# Managerial discretion and efficiency of internal capital markets☆

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ABSTRACT

I use the staggered adoption of state-level antitakeover laws to provide causal evidence that managerial agency problems reduce the allocative efficiency of conglomerate firms. I find that increases in control slack following the passage of antitakeover laws reduces *q*-sensitivity of investment by 64%. The adverse impact of the laws appears mostly at conglomerate firms that benefited from disciplinary takeover threats prior to the passage of the laws, lacked alternative sources of pressure on management, or had the structural makings to fuel wasteful influence activities and power struggles among managers. These findings suggest that takeover threats impact the efficiency of resource allocation.

## 1. Introduction

Do managerial agency problems affect the allocative efficiency of internal capital markets? This question is important for at least two reasons. First, much of corporate investment relies on the internal resources of firms. Second, the internal capital markets of conglomerate firms allow managers to make sizable transfers across different business units, effectively bypassing the allocative discipline of external capital markets.

My empirical strategy builds on the long-held view of economists that corporate control markets mitigate agency problems by subjecting badly-managed firms to takeover threats (Manne, 1965; Jensen and Meckling, 1976). Following the approach pioneered by Garvey and Hanka (1999) and Bertrand and Mullainathan (1999), I use the staggered adoption of state-level antitakeover laws in the United States throughout the 1980s and 1990s as quasi- random shocks that increase slack in corporate control to test whether agency problems affect the efficiency of capital allocation in internal capital markets.

In thinking about how resource allocation decisions within a firm differ from those in the marketplace, several models of internal capital markets in the literature point to influence activities and power struggles in large organizations as fundamental sources of inefficiency in the resource allocation process (Rajan et al., 2000; Scharfstein and Stein, 2000). While models with agency frictions differ in their setups and mechanisms, they share the general prediction that resources would be allocated less efficiently than a first-best benchmark involving pure profit maximization. In particular, they predict a form of corporate socialism in which weaker business

units receive more capital resources than they deserve at the expense of stronger business units due to residual agency problems. This paper provides causal evidence that managerial agency problems lessen the extent of winner-picking behavior at conglomerate firms.

Following the literature, my baseline specifications compare the investment behavior of conglomerate segments and standalone firms over time — before and after the passage of state-level antitakeover laws — by estimating the responsiveness of capital expenditures to industry investment opportunities as measured by industry $q$. This empirical approach to gauging the degree of winner-picking behavior with so-called $q$-sensitivity of investment is motivated by many models of internal capital markets. I also note that my empirical strategy of using antitakeover laws as quasi-random shocks combined with estimating within-firm changes in $q$-sensitivity of investment helps address concerns in the literature about possibly biased inferences due to mismeasurement of investment opportunities.

The main finding in this paper is that conglomerate segments exhibit significantly lower $q$-sensitivity of investment following the passage of antitakeover laws, while the investment behavior of standalone firms remains remarkably stable during the same time. The evidence on standalone firms helps address potentially unobservable changes in the determinants of investment responsiveness such as adjustment costs that happen to coincide with the passage of antitakeover laws as an alternative explanation. Fig. 1, which plots the $q$-sensitivity of investment of conglomerate segments and standalone firms in event time, shows that the change in the investment behavior of conglomerate segments occurs right around the passage of antitakeover laws. In terms of economic magnitude, the $q$-sensitivity of investment drops by 64% for conglomerate segments, implying a significant role for agency frictions in explaining inefficiencies in internal capital markets. Additionally, the figure reveals no significant difference in the $q$-sensitivity of investment for conglomerate segments and standalone firms prior to the adoption of antitakeover laws, consistent with the parallel trends assumption. It shows that the significant difference in investment-$q$ sensitivity between conglomerate segments and standalone firms emerges following the passage of antitakeover laws.

I conduct a battery of tests to check the robustness of this result. First, following Karpoff and Wittry (2018), I eliminate observations where the treatment might not be considered exogenous or effective for the firms involved. Second, following Cain et al. (2017), I focus on a subset of antitakeover laws that had the most negative impact on ex-post takeover rates. Third, I use alternative $q$ proxies to mitigate potential concerns about measurement error in $q$. Fourth, as an alternative to investment-$q$ regressions, I examine changes in the overall efficiency of internal allocations (or transfers) between the different segments of conglomerate firms (Rajan et al., 2000) around the passage of state antitakeover laws. Finally, I test whether the estimated effect of antitakeover laws is sensitive to different sampling and clustering assumptions as well as the inclusion of additional controls. All the results confirm my main finding that the passage of antitakeover laws led to large reductions in the $q$-sensitivity of investment for segments of conglomerate firms.

The cross-sectional tests point to significant heterogeneities in the response of conglomerate firms to the passage of antitakeover laws. First, the reduction in $q$-sensitivity of investment is more pronounced at smaller conglomerates and conglomerate segments in industries with high level of M&A activity for which the market for corporate control previously provided stronger discipline. Second, the reduction in $q$-sensitivity of investment is smaller for conglomerates with higher financial leverage, more concentrated ownership, and conglomerate segments in competitive industries, suggesting that the presence of alternative control mechanisms that discipline management reduces the adverse effect of antitakeover laws on allocative efficiency in internal capital markets. Third, the drop in $q$-sensitivity of investment is larger for conglomerates with greater diversity of investment opportunities, lending direct support to the prediction of Rajan et al. (2000) regarding the distortionary impact of internal power struggles on the efficiency of capital allocations within conglomerates.

Overall, the adverse impact of the laws appears mostly at conglomerate firms that benefited from disciplinary takeover threats prior
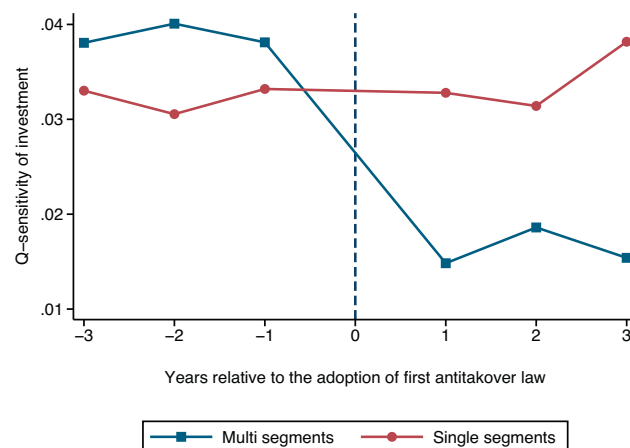


**Fig. 1.** $q$-sensitivity of investment around the adoption of first second-generation state antitakeover law.
This figure presents how investment-$q$ sensitivity of standalone (single-segment) and conglomerate (multi-segment) firms react to the passage of first second-generation state antitakeover law.

to the passage of the laws, lacked alternative sources of pressure on management, or had the structural makings to fuel wasteful influence activities and power struggles among managers. These results show that the efficiency of internal capital markets dropped in economically predictable ways following the passage of state-level antitakeover laws, helping to address potential concerns that my main finding might be spurious.

This paper contributes causal evidence on managerial agency problems matter for the workings of internal capital markets as predicted by models of internal capital markets with agency frictions (Rajan et al., 2000; Scharfstein and Stein, 2000; Ozbas, 2005). My empirical strategy uses increases in control slack following the passage of antitakeover laws to test directly for the presence of agency frictions in the allocation of resources within firms. In addition, the relatively large magnitude of the causal estimates reinforces the importance of agency frictions in models of internal capital markets, and complements the structural estimates of Matvos and Seru (2014). Moreover, the causal approach used in this paper addresses an important empirical critique in the literature that findings of inefficient cross- subsidization and valuation discount at conglomerate firms (Lamont, 1997; Shin and Stulz, 1998; Scharfstein, 1998; Rajan et al., 2000; Gertner et al., 2002) reflect omitted factors or selection problems (Campa and Kedia, 2002; Villalonga, 2004; Chevalier, 2004; Colak and Whited, 2007).

This paper follows previous research in using antitakeover laws as shocks to corporate control to shed light on the nature of managerial preferences. The main conclusion from that line of research is that managerial behavior appears most consistent with "quiet-life" preferences (Bertrand and Mullainathan, 1999, 2003) — uncontrolled managers prefer to avoid personally difficult decisions such as shutting down old plants or containing employees' wage demands. My main finding that uncontrolled managers engage in less winner-picking is also consistent with quiet-life preferences if managers find it personally costly to turn down requests for resources from undeserving business units due to social ties, internal politics, and so forth.

This paper is also related to the literature on mergers and acquisitions, and specifically research that views the takeover market as a source of managerial discipline (Manne, 1965) in addition to reallocating assets to their best uses in the economy (Jovanovic and Braguinsky, 2004). My analysis integrates those two views of the takeover market, and establishes a new channel through which the takeover market drives the efficiency of resource allocation in the economy — reductions in the threat of takeovers lead to reductions in the efficiency of internal capital markets where much of resource allocation takes place in the economy.

