Clawback provisions, executive pay and accounting manipulation

Alvaro Remesal
CEMFI
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Abstract

Clawback provisions allow shareholders to recover previously-awarded compensation from managers involved in accounting manipulation. I assess theoretically and empirically the effects of clawback provisions on the structure of managerial compensation and the frequency of accounting manipulation. I develop a theoretical principal-agent model in which effort and manipulation incentives are at conflict. In the model, clawbacks and deferred compensation may become complement tools to deter manipulation when clawback enforcement is imperfect. I test the implications of the model using data from U.S. public firms in the 2002-2016 period. The identification of the effects of clawback adoption relies on an instrumental variables strategy that exploits exogenous cross-industry variation in clawback adoption. I find that those firms with greater pre-adoption reliance on vested (short-term) incentives increase the wealth-performance sensitivity of unvested (long-term) compensation. The results suggest that enforcement frictions are relevant. Moreover, clawbacks are complements with deferred compensation for firms where manipulation problems are severe, and monitoring over managers is less intense.

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1 Introduction

In September 2016 directors at Wells Fargo triggered a clawback provision that recovered from the then CEO John G. Stumpf $69 million of compensation, which amounted to four times his annual pay. As internal investigations found out, Mr. Stumpf supported the incentive schemes that propelled the creation of thousands of bank accounts without customer consent.¹ The events at Wells Fargo illustrate that clawback provisions—or simply “clawbacks”—enable shareholders to recover compensation from managers in cases of fraudulent reporting, such as accounting manipulation, or misconduct. Once a rare governance tool, clawbacks are present in 80 percent of U.S. public firms as of 2016. This increased popularity follows a series of regulatory reforms and recommendations from proxy advisory firms that encouraged the adoption of clawbacks.² However, clawback enforcement is infrequent compared to, for instance, the number of financial restatements.³ This suggests that the threat of a clawback deters accounting manipulation practices or that shareholders find severe enforcement limitations, which reduce the effectiveness such provisions.

This paper provides a rationale for the clawback adoption decision and assesses, both theoretically and empirically, its effects on executive pay and accounting manipulation when clawback enforcement frictions are present. For this purpose, I develop a principal-agent model in which shareholders can induce a risk-neutral manager to exert unobservable effort that enhances long-term cash flows. Shareholders can offer short-term compensation based on earnings announcements and satisfy the manager’s preferences for early compensation. However, the manager can manipulate earnings, which reduces their informativeness and increases the cost of short-term incentive compensation. Hence,

¹See “Wells Fargo chief to forfeit more than $40m in pay”, Financial Times, September 28, 2016, and “Wells Fargo claws back $75m in bonuses over sham accounts”, Financial Times, April 10, 2017.
²The share of clawback adoption across U.S. public firms increased from roughly 0 percent in 2002, when the Sarbanes-Oxley Act was enacted, to 80 percent in 2016. In Appendix A I report the recent trends of clawback adoption across U.S. firms and describe the regulatory environment. For proxy advisory recommendations see Institutional Shareholders Services (2017), Skadden, Arps, Slate, Meagher & Flom LLP (2017).
deferred compensation and clawback provisions arise as tools to alleviate the manipulation problem.

To better understand the underlying trade-offs, I first consider the contract configurations in the absence of clawbacks. The optimal contract has one of two potential configurations. The first is a short-term compensation contract that induces manipulation and requires shareholders to pay high and frequent bonuses to induce effort. The second, meanwhile, is a partly-deferred compensation contract that deters manipulation but carries a cost due to the manager’s impatience. Shareholders then choose the cheaper between a contract that grants manipulation rents to the manager and another contract that involves costly deferrals.

The introduction of a clawback plays two roles. First, a clawback reduces the manager’s rewards from manipulation, which lowers the cost of inducing effort through short-term compensation. Second, a clawback reduces the costs of compensation by allowing shareholders to recover the unduly-granted pay when a manager manipulates earnings. These two effects provide an unambiguous advantage to clawback contracts but, realistically, I assume that clawback adoption entails frictions that generate enforcement costs and a limited recovery capacity for shareholders. Thus, a clawback may have limited impact on the accounting manipulation incentives of the manager, while creates fixed costs for shareholders.

