50.5%	17.2%	3.54
2013	1,515	39.7%	10.7%	21.5%	95.4%	88.8%	82.3%	98.3%	84.3%	44.8%	10.6%	3.38
2014	1,500	36.4%	9.8%	19.0%	97.3%	88.4%	82.7%	98.7%	84.2%	41.7%	8.6%	3.34
2015	1,505	34.0%	7.6%	18.7%	97.9%	89.1%	77.6%	98.4%	82.2%	37.1%	7.0%	3.25
2016	1,508	32.6%	4.9%	18.0%	98.1%	89.5%	82.6%	98.8%	84.6%	36.5%	5.6%	3.26
2017	3,002	43.1%	4.0%	16.2%	97.8%	90.4%	79.6%	97.6%	84.2%	42.9%	6.3%	3.31
2018	1,482	31.0%	1.9%	18.4%	98.9%	92.4%	83.5%	99.1%	86.2%	36.0%	4.9%	3.26
2019	1,485	30.2%	1.8%	17.2%	99.1%	92.8%	83.6%	98.9%	85.9%	35.7%	4.2%	3.25
2020	1,522	29.0%	3.2%	16.6%	99.2%	93.4%	84.1%	99.1%	86.7%	35.4%	4.1%	3.25
2021	1,513	28.2%	1.8%	16.1%	99.1%	93.6%	84.5%	99.0%	87.0%	33.6%	3.7%	3.23
2007-2021	4,140	40.3%	12.3%	23.0%	95.3%	89.6%	77.1%	97.8%	83.7%	42.9%	11.8%	3.38

Table 2: Summary of corrected E-index data

This table reports summary information on the fraction of firms that have each of the six E-index provisions from 1990 through 2016 using corrections provided by Larcker, Reiss, and Xiao (2015) and Karthaus, von Meyerinck, and Schmid (2021). Larcker, Reiss, and Xiao (2015) and Karthaus, von Meyerinck, and Schmid (2021) point out that the data available via WRDS (and summarized in Table 1) contain errors, and they use data from SharkRepellent and manual reviews to provide corrected data. Panel A reports corrected data for 1990 – 2006 based on inferences from data in Larcker, Reiss, and Xiao (2015). Panel B reports corrected data for 2007-2016 as reported by Karthaus, von Meyerinck, and Schmid (2021)

		Percentage of firms with the following provisions:						Percentage of firms with at least:				
Year	Number of firms	Classified Board	Poison Pill	Supermajority Vote (Merger)	Limits to Amend Charter	Limits to Amend Bylaw	Golden Parachute	2 Provisions	3 Provisions	4 Provisions	5 Provisions	Average E-Index
Panel A: IRRC (ISS Legacy Data) Governance Data corrected with SharkRepellent and manual review from Larcker, Reiss, and Xiao (2015)												
1990	1,327							67.7%	43..1%	23.3%	13.3%	2.2
1993	1,330							71.2%	47.1%	25.8%	15.1%	2.3
1995	1,365							73.6%	49.5%	29.3%	17.7%	2.3
1998	1,682							74.1%	51.4%	32.7%	18.7%	2.8
2002	1,324							85.1%	69.4%	51.8%	29.6%	3.4
2004	1,594							83.9%	66.8%	49.6%	27.9%	3.3
2006	1,558							81.4%	65.0%	46.1%	23.8%	3.2
Panel B: ISS Governance Data corrected with SharkRepellent and manual review from Karthaus, von Meyerinck, and Schmid (2021)												
2007	1,431	50.5%	39.4%	34.9%	56.8%	43.2%	89.4%	78.7%	60.9%	41.5%	22.9%	3.07
2008	1,459	46.9%	33.7%	33.1%	56.5%	42.9%	90.6%	77.1%	58.7%	40.7%	20.2%	2.97
2009	1,473	44.7%	26.4%	32.1%	56.0%	41.9%	91.8%	74.9%	56.7%	38.1%	17.4%	2.88
2010	1,480	42.5%	20.8%	32.4%	54.7%	41.8%	91.4%	72.3%	55.0%	36.2%	14.9%	2.78
2011	1,469	40.5%	16.9%	29.2%	53.8%	40.6%	91.8%	69.3%	52.3%	32.5%	10.7%	2.62
2012	1,492	37.2%	13.6%	22.8%	53.2%	40.3%	92.2%	68.1%	51.0%	29.1%	8.2%	2.54
2013	1,509	33.9%	10.7%	21.5%	52.8%	39.8%	92.9%	67.0%	49.8%	26.4%	6.4%	2.47
2014	1,491	32.4%	9.9%	20.9%	52.8%	40.6%	93.3%	66.7%	48.5%	25.4%	6.0%	2.44
2015	1,499	32.1%	7.5%	20.4%	52.1%	39.5%	92.9%	65.5%	46.3%	24.6%	5.3%	2.39
2016	1,499	32.7%	5.6%	20.0%	52.4%	38.8%	93.5%	64.7%	45.8%	23.5%	4.7%	2.36
2007-2016	2,126	41%	19%	27%	55%	43%	93%	72%	54%	33%	12%	2.72