Finally, this paper is related to studies that examine the effect of managerial power and connections on internal capital allocations in conglomerate firms (Duchin and Sosyura, 2013; Glaser et al., 2013). Glaser et al. (2013), in particular, study the internal capital market of one conglomerate and show that more powerful and better connected business unit managers receive larger capital allocations following cash windfalls, which reflects inefficient internal resource allocation. More broadly, this paper is related to the literature that examines whether internal governance mechanisms (Denis et al., 1997; Lins and Servaes, 2002; Hoechle et al., 2012; Chen and Chen, 2012) matter for the relative efficiency of conglomerate and standalone forms of organization. The causal empirical strategy for agency problems in this paper strengthens the agency interpretation of much evidence.

The rest of the paper is organized as follows. Section 2 provides a description of state-level antitakeover laws. Section 3 describes the data and provides summary statistics. Section 4 examines the impact of antitakeover laws on the *Q*-sensitivity of investment of standalone firms and conglomerate segments. Section 5 presents robustness checks. Section 6 presents cross-sectional heterogeneity in the effect of antitakeover laws. Section 7 concludes the paper.

## 2. Background on antitakeover laws

In this section, I provide a brief history of antitakeover laws and summarize empirical evidence on how those laws affect hostile takeover rates and managerial decisions. More detailed discussions are available in a number of papers, including Catan and Kahan (2016), Cain et al. (2017), and Karpoff and Wittry (2018).

### 2.1. The Williams Act

The history of antitakeover legislation dates back to the Williams Act that was enacted in 1968 in response to a wave of coercive cash tender offers in the 1960s. Prior to the Act, hostile bidders could quietly accumulate shares on the open market or make cash tender offers to shareholders, a substantial majority of which were uninformed individual investors, on a compressed timetable with little or no disclosure. Whereas federal securities laws provided disclosure requirements for proxy fights and stock-for-stock exchanges to help shareholders make informed decisions in control contests, no laws applied to cash tender offers. The Act was introduced by the United States Congress to fill this legal gap (Sautter, 2016).

Among other things, the Act and a subsequent amendment in 1970 require investors to report stock accumulations by filing a disclosure statement with the SEC within ten days of acquiring a beneficial ownership of more than 5% in a public company, to indicate whether they are seeking to acquire control of the company, and to disclose further information if the intent is to acquire control. In addition, investors are subject to disclosure requirements prior to any tender offer if it would lead to a greater than 5% beneficial ownership. Cain et al. (2017) find that while there was no significant change in the incidence of hostile takeovers following the passage of the Williams Act, the likelihood of a hostile bid conditional on an acquisition was significantly diminished.

The literature considers several other developments to also have had a significant impact on the market for corporate control since the Williams Act. First, institutional shareholders with stronger incentives and better resources to stay informed and to actively participate in governance gradually replaced individual shareholders. Second, states adopted antitakeover statutes making it difficult for their home corporations to be acquired without management's approval. Third, companies began devising their own takeover deterrents such as poison pills and staggered boards.

## 2.2. First-generation antitakeover laws

Researchers often refer to state antitakeover statutes that were adopted before 1982 as first-generation laws, and those that were adopted after 1982 as second-generation laws. First-generation laws were invalidated by a United States Supreme Court decision (*Edgar v. MITE Corp.*) on June 23, 1982; before 1982, those laws provided firms incorporated in 38 different states protection against unwanted acquisitions bids (Karpoff and Wittry, 2018) although it is also worth noting that several lower courts had already invalidated some of the first-generation laws before the Supreme Court decision.

As Jarrell and Bradley (1980) explain, first-generation laws included provisions that (i) required bidders to alert the management of the target company before announcing a tender offer and hold longer tender periods than in the past; (ii) allow state commissioners to evaluate the legality of tender offers upon request by the target company, and seek injunction in state courts if deemed necessary; and (iii) hold the bidder liable for damages from violations of the disclosure and administrative procedures established under the law. These provisions gave managers more time to prepare defenses against unwanted bids or to solicit alternative bids. They also increased bidders' expected costs.

Past studies provide mixed evidence on the extent of takeover protection provided by first- generation laws. On the one hand, consistent with first-generation laws increasing bidders' expected costs in hostile takeovers, Jarrell and Bradley (1980) find that takeover premiums increased significantly following the adoption of those laws. On the other hand, Cain et al. (2017) find no significant relation between first-generation laws and the incidence of hostile takeovers.

## 2.3. Second-generation antitakeover laws

Recent studies that examine the causal effect of managerial slack on corporate policies commonly use the staggered adoption of second-generation antitakeover laws for empirical identification.[1] I use the same identification strategy to study the effect of managerial slack on the efficiency of resource allocation within conglomerate firms.

As Karpoff and Wittry (2018) explain, there are five major types of second-generation laws:

(i) business combination (BC) laws, (ii) control share acquisition (CS) laws, (iii) fair price (FP) laws, (iv) directors' duties (DD) laws, and (v) poison pill (PP) laws. Table 1 lists the adoption years of those laws by state.

*BC laws*, also known as "freeze-out" laws, prevent a large shareholder from engaging in any business combination (e.g., significant asset purchase or merger) with the target firm for a specified number of years unless the business combination is pre-approved by the shareholders and the board of directors of the target company. *CS laws* require a large shareholder seeking to obtain a significant fraction of the voting rights in the company (e.g., 20% or 50%) to receive approval from the majority of the remaining shareholders (excluding the officers of the company). *FP laws* require a bidder to either receive a super-majority shareholder approval or pay the highest share price paid during a specified period of time before the beginning of a tender offer. *DD laws*, also known as constituency laws, give directors the right to reject a tender offer that is not in the best interest of non-investor stakeholders (e.g., employees or customers) even if the transaction is attractive to the company's shareholders. *PP laws* grant firms the right to adopt poison pills as takeover defenses.

There is no consensus in the literature on which of these laws offer the greatest protection from unsolicited takeovers and how different types of laws interact with each other (Catan and Kahan, 2016; Karpoff and Wittry, 2018; Cain et al., 2017). Cheng et al. (2004) state that the adoption of subsequent laws in a given state may be eased by the passage of the first law. They argue that only the enactment of the first law can be considered truly exogenous since the passage of one law may stimulate the passage of other types of laws. Following their argument, rather than making an assumption about the relative importance of the different types of laws, I consider the adoption of the first second-generation antitakeover law in a firm's state of incorporation as an exogenous shock.[2,3]

## 3. Data and summary statistics

The segment-level data come from Compustat historical segment files, which provide coverage going back to 1976.[4] The segment files provide annual accounting information such as sales, assets, capital expenditures, operating profits, and depreciation at the segment level. In addition, I obtain annual firm-level data from Compustat industrial files. I cross-validate annual segment sales with annual firm-level sales and drop observations for which the sum of segment sales is not within 25% of the firm's total sales. I further exclude segment observations with (i) name "other", (ii) incomplete data on sales, assets, capital expenditures, depreciation, or operating profits, (iii) anomalous accounting data (zero depreciation, capital expenditures greater than sales or assets, negative capital expenditures), and (iv) firm-level sales less than $20 million in 1982 dollars using the Bureau of Labor Statistics producer price index

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[1] Table A1 of Karpoff and Wittry (2018) provides a summary of 75 empirical papers that use the passage of antitakeover laws for identification.

[2] In Section 5, I check the robustness of the results to this assumption.

[3] Several states passed multiple laws in one year (Arizona, Idaho, Indiana, Nebraska, Rhode Island, and South Dakota) and several states passed only one law (Colorado, Delaware, North Dakota, New Mexico, and Vermont). Internet Appendix Table IA.10 presents similar findings for the subsamples of firms that are incorporated in these states and the results are consistent with the main results.

[4] In order to address potential concerns that the adoption of antitakeover laws affects firms' segment reporting decisions, I estimate firm-level specification and show that the passage of antitakeover laws has no impact on the number of reported segments at the firm-level. These results are available upon request.