I show that the optimal contract with clawback is always a fully short-term compensation contract when shareholders can fully recover the short-term bonus. Indeed, clawback contracts are akin to contingent deferred compensation contracts in which shareholders circumvent the costs of deferring compensation due to managerial impatience. In contrast, if enforcement entails a limited recovery, the optimal contract with clawback may feature some deferred compensation. This effect takes place because a fully short-term contract with a weak clawback still may induce manipulation and pay the manager more frequently than a partly-deferred compensation contract that deters manipulation. Moreover, the partly-deferred compensation contract features lower deferral costs than the equivalent contract without clawbacks.

Clawback adoption may lead to a contract with higher long-term incentives relative to the optimal contract without clawbacks. I show that this result may take place only for those firms in which, without clawbacks, shareholders tolerate manipulation and incentives are fully provided with short-term compensation. Thus, clawback adoption may lead to less intense manipulation by firms shifting to deferred compensation structures. Specifically, clawbacks and deferred compensation are complements when manipulation and, in general, agency problems are more severe.
The contribution of this paper lies in providing new insights on the complementarity between clawback adoption and deferred compensation schemes. While stylized, the theoretical model features a general setting where shareholders can adopt clawbacks, opt to defer compensation and also face clawback enforcement frictions. In the optimal contracts literature, clawback provisions are assimilated to contingent deferred compensation contracts—see, e.g., Marinovic and Varas (2017), Makarov and Plantin (2015), Edmans et al. (2012) and Levine and Smith (2009). In contrast, in this paper, I highlight how enforcement frictions lead clawbacks to generate non-trivial effects on the optimal structure of compensation, so that clawbacks and deferred compensation may become complements. Thanassoulis and Tanaka (2017), Chen et al. (2014) and Levine and Smith (2009) study clawback provisions in similar environments, but abstract from analyzing the interaction between enforcement frictions and deferred pay.

The implications of the model rest on three key assumptions. The first assumption is that manipulation distorts the informativeness of earnings and makes short-term incentive compensation more expensive. This is similar to the models of Crocker and Slemrod (2007) and Goldman and Slezak (2006). However, they leave aside the analysis of clawback adoption or deferred compensation.

The second assumption, which is common to the dynamic agency literature, is that the manager is relatively impatient. Hence, in the absence of manipulation deferred compensation is less effective than short-term compensation as a source of incentives—as in, e.g., Biais et al. (2007), DeMarzo and Sannikov (2006). Managerial impatience captures the private investment opportunities of the manager or—as I explicitly derive in an extension—the advantage of short-term compensation in reducing the managerial retention costs for shareholders.\(^4\)

The third assumption is that clawback enforcement is subject to frictions, i.e., recovery may be costly and incomplete. The frictions may stem from the need to set up the governance, legal or accounting structures that minimize litigation with the manager and make effective the threat of a clawback. This assumption captures the idea that powerful managers may resist against earnings restatements or against recognizing misconduct (Pyzoha, 2015).\(^5\) Alternatively, the enforcement frictions may also represent optimal governance structures that protect the manager from an opportunistic or incorrect ex-

\(^4\)In particular, I show this in a signal-jamming version of the model where shareholders must retain the manager after the, possibly manipulated, earnings announcement. Manipulation reduces the outsiders’ willingness to pay for the manager and the retention costs for shareholders, which makes short-term compensation relatively advantageous.

\(^5\)Anecdotal evidence suggests that sometimes firms face costs from recovering executive pay, such as legal bills, that exceed the amount of compensation to recover from managers. See “Companies discover that it’s hard to reclaim pay from executives”, The Wall Street Journal, November 20, 2006, and “Sorry, I’m keeping the bonus anyway”, The New York Times, March 13, 2005.
use of clawbacks, which would interfere with the \textit{ex-ante} provision of incentives to managers.

What is the empirical relevance of the complementarity between clawbacks and deferred compensation? To answer this question, I provide reduced form evidence using data on clawback adoption, executive compensation, financial restatements and earnings forecasts in public U.S. firms in the 2002-2016 period. As a measure of executive compensation, I compute the wealth-performance sensitivity of executive pay (Edmans et al., 2009, Coles et al., 2013), considering separately its vested—short-term—and unvested—long-term—components. Furthermore, I use two proxies to understand the effects of clawbacks on the frequency of accounting manipulation. First, I consider the fact that firms embark on earnings management practices to announce earnings in the neighborhood of the analysts’ consensus (median) forecast (Dechow et al., 2010)—the “meet and beat” behavior. Second, I consider the frequency of financial restatements.