Appendix A: Firm-level takeover provision definitions

Anti-greenmail provisions. Greenmail refers to a target firm's tactical response to a takeover bid, wherein the target repurchases its own shares – usually at a premium over the market price – from a potential acquirer holding a large block of shares, in exchange for the blockholder's promise not to seek control of the company for a specified period. Anti-greenmail provisions prevent such arrangements unless the same repurchase offer is made to all shareholders or approved by a shareholder vote.

Blank check preferred stock. Blank check preferred stock is authorized preferred stock for which the board of directors has broad discretion in establishing voting, dividend, and other rights. Blank check preferred stock can be issued to parties friendly to management to block unwanted hostile bids and can also be used as a vehicle to implement a poison pill.

Classified (or staggered) boards. The most common arrangement in classified boards provides for three sized classes of directors, such that only one third of the directors stand for election each year. This makes it more difficult for dissidents or bidders to take control of a target company immediately even if they control a majority of the company's stock. Classified boards provide antitakeover protection not only by forcing a bidder to wait at least one year to gain control of the board, but also by requiring the bidder to win two elections over a longer interval (see Bebchuk, Coates, and Subramanian, 2002).

Compensation plans. Like golden parachutes, compensation plans relate to payments made to executives when their departures are triggered by a takeover, and typically work by accelerating option vesting and other benefits upon a change in control.

Directors' duties. Directors' duties provisions allow directors to consider stakeholders other than shareholders when considering bids and provides boards of directors with a legal basis for rejecting takeovers that benefit shareholders.

Director indemnification. Director indemnification provisions in a firm's bylaws or charter indemnify officers and directors from legal expenses and judgments associated with lawsuits regarding their conduct. In most cases, a firm that adopts such a provision purchases indemnity insurance to cover its risk.

Director indemnification contracts. Director indemnification contracts indemnify particular officers and directors from legal expenses and judgments if lawsuits are filed concerning their conduct. These indemnification contracts sometimes supplement director indemnification provisions present in the firm's bylaws or charter.

Fair price provisions. Fair-price provisions are designed to constrain two-tier offers and are comprised of both fair-price laws and firm-level provisions, which work similarly. Under these provisions (or laws), acquirers must pay all shareholders the highest price paid during a specified period before a tender offer, thus increasing the cost to the acquirer. Most fair price provisions are accompanied by a backstop provision requiring a supermajority vote to circumvent the pricing guidelines.

Golden parachutes. Golden parachutes provide for generous severance payments to target management upon a change in control. Parachutes are granted by the board of directors and did not require a shareholder vote during our sample period.

Limits on action by written consent. Limitations on action by written consent can require unanimous consent, require majority thresholds beyond state law, or eliminate shareholders' rights to act by written consent. The limitations prolong takeover contests and proxy fights because potential buyers must wait until the next annual meeting to oust board members or remove takeover defenses.

Limits to charter amendments. Charter amendment limitations are like bylaw amendment limitations. A common limitation requires a supermajority vote for charter amendments; this requirement is also referred to as a "lock-in" provision.

Limits on director liability. Limitations on director liability are charter amendments that limit directors' personal liability to the extent allowed by state law. They often eliminate personal liability for breaches of the duty of care, but not for breaches of the duty of loyalty or for acts of intentional misconduct or knowing violation of the law.

Limits to shareholder bylaw amendments. These limitations can eliminate the shareholders' ability to amend the bylaws or require a supermajority vote requirement for amendments. Coates (2001) argues that in those firms with no limitation to amend bylaws, shareholders can work around provisions that might impede takeovers.

Limits on special meetings. Limitations to call special meetings restrict shareholders' ability to meet outside of regularly scheduled meetings, adding extra time to takeover contests and proxy fights.

Pension parachutes. Pension parachutes prevent an acquirer from using surplus cash in the pension fund of the target to finance an acquisition. Surplus funds are required to remain the property of the pension fund and to be used for plan participants' benefits.

Poison pills. Poison pills, also known as shareholder rights plans, are relatively complex among takeover defenses, and their terms and conditions vary considerably. Poison pills do not require shareholder approval and typically entitle non-bidder shareholders to special rights (typically to additional shares at deeply discounted prices) in the event of an unsolicited bid. If these rights are exercised, costs become prohibitive for a potential hostile bidder.

Restrictions on cumulative voting. Cumulative voting enables minority shareholders to concentrate their votes and thereby enhance their power to elect directors. Restrictions on this power discourage takeover attempts because dissidents are unable to cumulate their votes to elect one or two dissident-backed directors to the corporate board.