**Table 1**

The adoption year of second-generation antitakeover laws by state.

| State | Business combination (BC) | Control share acqusition (CS) | Fair price (FP) | Directors' duty (DD) | Poison pill (PP) |
|---|---|---|---|---|---|
| Alaska | – | – | – | – | – |
| Alabama | – | – | – | – | – |
| Arkansas | – | – | – | – | – |
| Arizona | 1987 | 1987 | 1987 | 1987 | – |
| California | – | – | – | – | – |
| Colorado | – | – | – | – | 1989 |
| Connecticut | 1988 | – | 1984 | 1988 | 2003 |
| Delaware | 1988 | – | – | – | – |
| Florida | – | 1987 | 1987 | 1989 | 1989 |
| Georgia | 1988 | – | 1985 | 1989 | 1988 |
| Hawaii | – | 1985 | – | 1989 | 1988 |
| Iowa | 1997 | – | – | 1989 | 1989 |
| Idaho | 1988 | 1988 | 1988 | 1988 | 1988 |
| Illinois | 1989 | – | 1985 | 1985 | 1989 |
| Indiana | 1986 | 1986 | 1986 | 1986 | 1986 |
| Kansas | 1989 | 1988 | – | – | – |
| Kentucky | 1986 | – | 1984 | 1988 | 1988 |
| Louisiana | – | 1987 | 1984 | 1988 | – |
| Massachusetts | 1989 | 1987 | – | 1989 | 1989 |
| Maryland | 1989 | 1989 | 1983 | 1999 | 1999 |
| Maine | 1988 | – | – | 1985 | 2002 |
| Michigan | 1989 | 1988 | 1984 | – | 2001 |
| Minnesota | 1987 | 1984 | 1991 | 1987 | 1995 |
| Missouri | 1986 | 1984 | 1986 | 1986 | 1999 |
| Mississipi | – | 1990 | 1985 | 1990 | 2005 |
| Montana | – | – | – | – | – |
| North Carolina | – | 1987 | 1987 | 1993 | 1989 |
| North Dakota | – | – | – | 1993 | – |
| Nebraska | 1988 | 1988 | – | 1988 | – |
| New Hampshire | – | – | – | – | – |
| New Jersey | 1986 | – | 1986 | 1989 | 1989 |
| New Mexico | – | – | – | 1987 | – |
| Nevada | 1991 | 1987 | 1991 | 1991 | 1989 |
| New York | 1985 | – | 1985 | 1987 | 1988 |
| Ohio | 1990 | 1982 | 1990 | 1984 | 1986 |
| Oklahoma | 1991 | 1987 | – | – | – |
| Oregon | 1991 | 1987 | – | 1989 | 1989 |
| Pennsylvania | 1988 | 1990 | 1988 | 1990 | 1988 |
| Puerto Rico | – | – | – | – | – |
| Rhode Island | 1990 | – | 1990 | 1990 | 1990 |
| South Carolina | 1988 | 1988 | 1988 | – | 1998 |
| South Dakota | 1990 | 1990 | 1990 | 1990 | 1990 |
| Tennessee | 1988 | 1988 | 1988 | 1988 | 1989 |
| Texas | 1997 | – | – | 2003 | 2003 |
| Utah | – | 1987 | – | – | 1989 |
| Virginia | 1988 | 1989 | 1985 | 1988 | 1990 |
| Vermont | – | – | – | 1998 | – |
| Washington | 1987 | – | 1985 | – | 1998 |
| Wisconsin | 1987 | 1984 | 1984 | 1987 | 1987 |
| West Virginia | – | – | – | – | – |
| Wyoming | 1989 | 1990 | – | 1990 | – |

for finished goods (WPUSOP3000). Moreover, I exclude segments with a missing SIC code, a one-digit SIC code of 6 (financial firms) or 9 (government firms) and a two-digit SIC code of 49 (regulated utilities).[5] Furthermore, I drop firms incorporated outside of the United States and firms with missing information on their state of incorporation.

Compustat reports only the recent state of incorporation, which may differ from the historical one if a firm changed its state of incorporation. However, Gormley and Matsa (2016) note that the use of the most recent states of incorporation instead of historical states of incorporation does not have a significant impact on their estimates. They also state that the relative to the most recent version of Compustat, historical data change the state of incorporation for about 6% of their observations. Firms may respond to changes in takeover laws by reincorporating from one state to another. For example, if a currently incorporated state passes a law that affects a firm negatively, a firm may choose to reincorporate in another state. Cain et al. (2017) examine the reincorporation of firms and show that the majority of reincorporations are to Delaware and no other state comprises more than 4% of reincorporations over their sample

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[5] Internet Appendix Table IA.8 shows that the results are robust to excluding all segments of conglomerates with a financial segment from my sample.

period, suggesting that firms do not reincorporate to other states that offer stronger or weaker takeover laws. Heider and Ljungqvist (2015) examine the impact of changes in states' corporate income tax rates on firms' use of debt. They show that using Compustat's states of incorporation data yields more conservative estimates, and it does not alter their findings.

I end the sample period in 2006 because the last state antitakeover law is passed in 2005 and the financial crisis occurs in 2007 and 2008. These selection criteria yield 48,810 segment-year observations for 7,189 standalone (or single-segment) firms and 66,286 segment-year observations for 3,132 conglomerate (or multi-segment) firms over the period from 1977 through 2006.

Table 2 provides descriptive statistics for standalone firms and conglomerate segments in the sample. Segment capital expenditure is Compustat segment item CAPXS. Segment cash flow is the sum of operating profits (OPS) and depreciation (DPS). I scale both measures by segment sales. To reduce the potential influence of outliers on the results, I winsorize both ratios at the top and bottom 1% of their full sample distributions. Firm age equals the natural logarithm of one plus the number of years since the firm is first listed in Compustat.[6] I compute Tobin's $q$ for standalone firms following the data definition of Kaplan and Zingales (1997) and bound it above at 10 by dividing the market value of assets by the sum of 0.1 times the market value of assets and 0.9 times the book value of assets to reduce the effect of potential measurement error in the book value of assets (Ozbas and Scharfstein, 2010).[7] The market value of assets is equal to the book value of assets (AT) plus the market value of common equity (CSHO x PRCC F) less the book value of common equity (CEQ) and balance sheet deferred taxes (TXDB). Industry $q$ in a given year is the median Tobin's $q$ of standalone firms operating within the same two-digit SIC code industry in that year (one-digit SIC codes are too broad to form industries and there can be too few standalone firms operating in a given three-digit SIC code industry; the alternative of using the narrowest SIC grouping with a sufficient number of standalone firms has the disadvantage of introducing time-varying measurement error in industry $q$).[8]

Table 2 shows that standalone firms are on average younger than conglomerate firms. They are also smaller than conglomerate segments as measured by sales ($767 million versus $845 million). In addition, they are less profitable than conglomerate segments as measured by the cash flow to sales ratio (10.9% versus 13.1%), and they tend to operate in industries with better investment opportunities than conglomerate segments do as proxied by industry $q$ (1.39 versus 1.29).

## 4. Antitakeover Laws and Internal capital markets

My main research question is whether managerial agency problems lead to distortions in the allocation of the capital budget across multiple business units. Specifically, models of internal capital markets with agency problems predict a form of corporate socialism in which weaker business units receive a bigger share of the firm's capital budget than they deserve at the expense of stronger business units. The literature has found evidence generally consistent with this prediction: conglomerate firms tend to allocate more resources to segments in low-$q$ industries and fewer resources to segments in high-$q$ industries, compared to standalone firms (Rajan et al., 2000; Ozbas and Scharfstein, 2010; Matvos and Seru, 2014). This paper adds to the existing literature by providing causal evidence that managerial agency problems lessen the extent of winner-picking behavior at conglomerate firms.

The empirical strategy is to use the passage of state antitakeover laws as a quasi-random shock to managerial slack to test the agency view. If agency problems arising from managerial slack distort internal capital market allocations, I would expect the distortions to intensify after the adoption of state antitakeover laws that increase managerial slack. Comparing conglomerate segments and standalone firms, I would expect (i) conglomerate segments to exhibit lower $q$-sensitivity of investment following the adoption of state antitakeover laws, and (ii) the wedge between the $q$-sensitivity of investment of conglomerate segments and standalone firms to widen since standalone firms do not allocate resources across multiple business units.

The most important feature of the empirical strategy from an identification standpoint is that different states adopted their second-generation antitakeover laws at different times. This allows me to cleanly estimate changes in investment behavior due to changes in agency problems with the plausible identifying assumption that the staggered adoption of state-level antitakeover laws is orthogonal to other potentially omitted determinants across firms and over time. In addition, I can use firm fixed effects to control for time-invariant differences in the way firms allocate resources for reasons other than agency frictions. Put differently, firms serve as "controls" for themselves until they are "treated" with the passage of antitakeover laws in their respective states of incorporation. Similarly, I can use time fixed effects to control for general trends in the way firms allocate resources (perhaps due to changes in taxes, the business cycle, and so forth) because at any point in time, firms in states that have not yet passed antitakeover laws serve as "controls" for "treated" firms in states that have passed antitakeover laws.