To alleviate the endogeneity of clawback adoption, I use as an instrumental variable the leave-one-out average share of clawback adoption across industries defined at the two-digit SIC level. This strategy indirectly exploits the increased popularity of clawback provisions among U.S. firms that results from a series of regulatory reforms that since the early 2000s—e.g., the 2002 Sarbanes-Oxley Act and the 2010 Dodd-Frank Act—reduced the clawback enforcement frictions. Importantly, this trend occurs after “soft” comply-or-explain recommendations, rather than a “hard” compulsory adoption rule.

Moreover, the adoption of clawback provisions has become a standard recommendation of proxy advisory firms (Institutional Shareholders Services, 2017, Skadden, Arps, Slate, Arps, Slate,

\footnote{In additional results in the Appendix, I find that executives face steeper short-term incentives, measured by the wealth-performance sensitivity of vested compensation when executives display a high record of earnings manipulation in the past, measured both by the frequency of financial restatements and the meet behavior. This result is in line with shareholders providing steeper incentives to induce better decision-making by those managers that report accounting information of lower quality. Moreover, forecasts-meeting is related to executives facing, \textit{ex-ante}, steeper short-term incentives, suggesting that managers expect a positive reaction to stock prices and manage earnings opportunistically to boost their compensation.}


\footnote{All public firms must comply with the Dodd-Frank clawback, but the SEC’s final rulings are undelivered as of June 2018. See \textquote{Implementing Dodd-Frank Wall Street Reform and Consumer Protection Act-Upcoming Activity}, available at \url{http://www.sec.gov/spotlight/dodd-frank/dfactivity-upcoming.shtml}. Moreover, the infrequent cases of clawback enforcement by the SEC hint that a hard compliance requirement is unlikely (Fried, 2016).}
The voluntary nature of clawback adoption allows exploiting the cross-industry heterogeneity as exogenous variation to identify the equilibrium relationship between clawbacks, executive pay and accounting manipulation. The relevance of the instrument relies on the existence of spillover effects of adoption within industries that trigger the individual clawback adoption decision through a reduction in the explicit and implicit costs of clawback adoption. Thus, the probability of an individual firm having a clawback correlates negatively with the share of clawback adoption in the remaining industries. Meanwhile, the exclusion restriction is satisfied as long as reputation concerns or competition for managerial talent take place only within industries. I further alleviate the identification issues by interacting the adoption in other industries with fixed firm-level variation.

The results show that clawback adoption leads firms to increase the sensitivity of long-term compensation when firms, pre-adoption, display a relatively more sensitive short-term compensation. In particular, the clawback-induced increase in the sensitivity of long-term compensation is of 34 percent for firms located at the 90th percentile of the pre-adoption relative importance of short-term compensation. In contrast, the estimated effect is a reduction of 60 percent for firms in the 10th percentile of the distribution. Besides, clawback adoption reduces the frequency of earnings manipulation, with the reduction being smaller in firms with greater pre-adoption reliance on short-term compensation.\textsuperscript{9} From the perspective of the theoretical model, the results support that firms with weaker monitoring face enforcement frictions that reduce the effectiveness of clawbacks and give more prevalence to deferred compensation structures. In those firms, clawbacks and deferred compensation become complementary tools to reduce the compensation costs from manipulation.

I extend the baseline model to rationalize the increasing popularity of clawbacks and motivate further the instrumental variables strategy. Based on empirical findings that highlight the presence of governance spillovers across firms (Gantchev et al., 2017, Foroughi et al., 2016, Bouwman, 2011), I assume that clawback adoption by an individual firm benefits other firms by lowering the clawback enforcement costs. Then, complementarities in clawback adoption lead to the coexistence of two equilibria, one with generalized clawback adoption and another with no adoption. As a result, a slight change in regulations can shift the equilibrium regime and trigger a clawback adoption wave. Moreover, firm heterogeneity in enforcement costs or agency problems can theoretically explain the cross-industry variation in the pace of clawback adoption.

\textsuperscript{9}In robustness tests, I show that the increase in long-term incentives holds for firms that pre-adoption had (i) fewer independent directors, (ii) higher leverage and (iii) smaller size.
The remainder of the paper is organized as follows. Section 2 reviews the literature. Section 3 presents the model. Section 4 characterizes the configurations of the optimal contract and the implications of the model. Section 5 presents the empirical results. In Section 6 I discuss the results and provide extensions that rationalize the wave of clawback adoption. Section 7 concludes.