Secret ballot. Firms with these provisions enlist an independent third party (or others sworn to secrecy) to count proxy votes. Typically, the individual proxy votes are also not seen by management. The practice can reduce management pressure on employees or partners who own shares and can reduce potential conflicts of interest for fiduciaries voting others' shares.

Severance agreements. Executive severance agreements compensate high-level executives upon removal. Because these agreements are not contingent upon a change in control (unlike golden parachutes), there is little reason to believe they serve as an incremental deterrent.

Silver parachutes. Silver parachutes provide severance payments to many employees upon a change in corporate control. However, since these do not protect the key decision-makers of merger negotiations, they are unlikely to significantly affect takeover outcomes, unless they considerably increase costs for the acquirer.

Supermajority requirements for mergers. Supermajority voting requirements are charter provisions that require minimum voting thresholds for mergers that exceed the minimum requirements of state law. The provisions typically require two-thirds or more of the outstanding shares for actions that otherwise would require simple majority approval.

Unequal voting. Unequal voting rights refers to when the rights of different common shareholders might be limited or expanded. For example, under time-phased voting, shareholders who own shares for a threshold period of time are granted more votes per share than recent purchasers. Or, for firms with a substantial-shareholder provision, any shareholders who have exceeded an ownership threshold will see their voting power limited.

Appendix B – Major types of state antitakeover laws

Business combination (BC) laws – Business combination laws, also called freeze-out laws, impose a moratorium on significant asset sales or mergers between a large shareholder and the covered firm once the large shareholder's stake passes a threshold level. For example, the New York business combination law prohibits asset sales or a merger with a 20% shareholder for five years. Even after the moratorium, most business combination laws allow the business combination to proceed only if the transaction satisfies fair price provisions. Thus, the typical business combination law is like a fair price law with a forced delay. In most laws, the provisions of the law can be relaxed if the business combination is pre-approved by shareholders or the target firm's board of directors.

Cash-out law. Cash-out laws require any person who acquires a large stake (e.g., 20%) in a firm to notify all other shareholders of the acquisition. All other shareholders are then entitled to sell their shares to the acquirer at a price at least as high as the highest price the acquirer paid in the period over which the large shareholder acquired its shares

Control share acquisition (CS) laws – A Control share acquisition law requires shareholder approval before a large shareholder may vote shares obtained in a control share acquisition. For example, Indiana's control share acquisition law defines a control share acquisition as a series of acquisitions over time that, without the law, would increase a large shareholder's share of the total voting rights to 20%, 33 1/3%, or 50%. To obtain the voting rights associated with the control shares, the large shareholder must receive approval from the majority of all disinterested shares (i.e., shares not owned by the large shareholder or officers of the firm). Many control share acquisition laws are patterned after the Indiana law because in 1987 the U.S. Supreme Court upheld the Indiana law in CTS v. Dynamics Corp. of America.

Directors' duties (DD) laws – Also called constituency laws, directors' duties laws explicitly expand board members' duties to act in the best interests of the company to include the interests of non-investor stakeholders. The effect is to provide legal authorization to justify decisions that do not serve shareholders' interests. Pennsylvania's directors' duties law, for example, states that "… In determining the best interests of the corporation, a director may consider: (1) the interests of the corporation's shareholders, employees, customers, creditors, suppliers and communities in which it is located; (2) the long-term and short-term interests of the corporation, including the possibility that these interests may be best served by its continued independence… The board shall not be required to consider the interests of any particular group as dominant or controlling…or take other action solely because of the effect it might have on the consideration that might be paid to shareholders in an acquisition."

Fair price (FP) laws – Fair price laws impose restrictions that are similar to fair price provisions adopted by many firms. The law regulates the back-end price in a two-tiered takeover bid or other significant business combination involving a large shareholder. The typical fair price law prohibits business combinations between the firm and a large stockholder unless one of two conditions is met. Either (1) prior approval is granted by a supermajority (e.g., 80%) of all outstanding voting stock and by a supermajority (e.g., two-thirds) of the outstanding stock not held by the interested stockholder; or (2) stockholders receive a stipulated price for the stock acquired by the large stockholder as part of the business combination. The stipulated price is set by a formula that guarantees the price paid will be very high.

Poison pill (PP) laws – Poison pill laws, also known as poison pill endorsement laws, grant firms that are covered by the law the right to adopt poison pill takeover defenses. For example, Virginia's poison pill law authorizes a corporation to "… issue rights, options or warrants for the purchase of shares of the company upon such terms and conditions and for such consideration, if any, and such purposes as may be approved by the board of directors." Poison pill laws can be important because the right to use a poison pill defense is more secure when explicitly authorized by statute and is less likely to be limited by court action.

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