In addition, I can use the impact of state antitakeover laws on the investment behavior of standalone firms as a benchmark for conglomerate segments to address the possibility of an unspecified antitakeover law effect (perhaps via changes in real or financial adjustment costs). In essence, standalone firms provide further economic identification for changes in investment behavior for reasons other than internal capital markets since there is no reason to believe that the staggered adoption of state antitakeover laws would be related to omitted differences that endogenously determine organizational form and investment behavior.

Eq. (1) shows the baseline specification:

$$Investment_{ijt} = \beta_1 q_{ijt-1} + \beta_2 Post_{it} + \beta_3 q_{ijt-1} \times Post_{it} + \gamma X_{ijt} + \alpha_i + \lambda_t + u_{ijt} \tag{1}$$

Here, subscript $i, j$, and $t$ denote firm, segment, and year, respectively; $\alpha_i$ and $\lambda_t$ are firm- and year-specific fixed effects; $X$ is a matrix

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[6] Internet Appendix Table IA.7 shows the robustness of the results to defining firm age as the number of years that a firm has been in Compustat.
[7] Internet Appendix Table IA.3 shows the robustness of the results to using non-bounded Q.
[8] Internet Appendix Table IA.4 shows the robustness of the results using industry mean Q.

**Table 2**
Descriptive statistics.

| Variables | Standalone firms | | Conglomerate segments | |
|---|---|---|---|---|
| | Mean | S.D. | Mean | S.D. |
| Segment Sales | 767 | 3,172 | 845*** | 3,702 |
| Segment Assets | 696 | 3,231 | 697 | 3,036 |
| Segment CapEx | 55 | 320 | 52 | 278 |
| Segment Cash Flow | 102 | 543 | 118*** | 521 |
| Segment CapEx/Sales | 0.075 | 0.109 | 0.067*** | 0.103 |
| Segment Cash Flow/Sales | 0.109 | 0.155 | 0.131*** | 0.155 |
| Industry $q$ | 1.39 | 0.33 | 1.29*** | 0.33 |
| Firm age | 2.24 | 0.85 | 2.97*** | 0.73 |
| N | 48,810 | | 66,286 | |

This table provides descriptive statistics for the characteristics of standalone firms and conglomerate segments in the sample. The sample period is from 1977 to 2006. Data on segment and firm financial characteristics come from Compustat segment files and annual industrial files, respectively. Industry $q$ is the median $q$ of standalone firms that operate within the industry. In computing standalone $q$'s, I follow the data definition of Kaplan and Zingales (1997). Industry is defined at the level of two-digit SIC codes. Firm age is the natural logarithm of one plus the number of years since the firm's first appearance in Compustat. *, **, and *** denote that the mean of standalone firms is significantly different from the mean of conglomerate segments at the 10%, 5% and 1% level, respectively (based on a two-tailed $t$-test, assuming unequal variances).

of segment and firm characteristics including segment cash flow-to-sales ratio and segment size as well as firm age; and $u$ is the random error term. The dependent variable, *Investment*, is the ratio of segment capital expenditure to sales. I scale capital expenditures with sales instead of assets because firms have less discretion in allocating sales across business units and there can be vintage effects with assets that are recorded at historical cost.[9] *Post* is an indicator variable that is equal to one after the adoption of one of the five major antitakeover laws in firm $i$'s state of incorporation.[10] $q$, the proxy for segment investment opportunities, is the median $q$ of standalone firms that operate in the segment's industry in year $t - 1$. The main coefficient of interest in Eq. (1) is $\beta_3$, the effect of state antitakeover laws on the $q$-sensitivity of investment. I report standard errors that are heteroscedasticity-consistent and clustered at the firm level.[11]

Table 3 reports the baseline regression results for standalone firms (column 1) and conglomerate segments (column 2). An interesting first result is that the $q$-sensitivity of investment for conglomerate segments is not smaller than that for standalone firms prior to the passage of state antitakeover laws. Although the coefficient estimate on $q$ for conglomerate firms (0.039 in column 2) is larger than the corresponding estimate for standalone firms (0.031 in column 1), as shown in column 3, the difference between the two estimates is not statistically significant ($p$-value = 0.415).

Turning to the effect of state antitakeover laws, I find no discernible effect on the $q$-sensitivity of investment for standalone firms. The coefficient estimate on $q \times Post$ is small (0.001 in column 1) and statistically insignificant. I interpret this benchmark result as there being no "fundamental" effect of antitakeover laws (perhaps labor-, capital-, or adjustment- cost driven, or through technology and innovation) on standalone firms' $q$-sensitivity of investment. Also, there is no evidence that the level of investment by standalone firms is affected. The coefficient estimate on *Post* is positive (0.012 in column 1), but it is not statistically significant at conventional levels.

In contrast to the evidence of little or no impact on the investment behavior of standalone firms, I find that the $q$-sensitivity of investment for conglomerate segments is reduced by 0.025 ($q \times Post$ in column 2), or by 64 percentage points relative to the pre-treatment level following the passage of antitakeover laws. In addition to being economically large, the estimate is also statistically significant at the 1% level.[12] As shown in column 3, a comparison of the estimates in columns 1 and 2 rejects the hypothesis that the change in the $q$-sensitivity of investment is equal for standalone firms and conglomerate segments ($p$-value = 0.006).

Moreover, conglomerate segments invest unconditionally more after the adoption of state antitakeover laws as evidenced by a statistically significant coefficient estimate on *Post* (0.047 in column 2). This estimate is also statistically different from the insignificant estimate for standalone firms ($p$-value = 0.007), as shown in column 3. Combined with the decline in the $q$-sensitivity of investment for conglomerate segments, the regression evidence in column 2 shows a significant deterioration in the efficiency of resource allocation within the internal capital markets of conglomerate firms.

Overall, the evidence in Table 3 is broadly supportive of models with agency frictions in explaining inefficiencies in internal capital markets.

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[9] Internet Appendix Table IA.2 shows the robustness of the results to scaling capital expenditures by assets.

[10] *Post* changes from zero to one when antitakeover laws become effective during fiscal year $t$ in firm $i$'s state of incorporation. The results are robust to excluding the first year in which an antitakeover law becomes effective.

[11] Internet Appendix Table IA.1 shows the robustness of the results to controlling for other segments' cash flow and IA.6 shows the robustness to using segment fixed effects instead of firm fixed effects.

[12] In order to show that the documented change takes place after the adoption of antitakeover laws, following Bertrand and Mullainathan (2003) and Atanassov (2013) I also investigate the dynamic effect of antitakeover laws on the $q$-sensitivity of investment for conglomerate segments. Consistent with the causal interpretation of the reported results, I confirm that there is no relation between antitakeover laws and the $q$-sensitivity of investment before the introduction of antitakeover laws and the $q$-sensitivity of investment for conglomerate segments drops significantly following the passage of antitakeover laws. These results are not reported for brevity but are available upon request.

**Table 3**

Investment-$q$ sensitivity before and after the passage of antitakeover laws.

| | Investment$_t$ | | |
| --- | --- | --- | --- |
| | (1) | (2) | |
| Explanatory variables | Standalone firms | Conglomerate segments | *p*-value difference |
| $q_{t-1}$ | 0.031*** | 0.039*** | 0.415 |
| | (0.008) | (0.006) | |
| Post$_t$ | 0.012 | 0.047*** | 0.007 |
| | (0.010) | (0.008) | |
| $q_{t-1}$ x Post$_t$ | 0.001 | −0.025*** | 0.006 |
| | (0.007) | (0.006) | |
| CF$_t$ | 0.063*** | 0.195*** | 0.000 |
| | (0.018) | (0.019) | |
| CF$_t$ x Post$_t$ | −0.084*** | −0.095*** | 0.688 |
| | (0.019) | (0.019) | |
| Age$_t$ | −0.021*** | −0.007** | 0.000 |
| | (0.002) | (0.003) | |
| Size$_t$ | −0.004** | −0.013*** | 0.000 |
| | (0.002) | (0.001) | |
| Firm FEs | Yes | Yes | |
| Year FEs | Yes | Yes | |
| N | 48,810 | 66,286 | |
| $R^2$ | 0.058 | 0.080 | |

This table reports the effect of second-generation state-level antitakeover laws on the $q$-sensitivity of investment for standalone firms in column (1) and conglomerate segments in column (2) by estimating the following equation:

$$Investment_{ijt} = \beta_1 q_{ijt-1} + \beta_2 Post_{it} + \beta_3 q_{ijt-1} \times Post_{it} + \gamma X_{ijt} + \alpha_i + \lambda_t + u_{ijt}.$$

Subscripts $i$, $j$, and $t$ denote firm, segment, and year, respectively. $\alpha_i$ and $\lambda_t$ are firm- and year-specific fixed effects, respectively. *Post* is an indicator variable that equals one after the firm's state of incorporation enacts a second-generation antitakeover law for the first time. *X* is a matrix of control variables that include segment cash flow to sales (and its interaction with *Post*), as well as the natural logarithm of segment sales and firm age defined as the number of years since first appearance in Compustat. The sample period is from 1977 through 2006. Standard errors that are heteroscedasticity-consistent and clustered at the firm level are reported in parentheses beneath coefficient estimates. *, **, and *** denote significance at the 10%, 5% and 1% level, respectively. The *p*-values of differences between coefficients in columns (1) and (2) are calculated using seemingly unrelated regressions.