2 Review of the literature

This paper is related to the theoretical literature on manipulation incentives in principal-agent models. In Crocker and Slemrod (2007) a manager must exert \textit{ex-ante} unobservable effort and can manipulate an \textit{ex-post} performance metric. Relative to the situation without manipulation, the optimal contract must feature higher pay-for-performance to offset the impact of manipulation on effort incentives. Goldman and Slezak (2006) study a framework where the manager must bear legal penalties after the detection of manipulation. They show how an increase in such penalties increases the sensitivity of compensation to reported performance, which may increase the equilibrium manipulation level.

Pagano and Immordino (2012) show how investment in internal auditing and pay-for-performance are substitutes at jointly alleviating empire-building incentives and inducing unobservable managerial effort. In Peng and Röell (2014) a manager has an uncertain propensity to manipulate that the manager learns privately after the contracting stage. The optimal stock-based pay is more sensitive to reported short-term performance when the dispersion of manipulation propensity is higher—such as in high-growth, high-tech firms. The authors discuss how disclosure regulations improve the design of incentive compensation and reduce earnings manipulation. In this paper, I analyze how shareholders can voluntarily adopt clawback provisions that reduce the compensation costs associated with earnings manipulation actions.

To the best of my knowledge, three papers explicitly analyze the adoption of clawback provisions similar to this paper. In Levine and Smith (2009) a risk-averse and impatient manager can embark on manipulation and shareholders can choose a short-term or a long-term incentive structure. However, what the authors denote as a clawback contract is equivalent to a contract with contingent long-term compensation. In Chen et al. (2014) a manager with mean-variance preferences can manipulate short-term performance. The likelihood of voluntary clawback adoption is inversely related to the manager’s risk aver-

\footnote{Early references include Stein (1989), Stein (1988) and Narayanan (1985).}

\footnote{Laux (2014) and Laux and Stocken (2012) also highlight the side-effects of increasing penalties to managers on misreporting and misconduct.}
sion and earnings volatility. The authors provide suggestive reduced-form evidence supporting the theory. Thanassoulis and Tanaka (2017) show that compulsory clawback regulations can be effective at reducing excessive risk-taking in the banking sector.

This paper is also related to the literature that studies the role of deferred compensation in deterring short-termism. Edmans et al. (2012) show that short-termism increases the performance sensitivity of the optimal contract and transfers must take place even after retirement, as in Marinovic and Varas (2017). Makarov and Plantin (2015) show that a long-term contract with contingent deferrals, akin to a clawback contract, can deter managerial risk-taking. Differently from this literature, in this paper, I consider that clawbacks relax managerial limited liability but with enforcement frictions. The analysis leads to new insights on the substitutability or complementarity between deferred compensation and clawback adoption.

Empirically, the voluntary adoption of clawbacks is more likely in firms with prior executive misbehavior and with more independent governance bodies (Babenko et al., 2015, Addy et al., 2009). Moreover, firm size and peer firms’ adoption are strong predictors of clawback adoption (Chan et al., 2013). Stock prices go up after the adoption (Iskandar-Datta and Jia, 2013). The quality of accounting information improves: financial restatements go down, auditor fees decrease and forecasts-meeting behavior decreases (Dehaan et al., 2013, Chan et al., 2012). Executive compensation tends to increase after the adoption, as well as the pay for performance (Chen et al., 2014, Chan et al., 2012). Managers tend to substitute accruals management for real earnings management, such as reducing R&D expenditures (Chan et al., 2015), and show resistance against restatements (Pyzoha, 2015). In this paper, I contribute to this literature by exploiting exogenous variation from adoption in other industries to estimate the effects of clawback adoption. Moreover, I analyze the impact of clawback adoption on the structure—long vs. short-term—of incentive compensation.