## 5. Robustness checks

I conduct a large number of tests to check the robustness of the results reported in Table 3. This section provides a summary of the findings.

### 5.1. Exogeneity of treatment

As Karpoff and Wittry (2018) explain, state antitakeover laws might not be considered exogenous for firms that lobbied for the adoption of those laws, and do not apply to firms that opted out of coverage by the laws. Exogeneity is also violated when antitakeover laws require firms to opt into coverage. To minimize concerns about endogenous treatment as well as potential measurement error in treatment status, I estimate the baseline specification after excluding lobbyists, opt-outs, and 173 firms incorporated in Tennessee and Georgia where some antitakeover laws require companies to opt into coverage. I obtain the list of companies that lobbied for the passage of their states' antitakeover laws from Gartman (2000) who identified a total of 46 lobbyists in 23 different states. In most cases, the lobbyists were targets of an actual or a rumored acquisition bid. The list of firms that opted out of antitakeover laws comes from the Risk Metrics Governance database which indicates that 171 firms in the sample opted out of at least one state antitakeover law for one calendar year or more during 1990–2006. As shown in Panel A of Table 4, the exclusion of lobbyists, opt-outs, and firms incorporated in Tennessee and Georgia does not have any discernible effect on the results, which mitigates potential concerns with endogenous treatment.

Catan and Kahan (2016) argue that firms can choose their states of incorporation and they have the option to reincorporate to states that offer a level of antitakeover protection that best suits their needs. Cain et al. (2017) show that the majority of reincorporations are to Delaware. Additionally, about half of my sample firms are incorporated in Delaware. Since all Delaware firms receive the shock in the same year, another potential concern might be that the impact of antitakeover laws is concentrated in firms incorporated in Delaware. Hence, in order to address potential concerns about Delaware's concentration in the sample and endogenous treatment as a result of reincorporation decisions, I estimate the baseline specification excluding firms incorporated in Delaware. The results reported in Panel B of Table 4 confirm that the exclusion of firms incorporated in Delaware does not alter my findings.

### 5.2. First-generation state antitakeover laws

Karpoff and Wittry (2018) argue that accounting for the existence of first-generation state antitakeover laws could reverse

**Table 4**

Exogeneity and effectiveness of antitakeover laws.

| | Explanatory variables | | | | N/ $R^2$ |
|---|---|---|---|---|---|
| | $q_{t-1}$ | $Post_t$ | $q_{t-1}$ x $Post_t$ | Other controls | |
| Panel A: Excluding Lobbyists, Opt-outs, and Firms Incorporated in GA and TN | | | | | |
| (1) Stand-alone | 0.031*** | 0.010 | 0.002 | Yes | 46,123 |
| | (0.008) | (0.011) | (0.008) | | 0.058 |
| (2) Conglomerate | 0.040*** | 0.047*** | −0.026*** | Yes | 61,381 |
| | (0.006) | (0.008) | (0.006) | | 0.078 |
| *p*-difference | 0.358 | 0.005 | 0.005 | | |
| Panel B: Excluding Firms Incorporated in Delaware | | | | | |
| (3) Stand-alone | 0.029*** | 0.023** | −0.006 | Yes | 19,870 |
| | (0.009) | (0.012) | (0.008) | | 0.056 |
| (4) Conglomerate | 0.054*** | 0.067*** | −0.044*** | Yes | 26,785 |
| | (0.011) | (0.014) | (0.011) | | 0.077 |
| *p*-difference | 0.072 | 0.014 | 0.006 | | |
| Panel C: Excluding Firm-Years in which First-Generation Antitakeover Laws in Effect | | | | | |
| (5) Stand-alone | 0.031*** | 0.010 | 0.001 | Yes | 47,288 |
| | (0.009) | (0.011) | (0.008) | | 0.058 |
| (6) Conglomerate | 0.036*** | 0.044*** | −0.022*** | Yes | 60,826 |
| | (0.007) | (0.008) | (0.006) | | 0.079 |
| *p*-difference | 0.668 | 0.016 | 0.027 | | |

This table reports robustness tests that address concerns about endogenous treatment as well as potential measurement error in treatment status in the regression evidence in Table 3. In Panel A, firms that (i) lobbied for the passage of antitakeover laws, (ii) opted out of coverage, and (iii) were incorporated in Georgia and Tennessee whose antitakeover laws required firms to opt into coverage are excluded. In Panel B, firms incorporated in Delaware are excluded. In Panel C, firm-year observations in which first-generation antitakeover laws were effective are excluded. Standard errors that are heteroscedasticity-consistent and clustered at the firm level are reported in parentheses beneath coefficient estimates. *, **, and *** denote significance at the 10%, 5% and 1% level, respectively. The *p*-values for the difference between the coefficient estimates for standalone firms and conglomerate segments are calculated using seemingly unrelated regressions.

inferences made in studies focusing on second-generation laws, especially those studies using data from before 1982. To address this concern, I estimate the baseline models excluding firm-years in which first-generation laws were effective. Karpoff and Wittry (2018) consider all first-generation laws to be effective until the United States Supreme Court decision in *Edgar v. Mite* on June 22, 1982. However, Cain et al. (2017) argue that in 12 states, those laws were already overturned by federal court decisions prior to 1982. When coding the years during which the first-generation laws were effective, I rely on the dates provided by Cain et al. (2017). As shown in Panel C of Table 4, I find that the exclusion of firm-year observations in which first-generation antitakeover laws were effective does not alter the sign, significance, or size of the key coefficient estimates.

### 5.3. Most effective legal changes

Cain et al. (2017) find that state-level *BC*, *CS*, and *PP* laws had no discernible impact on ex-post hostile takeover rates. Instead, they find that hostile takeovers decreased significantly after three legal changes: the adoption of *FP* laws, the assumption of labor contracts, and the adoption of the Unocal standard. Assumption of labor contracts requires hostile bidder to assume all preexisting labor contracts of the target firm after the acquisition. In states where Unocal is adopted, a board may undertake defensive strategies to prevent a takeover if the defensive measure is reasonable (allows the "just say no" strategy).

In Table 5, I use these three legal changes to identify the year of treatment. In Panel A, I define the treatment year based on the earliest of the three legal changes. In Panels B through D, I examine the effect of each legal change individually. As shown, I find in all four panels that the *q*-sensitivity of the investment for conglomerate segments is significantly diminished following the legal changes. For standalone firms, only the adoption of *FP* laws has a significant negative effect on the *q*-sensitivity of investment. In all four panels, I find that the decline in investment-*q* sensitivity is larger for conglomerate segments than it is for standalone firms. Taken together, these results support the main finding that the loss of discipline provided by the corporate control market reduced the efficiency of internal capital markets.

### 5.4. Measurement error in q

Whited (2001) notes that the divergence between unobservable marginal *q* and its empirical proxies may distort inferences made about the efficiency of internal capital markets using investment-*q* models. My focus in this paper is on within-firm *changes* in the sensitivity of segment investment to industry *q* following the adoption of antitakeover laws. To the extent that the amount of measurement error in industry *q* as a proxy for marginal *q* remains the same around the passage of antitakeover laws (and there is no clear reason to expect that it changes), or more conservatively, measurement error does not increase more for conglomerate firms than it does for standalone firms, inferences based on my baseline specification will remain valid.

My inferences are unchanged if I (i) use the industry average *q*, (ii) define industry based on 3- or 4-digit SIC codes, (iii) unbound *q*

**Table 5**

Effective legal deterrents of hostile bids and investment-*q* sensitivity.

| | Explanatory variables | | | | N/ $R^2$ |
|---|---|---|---|---|---|
| | $q_{t-1}$ | $Post_t$ | $q_{t-1}$ x $Post_t$ | Other controls | |
| Panel A: Passage of the First of the Three Most Effective Legal Changes | | | | | |
| (1) Standalone | 0.033*** | 0.019** | −0.002 | Yes | 48,810 |
| | (0.008) | (0.010) | (0.008) | | 0.061 |
| (2) Conglomerate | 0.047*** | 0.053*** | −0.036*** | Yes | 66,286 |
| | (0.006) | (0.008) | (0.006) | | 0.079 |
| *p*-difference | 0.145 | 0.008 | 0.001 | | |
| Panel B: Passage of Fair Price Laws | | | | | |
| (3) Standalone | 0.035*** | 0.024*** | −0.011** | Yes | 48,810 |
| | (0.004) | (0.007) | (0.005) | | 0.056 |
| (4) Conglomerate | 0.028*** | 0.037*** | −0.024*** | Yes | 66,286 |
| | (0.004) | (0.007) | (0.005) | | 0.075 |
| *p*-difference | 0.204 | 0.205 | 0.058 | | |
| Panel C: Assumption of Labor Contracts | | | | | |
| (5) Standalone | 0.029*** | 0.000 | 0.005 | Yes | 48,810 |
| | (0.005) | (0.008) | (0.005) | | 0.059 |
| (6) Conglomerate | 0.027*** | 0.021*** | −0.010** | Yes | 66,286 |
| | (0.004) | (0.007) | (0.005) | | 0.075 |
| *p*-difference | 0.734 | 0.040 | 0.030 | | |
| Panel D: Settlement of Unocal Case | | | | | |
| (7) Standalone | 0.030*** | 0.005 | 0.002 | Yes | 48,810 |
| | (0.005) | (0.007) | (0.005) | | 0.058 |
| (8) Conglomerate | 0.033*** | 0.032*** | −0.021*** | Yes | 66,286 |
| | (0.004) | (0.007) | (0.005) | | 0.075 |
| *p*-difference | 0.659 | 0.006 | 0.002 | | |

This table reports the change in the *q*-sensitivity of investment for standalone firms and conglomerate segments after the introduction of the three most effective legal changes that deter hostile takeover according to Cain et al. (2017): fair price laws, assumption of labor contracts, and settlement of the Unocal case. Standard errors that are heteroscedasticity-consistent and clustered at the firm level are reported in parentheses beneath coefficient estimates. *, **, and *** denote significance at the 10%, 5% and 1% level, respectively. The *p*-values for the difference between the coefficient estimates for standalone firms and conglomerate segments are calculated using seemingly unrelated regressions.

**Table 6**

The effect antitakeover laws on relative value added of transfers within conglomerate firms.

| | Relative Value Added | |
|---|---|---|
| Explanatory variables | (1) | (2) |
| $Post_t$ | −0.026* | −0.027* |
| | (0.014) | (0.014) |
| $Size_t$ | | −0.009 |
| | | (0.008) |
| Firm FEs | Yes | Yes |
| Year FEs | Yes | Yes |
| N | 3,316 | 3,315 |
| $R^2$ | 0.312 | 0.312 |

I estimate regressions explaining the effect of antitakeover laws on relative value added by allocation of capital expenditures across different divisions of a conglomerate firm. Relative Value Added (*RVA*) is computed as follows:

$$\sum_{j=1}^{n} w_j \left(q_j - \overline{q}\right) \left\{ \frac{I_j}{S_j} - \left(\frac{I}{S}\right)^{ss}_j - \sum_{j=1}^{n} w_j \left[ \frac{I_j}{S_j} - \left(\frac{I}{S}\right)^{ss}_j \right] \right\}$$

Here, $q_j$ is the industry median *q* of segment *j* and $\overline{q}$ is the sales-weighted average of all of the segment industry median *q*'s, $S_j$ is the sales of segment *j*, $I_j$ is the capital expenditure of segment *j*, and $(I_j^{ss}/S_j^{ss})$ is the median capital expenditure to sales ratio for the single segment firms in the corresponding industry. Industry definitions are based on narrowest SIC grouping that includes at least five single segment firms. *RVA* is winsorized at 1% in each tail. I also require sample conglomerate firms to have at least two firm-year observations both before and after the law change. Standard errors that are heteroscedasticity-consistent and clustered at the firm level are reported beneath coefficient estimates. *, **, and *** denote significance at the 10%, 5% and 1% level, respectively.

at 10, or (iv) use a $q$ measure that accounts for intangible capital (Peters and Taylor, 2017). These results suggest that neither the measurement error in industry $q$ as a proxy for marginal $q$ nor the change in measurement error around the passage of antitakeover laws is a threat to my inferences. These results are not reported in a table for brevity but are available upon request.

## 5.5. Efficiency of firm-level investment allocations

This paper measures changes in the efficiency of internal capital markets following the passage of antitakeover laws using segment-level investment-$q$ regressions. A complementary approach is to examine the relative value added ($RVA$) by headquarters' allocation of funds to each segment within each firm (Rajan et al., 2000). I construct a sales-based $RVA$ measure as follows:

$$\sum_{j=1}^{n} w_j \ (q_j - \overline{q}) \left\{ \left[ \frac{I_j}{S_j} - \left(\frac{I}{S}\right)_j^{ss} \right] - \sum_{j=1}^{n} w_j \left[ \frac{I_j}{S_j} - \left(\frac{I}{S}\right)_j^{ss} \right] \right\} \tag{2}$$

Here, $q_j$ is the industry median $q$ of segment $j$ and $\overline{q}$ is the sales-weighted average of all of the segment industry median $q$'s, $S_j$ is the sales of segment $j$, $I_j$ is the capital expenditure of segment $j$, and $(I_j^{ss}/S_j^{ss})$ is the median capital expenditure to sales ratio for the single segment firms in the corresponding industry.

$RVA$ shows the association between investment and investment opportunities across different divisions of a conglomerate firm. The stronger the association, the more efficient conglomerate investment becomes. Put differently, $RVA$ is higher when firms allocate more capital expenditures to their segments in high-$q$ industries.

As shown in Table 6, I find that $RVA$, decreases following the adoption of antitakeover laws (significant at the 10% level), suggesting that antitakeover laws reduce the overall efficiency of transfers within conglomerate firms.

## 5.6. Clustering

Past studies that examine the effect of state antitakeover laws on firm outcomes cluster regression standard errors either at the firm level (Atanassov, 2013; Cain et al., 2017) or at the state level (Bertrand and Mullainathan, 2003; Giroud and Mueller, 2010; Karpoff and Wittry, 2018). Following the first set of papers, I cluster the standard errors of the baseline regressions at the firm level to account for serial correlation in firms' resource allocation and investment decisions. However, because the treatment variable, Post, is defined at the state level, as a robustness check, I also cluster the standard errors at the state level. I find that while the standard errors of the variables Post and Post $\times$ q increase slightly with state-level clustering, the significance levels of all the regression coefficients remain the same.[13] Put differently, whether I cluster regression standard errors at the firm level or at the state level does not affect my conclusions.

## 5.7. Other robustness tests

I implement a number of additional tests to check the robustness of the results reported in Table 3. First, I estimate the regressions using segment (instead of firm) fixed effects. Second, I control for other segments' cash flow since investment opportunities of a segment might be correlated with the cash flow of other segments of the same company. Third, I scale capital expenditures by assets instead of sales. Fourth, I eliminate firms without December fiscal year ends. The effect of antitakeover laws on the investment efficiency of conglomerate segments remains unchanged in any of these tests (not tabulated for brevity).

My results are also robust to ending my sample in 1996. Many of the second-generation antitakeover laws were introduced before 1992. In order to only consider the impact of these laws, I estimate my baseline specification by ending the sample period in 1996. As presented in Internet Appendix Table IA.9, this alternative sample period does not affect my findings.

## 6. Cross-sectional tests

In this section, I explore several sources of cross-sectional variation to shed light on how the adoption of state antitakeover laws reduced the efficiency of internal capital markets. To investigate potential mechanisms, I proceed as follows: (i) divide the sample of conglomerate segments into subsamples based on a proxy for the mechanism, (ii) estimate Eq. (1) for each subsample, and (iii) compare the coefficient estimates on q $\times$ Post, representing the change in internal capital market efficiency, between the different subsamples.

My first set of tests are aimed at validating the idea that the adoption of antitakeover laws decrease the efficiency of internal capital markets precisely at those conglomerate firms that used to benefit from the disciplinary pressure provided by the corporate control market.

Building on the inverse relation between firm size and probability of a hostile takeover that has been documented in the literature (Palepu, 1986; Morck et al., 1988), I divide the sample of conglomerate firms into two (small and large firms) based on total firm sales in the year prior to the adoption of antitakeover laws. I expect the drop in the efficiency of internal capital markets following the adoption of antitakeover laws to be more pronounced at smaller conglomerates that used to operate under a higher ex-ante likelihood

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[13] Results can be found in Internet Appendix Table IA.5.

of a hostile takeover.