This paper is also related to the empirical literature on accounting manipulation and the timing and structure of executive compensation. Kedia and Philippon (2009) find that firm growth in periods of manipulation fully reverts in subsequent years. Moreover, managers tend to exercise options before the detection of manipulation. Bennett et al. (2017), Edmans et al. (2017a) and Edmans et al. (2014) find that the timing of equity and option vesting schedules match the timing of firms’ news announcements, which suggests that managers extract rents from misreporting. Efendi et al. (2007), Bergstresser and Philippon (2006) and Burns and Kedia (2006) show that compensation structures with more weight on and greater performance-sensitivity of stock options are associated with more intense ex-post manipulation. In this paper, I provide evidence on the effects of clawback provisions both on the structure of compensation and accounting manipulation.
Lastly, this paper contributes to the literature on the regulation of executive compensation after the 2007-2009 financial crisis. There is agreement among policymakers and practitioners that flawed incentive schemes fueled managerial misconduct and the subsequent crisis. The new set of worldwide financial regulations foster the lengthening of pay horizons and the adoption of clawbacks.\footnote{See Financial Stability Forum (2009) and “Guidance on sound incentive compensation policies” Federal Register, Vol. 75, No. 122, Friday, June 25, 2010, available at \url{https://occ.gov/news-issuances/federal-register/75fr36395.pdf}.} In contrast, the academic literature finds little scope for executive pay regulation as the sole or more direct way to solve market failures (Edmans et al., 2017b, Thanassoulis, 2012). In this paper, I provide a theory and some evidence to understand how firms self-regulate to curb accounting manipulation and the role of enforcement frictions. In particular, I highlight the complementarities between both clawbacks and deferred compensation at removing earnings manipulation incentives when enforcement frictions are relevant.

3 The model

In this section, I present the ingredients of the theoretical framework. The model features a principal-agent setting in which short-term compensation structures may induce earnings manipulation incentives. Clawbacks and deferred compensation are tools that alleviate the manipulation problem and reduce the cost of incentive compensation.

Preferences and technology

Consider a 3-period risk neutral economy. Time is denoted by \( t = 0, 1, 2 \), and the market rate of return is normalized to zero. Shareholders own a firm with assets in place that yields terminal cash flows \( y \) at \( t = 2 \), which are equal to \( y_H \) with probability \( e \in [0, 1] \) and \( y_L \) with probability \( 1 - e \), where \( y_H > y_L \).

The firm is operated by a penniless manager, whose unobservable effort decision at \( t = 0 \) determines the probability of high cash flows \( e \). The manager can choose \( e = \bar{e} > 0 \) or \( e = 0 \). A choice of \( e = 0 \) yields some private benefits \( B > 0 \) to the manager at \( t = 0 \), which represent the manager’s opportunity cost of effort or perquisite consumption. The manager has a discount factor \( \beta \in (0, 1) \), which reflects a higher opportunity cost of funds than that of shareholders.

Terminal cash flows \( y \) are distributed to shareholders at \( t = 2 \), but the manager privately observes the realization of \( y \) at \( t = 1 \). With this information, the manager
generates an earnings announcement $x \in \{x_L, x_H\}$ at $t = 1$. When cash flows are $y_H$, the manager announces high earnings, $x_H$. However, when cash flows are $y_L$ the manager can manipulate earnings and also announce high earnings $x_H$ with probability $m \in [0, 1]$. In contrast, the manager announces low earnings $x_L$ with probability $1 - m$. The manager chooses a manipulation intensity $m \in \{0, m\}$ in an unobservable manner at $t = 1$ and incurs a cost $\gamma \geq 0$ from manipulation, $m = \bar{m}$.\textsuperscript{13} The probabilistic success of manipulation and the private manipulation cost stem from the ex-ante monitoring mechanisms that may prevent the manager from circumventing internal controls.\textsuperscript{14}

While manipulation may be successful at $t = 1$, cash flows at $t = 2$ reveal the accuracy of the earnings report. Thus, after a sequence of high earnings and low cash flows, $(x_H, y_L)$, the firm files a financial restatement, which acknowledges the inaccuracy of the prior earnings report and may trigger a clawback.\textsuperscript{15}

**Incentive compensation contracts**

Shareholders set an incentive compensation contract for the manager at $t = 0$. The contract specifies short-term compensation $w_1$ and long-term compensation $w_2$ contingent on the history of short-term earnings reports, $x$, and terminal cash flows, $y$. Short-term compensation after $x_L$ and $x_H$ is denoted by $w_L$ and $w_H$, respectively. Thus, the term $w_H - w_L$ represents the bonus from a high earnings announcement. Long-term compensation is $w_{HH}$ when the earnings report is accurate, that is after the sequence $(x_H, y_H)$, $w_{HL}$ after a financial restatement, that is after $(x_H, y_L)$, and $w_{LL}$ after an accurate low earnings report, that is after $(x_L, y_L)$.\textsuperscript{16}

\textsuperscript{13}It may be possible for the manager to announce earnings $x_L$ after observing $y_H$ but, as long as under-reporting provides no benefits to the manager, the optimal contract always induces truthful reporting after the manager observing $y_H$.