Indeed, as shown in Panel A of Table 7, the $q$-sensitivity of investment for the segments of large conglomerates remains relatively stable (the coefficient estimate $-0.007$ on $q \times Post$ is insignificant in row 1) whereas the $q$-sensitivity of investment for the segments of small conglomerates drops significantly following the passage of antitakeover laws (the coefficient estimate $-0.052$ on $q \times Post$ is significant at the 1% level in row 2). The difference between these coefficient estimates in rows 1 and 2 is also statistically significant ($p$-value = 0.003), supporting the hypothesis that the negative impact of antitakeover laws on internal capital market efficiency was more pronounced for smaller conglomerates that used to operate under greater disciplinary pressure from the corporate control market before the law change.

I next use M&A activity at the industry level as an alternative proxy for the probability of becoming a takeover target.[14] I expect the decline in the $q$-sensitivity of investment to be more pronounced at conglomerate segments in industries with high level of M&A activity for which the market for corporate control prior to the passage of the laws provided stronger discipline. I obtain data on merger and acquisition activity from SDC database. Following Cremers and Ferrell (2014), I measure M&A activity at the industry level as the percentage of all firms in Compustat that were involved in M&A that year. Industry is defined at the level of two-digit SIC codes. I then divide conglomerate segments into two subsamples based on the median level of M&A activity in a given year.

As shown in Panel B of Table 7, conglomerate segments in industries with high level of M&A activity exhibit a significant drop in their $q$-sensitivity of investment following the adoption of antitakeover laws (the coefficient estimate $-0.044$ on $q \times Post$ is significant at the 1% level in row 4) while the $q$-sensitivity of investment for conglomerate segments in industries with low level of M&A activity remains relatively stable (the coefficient estimate $-0.007$ on $q \times Post$ is insignificant in row 3). The difference between these two coefficient estimates is also statistically significant at the 1% level. These findings are consistent with the notion that the adverse impact of antitakeover laws on $q$-sensitivity of investment was more pronounced for conglomerate segments in industries with high level of M&A activity for which takeover threats prior to the adoption of the laws provided stronger discipline.

I also examine whether the impact of antitakeover laws was muted for conglomerate firms with preexisting firm-level takeover defenses. Presumably, conglomerate firms with preexisting takeover defenses did not experience a material change in the likelihood of unwanted takeover bids following the passage of the laws. As a firm-level measure of takeover defenses, I use Bill Schwert's data set on poison pills on his web site. Using those data, I divide the sample of conglomerate firms into two subsamples based on the existence of a poison pill prior to the passage of antitakeover laws.

As shown in Panel C of Table 7, the coefficient estimate on $q \times Post$, representing the change in the efficiency of internal capital markets following the passage of antitakeover laws, is statistically insignificant for the segments of conglomerate firms with a poison pill ($-0.020$ in row 5) and significant for the segments of conglomerate firms without a poison pill ($-0.027$ in row 6). The negative impact of antitakeover laws on the efficiency of internal capital markets is greater for conglomerates without a poison pill as expected, but the difference between conglomerates with and without a poison pill is not statistically significant ($p$-value = 0.642).

I next examine whether financial leverage, concentrated ownership, and product market competition can serve as alternative sources of discipline on managers and effectively mitigate the loss of disciplinary takeover threats provided by the corporate control market after the passage of antitakeover laws. I report the results for these mechanisms in Table 8.

In Panel A, I divide the sample of conglomerate firms into quartiles based on market leverage (total book debt divided by total book debt plus the market value of equity) at the end of the fiscal year before the passage of antitakeover laws. As shown, the segments of conglomerate firms in the lowest leverage quartile exhibit larger declines in their $q$-sensitivity of investment following the passage of antitakeover laws than the segments of conglomerate firms in the highest leverage quartile – the coefficient estimate on $q \times Post$ is $-0.056$ for the segments of conglomerate firms in the lowest leverage quartile in row 1 and $-0.004$ for the segments of conglomerate firms in the highest leverage quartile in row 3. The difference between these two coefficient estimates is also statistically significant ($p$-value = 0.016). Importantly, the $q$-sensitivity of investment remains stable for the segments of conglomerate firms in the highest leverage quartile, consistent with the notion that financial leverage can help alleviate agency conflicts (Jensen, 1986) and serve as a governance device to discipline management.

In Panel B, I examine whether the presence of concentrated owners plays a role in how conglomerate firms respond to the passage of antitakeover laws. As owners, institutional shareholders have greater incentives to monitor management than do retail shareholders since the benefits are more likely to exceed the costs with greater concentration of ownership (Grossman and Hart, 1980; Shleifer and Vishny, 1986). Thus, I expect conglomerate firms with high concentration of institutional ownership and naturally associated monitoring of management to show a muted response to the loss of disciplinary takeover threats provided by the corporate control market.

I obtain quarterly data on the ownership stakes of institutional investors with more than $100 million under management from Thomson Reuters 13-F files to construct a firm-level Herfindahl index of institutional ownership as a measure of ownership concentration. I then divide conglomerate firms into two groups of high and low ownership concentration based on the median value of the Herfindahl index of institutional ownership in the year before the passage of antitakeover laws.

The results in Panel B of Table 8 are broadly consistent with the notion that concentrated ownership can help partially offset the loss of discipline provided by the corporate control market. Specifically, I find that the segments of conglomerate firms with a lower Herfindahl index of institutional ownership exhibit a larger reduction in their $q$-sensitivity of investment following the passage of antitakeover laws (the coefficient estimate on $q \times Post - 0.047$ in row 4 versus $-0.017$ in row 5). The difference is also statistically

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[14] I thank an anonymous referee for this suggestion.

**Table 7**
Ex-ante takeover risk and the effect of antitakeover laws.

| | Explanatory variables | | | | N/ $R^2$ |
|---|---|---|---|---|---|
| | $q_{t-1}$ | Post$_t$ | $q_{t-1}$ x Post$_t$ | Other controls | |
| Panel A: Ex-Ante Likelihood of a Hostile Takeover | | | | | |
| (1) Low | 0.017** | 0.021** | −0.007 | Yes | 26,877 |
| | (0.007) | (0.010) | (0.007) | | 0.162 |
| (2) High | 0.069*** | 0.076*** | −0.052*** | Yes | 16,745 |
| | (0.012) | (0.017) | (0.013) | | 0.070 |
| *p*-difference | 0.000 | 0.005 | 0.003 | | |
| Panel B: M&A Activity | | | | | |
| (3) Low | 0.021** | 0.007 | −0.007 | Yes | 29,030 |
| | (0.009) | (0.010) | (0.009) | | 0.055 |
| (4) High | 0.062*** | 0.075*** | −0.044*** | Yes | 25,027 |
| | (0.010) | (0.013) | (0.010) | | 0.119 |
| *p*-difference | 0.001 | 0.000 | 0.001 | | |
| Panel C: Firm-level Poison Pills | | | | | |
| (5) Yes | 0.029*** | 0.050*** | −0.020 | Yes | 6,528 |
| | (0.011) | (0.018) | (0.013) | | 0.196 |
| (6) No | 0.041*** | 0.048*** | −0.027*** | Yes | 59,758 |
| | (0.007) | (0.009) | (0.007) | | 0.073 |
| *p*-difference | 0.319 | 0.928 | 0.642 | | |

This table reports how the intensity of a hostile takeover threat prior to the passage of second-generation antitakeover laws is related to the impact of those laws on the *q*-sensitivity of investment of conglomerate segments. Panel A reports the estimates for large and small conglomerate firms. Firm size is measured as total firm sales in the year prior to the passage of antitakeover laws. Panel B reports the estimates for conglomerate segments in industries with low and high levels of M&A activity. M&A activity is defined as the proportion of Compustat firms in the two-digit SIC industry group that were involved in M&A that year. Panel C reports the estimates for conglomerate firms with and without poison pills before the passage of antitakeover laws. Data on firm-level poison pills are from Bill Schwert's website. Regression standard errors that are heteroscedasticity-consistent and clustered at the firm level are reported in parentheses beneath coefficient estimates. *, **, and *** denote significance at the 10%, 5% and 1% level, respectively. The *p*-values for the difference between the coefficient estimates for high versus low takeover-risk groups are calcu- lated using seemingly unrelated regressions.

significant at the 10% level.

In Panel C, I test whether product market competition can mitigate the negative impact of antitakeover laws on the efficiency of internal capital markets. Giroud and Mueller (2010) document that product market competition can serve as an alternative governance mechanism on management that mitigates managerial agency problems. I measure industry concentration at the two-digit SIC code level using the standard Herfindahl-Hirschman index, HHI. The HHI is defined as the sum of squared market shares,

$$HHI_{jt} = \sum_{i=1}^{N_j} s_{ijt}^2$$

where $s_{ijt}$ is the market share based on sales of segment i that operates in industry j in year t. Higher levels of HHI indicate higher industry concentration, and therefore weaker product market competition. I divide conglomerate segments into two subsamples based on the median level of industry concentration measure in a given year since this is a highly time-varying measure.

The results in Panel C of Table 8 show that the *q*-sensitivity of investment for the conglomerate segments in non-competitive in-dustries (high HHI) drops significantly following the adoption of antitakeover laws (the coefficient estimate −0.036 on *q* × *Post* is significant at the 1% level in row 7) whereas the *q*-sensitivity of investment remains stable for conglomerate segments in competitive industries (low HHI) (the coefficient estimate −0.005 on *q* × *Post* is insignificant in row 6). The difference between these coefficient estimates in rows 6 and 7 is also statistically significant (*p*-value = 0.009). The results are consistent with the idea that product market competition can serve as an alternative disciplinary mechanism on management that alleviates agency conflicts (Giroud and Mueller, 2010).

Finally, I explore the idea that internal power struggles can underpin inefficient allocation of resources in internal capital markets due to diversity of investment opportunities. To test this mechanism, I follow Rajan et al. (2000) in measuring the diversity of in-vestment opportunities at a conglomerate firm as the standard deviation of asset-weighted segment *q*'s divided by the equally-weighted average segment *q* in the firm. With the loss of disciplinary takeover threats following the passage of antitakeover laws, I expect the decline in the efficiency of internal capital markets to be more pronounced at conglomerate firms with greater within-firm diversity of investment opportunities.

In Table 9, I sort conglomerate firms into quartiles based on their within-firm diversity of investment opportunities in a given year since this is a highly time-varying measure. As expected, the segments of conglomerate firms in the highest diversity quartile exhibit the largest decline in their *q*-sensitivity of investment – the coefficient estimate on *q* × *Post* is −0.055 in row 4. In addition, the negative impact of antitakeover laws on the efficiency of internal capital markets is monotonic across the diversity quartiles, and there appears to be little or no impact on conglomerate firms in the lowest diversity quartile in row 1. The difference in the response of conglomerate

**Table 8**

The effect of antitakeover laws by leverage, ownership concentration and product market competition.

| | Explanatory variables | | | | N/ $R^2$ |
|---|---|---|---|---|---|
| | $q_{t-1}$ | $Post_t$ | $q_{t-1}$ x $Post_t$ | Other controls | |
| **Panel A: Leverage** | | | | | |
| (1) Quartile 1 | 0.052*** | 0.078*** | −0.056*** | Yes | 6,698 |
| | (0.015) | (0.026) | (0.017) | | 0.050 |
| (2) Quartile 2 & 3 | 0.035*** | 0.039*** | −0.023*** | Yes | 26,310 |
| | (0.008) | (0.010) | (0.008) | | 0.133 |
| (3) Quartile 4 | 0.026* | 0.012 | −0.004 | Yes | 10,582 |
| | (0.014) | (0.018) | (0.013) | | 0.126 |
| *p*-difference (Q1-Q4) | 0.204 | 0.031 | 0.016 | | |
| **Panel B: Institutional Ownership Concentration** | | | | | |
| (4) Low | 0.052*** | 0.064*** | −0.047*** | Yes | 8,148 |
| | (0.017) | (0.022) | (0.016) | | 0.090 |
| (5) High | 0.032*** | 0.032*** | −0.017* | Yes | 17,587 |
| | (0.008) | (0.012) | (0.009) | | 0.127 |
| *p*-difference | 0.284 | 0.192 | 0.097 | | |
| **Panel C: Product Market Competition** | | | | | |
| (6) Low HHI | 0.013** | 0.014* | −0.005 | Yes | 32,193 |
| | (0.006) | (0.007) | (0.005) | | 0.037 |
| (7) High HHI | 0.057*** | 0.059*** | −0.036*** | Yes | 31,301 |
| | (0.010) | (0.014) | (0.011) | | 0.094 |
| *p*-difference | 0.000 | 0.006 | 0.009 | | |

This table reports how financial leverage, institutional ownership concentration, and product market competition are related to the impact of second-generation antitakeover laws on the *q*-sensitivity of investment of conglomerate segments. In Panel A, conglomerate firms are split into quartiles based on financial leverage in the year before the passage of antitakeover laws. In Panel B, conglomerate firms are split into two subsamples based on the median level of institutional ownership concentration in the year before the passage of antitakeover laws. In Panel C, conglomerate segments are split into two subsamples based on the annual median value of industry concentration in a given year. Industry concentration is measured by HHI (Herfindahl-Hirschman index), which is computed as the sum of squared market shares of all segments in a given two-digit SIC industry. Market shares are computed based on segments' sales. Standard errors that are heteroscedasticity-consistent and clustered at the firm level are reported in parentheses beneath coefficient estimates. *, **, and *** denote significance at the 10%, 5% and 1% level, respectively. The *p*-values for the difference between coefficients estimates are calculated using seemingly unrelated regressions.

**Table 9**

The effect antitakeover laws by diversity of investment opportunities.

| | Explanatory variables | | | | N/ $R^2$ |
|---|---|---|---|---|---|
| | $q_{t-1}$ | $Post_t$ | $q_{t-1}$ x $Post_t$ | Other controls | |
| **Diversity of investment opportunities** | | | | | |
| (1) Quartile 1 | 0.005 | 0.015 | −0.006 | Yes | 19,171 |
| | (0.010) | (0.012) | (0.010) | | 0.133 |
| (2) Quartile 2 | 0.031*** | 0.049*** | −0.022* | Yes | 18,556 |
| | (0.011) | (0.014) | (0.012) | | 0.107 |
| (3) Quartile 3 | 0.048*** | 0.051*** | −0.031** | Yes | 15,664 |
| | (0.013) | (0.018) | (0.013) | | 0.080 |
| (4) Quartile 4 | 0.076*** | 0.081*** | −0.055*** | Yes | 11,365 |
| | (0.015) | (0.020) | (0.016) | | 0.043 |
| *p*-difference (Q1-Q4) | 0.000 | 0.003 | 0.004 | | |

This table reports how the diversity of investment opportunities among the segments of conglomerate firms is related to the impact of second-generation antitakeover laws on the Q-sensitivity of investment of conglomerate segments. Following Rajan et al. (2000), diversity of investment opportunities at a conglomerate firm is defined as the standard deviation of asset-weighted segment *q*'s divided by the equally-weighted average segment *q* in the firm. Conglomerate firms are split into quartiles based on the diversity measure (lowest diversity in quartile 1 and highest in quartile 4). Standard errors that are heteroscedasticity-consistent and clustered at the firm level are reported beneath coefficient estimates. *, **, and *** denote significance at the 10%, 5% and 1% level, respectively. The *p*-values for the difference between coefficient estimates for the top and bottom diversity quartiles are calculated using seemingly unrelated regressions.

firms in the lowest and highest diversity quartiles is also statistically significant (*p*-value = 0.004).

Overall, the results in this section show that the efficiency of internal capital markets dropped in economically predictable ways following the passage of state-level antitakeover laws. The adverse impact of the laws appears mostly at conglomerate firms that benefited from disciplinary takeover threats prior to the passage of the laws, lacked alternative sources of pressure on management, or had the structural makings to fuel wasteful influence activities and power struggles among managers. These cross-sectional results also serve as sensible checks to help address potential concerns that the main finding might be spurious.

## 7. Conclusion

This paper provides causal evidence that agency problems matter for the allocation of resources within conglomerate firms and affect the functioning of internal capital markets. Using the staggered adoption of state-level antitakeover laws as quasi-random shocks that reduced takeover threats and increased managerial discretion, I find that the resource allocation decisions of conglomerate firms, but not standalone firms, became less sensitive to investment opportunities, consistent with models of internal capital markets featuring agency problems (Rajan et al., 2000; Scharfstein and Stein, 2000).

The analysis builds on previous work that has used the passage of antitakeover laws to understand the nature of managerial preferences. To the extent managers dislike turning down resource requests in general, the main finding that conglomerate firms exhibit less winner-picking behavior following the adoption of antitakeover laws is consistent with previous evidence on the reluctance of managers to make decisions that they may personally find costly such as shutting down old plants (Bertrand and Mullainathan, 2003) or containing employees' wage demands (Bertrand and Mullainathan, 1999).

This paper also examines the cross-sectional heterogeneities in the response of conglomerate firms to the passage of antitakeover laws. The adverse impact of the laws appears mostly at conglomerate firms that benefited from disciplinary takeover threats prior to the passage of the laws, lacked alternative sources of pressure on management, or had the structural makings to fuel wasteful influence activities and power struggles among managers. Overall, the causal evidence in this paper supports the view that agency problems in internal capital markets are important for understanding the investment behavior of conglomerate firms.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jcorpfin.2021.102061.

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