\textsuperscript{14}It would be immediate to reformulate the model to another version where the manager can manipulate earnings and distribute them to shareholders in the form of dividends that revert in the long-term, e.g., as in Edmans et al. (2012) and Kedia and Philippon (2009). Moreover, it would also be immediate to generalize the model to the case with non-zero levels of low effort and low manipulation.

\textsuperscript{15}There is an equivalent interpretation of the model where the manager embarks on misconduct or fraud, for instance by misrepresenting information about the firm’s return prospects. In that case, the financial restatement at $t = 2$ can be reinterpreted as the discovery of misconduct. For clarity in the exposition, and its relationship to the empirical strategy below, I stick to the interpretation based on earnings manipulation and a subsequent financial restatement.

\textsuperscript{16}Earnings manipulation generates an advantage for managers as long as the assumptions of the revelation principle fail. Thus, manipulation is relevant in equilibrium if, for instance, managers and shareholders may have limited commitment their after-earnings continuation decision, as in Arya et al. (1998) or as I show in an extension in Appendix C. Moreover, communication with the manager may be restricted due to, e.g., a dispersed ownership structure.
Clawback provisions

The contract between the manager and shareholders must satisfy the standard limited liability constraints of the manager. However, shareholders can adopt a clawback provision, modelled as a binary decision $c \in \{0,1\}$ at $t = 0$. Clawback adoption, $c = 1$, gives the right to shareholders to recover the short-term bonus $w_H - w_L$ in case of a financial restatement at $t = 2$.

I assume that clawbacks have an ex-ante enforcement cost $\kappa > 0$ and a limited recovery capacity $\ell \in [0,1]$. The idea is that shareholders may face frictions from the ex-ante opposition to clawback adoption from an entrenched manager, as well as ex-post resistance to restate earnings and litigation after the clawback trigger. Thus, shareholders must adopt suitable governance structures or face costly litigation for an effectively trigger of the clawback. Alternatively, the enforcement frictions may represent an optimal governance structure that protects the manager from an opportunistic use of the clawback provision. With the possibility of a clawback, the limited liability constraint for $w_{HL}$ turns into $w_{HL} \geq -\ell(w_H - w_L)$, while all other elements of $w_1$ and $w_2$ must be nonnegative. I illustrate the timing of the model and its elements in Figure 1.

Discussion

The clawback enforcement cost $\kappa$ and the limited recovery $\ell$ capture the degree of enforceability of clawback provisions as allowed by the legal framework and the firm-specific governance and accounting information structures. The new set of U.S. regulations on clawback provisions improves the ability of shareholders to claw back compensation. For instance, the 2002 Sarbanes-Oxley Act gave the right to the SEC to recover executive pay in cases of accounting manipulation or misconduct, while the 2010 Dodd-Frank Act proposed that all public firms adopt a clawback provision that automatically recovers erroneously-awarded compensation after financial restatements. Thus, I interpret the

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17 The limit on the amount to recover follows usual restrictions on the amount and type of compensation that shareholders can recover. Legally, this amount captures the part of compensation that is granted only because of manipulation. In the model, the manager would obtain an excess compensation of $w_H - w_L$ because of manipulation.

18 Opportunistic agents, such as independent directors with reputation concerns or activist shareholders, may be tempted to trigger the clawback despite the manager not manipulating. In such situation, the clawback would interfere with— and make more expensive— the effective provision of incentives to the manager. Thus, it may be optimal to devise weak boards or other governance structures that protect the manager from an unjustified use of clawbacks. Anecdotal evidence highlights the importance of activist pressure and that corporate boards show reluctance to the adoption of clawbacks. See “Want change? Shareholders have a tool for that”, *The New York Times*, March 21, 2017. Activist pressure regarding clawbacks in the financial industry is also reported in “Banks toughen pay clawbacks under activist shareholder pressure”, *American Banker*, April 30, 2013.
As formulated above, the clawback provision relaxes the limited liability constraint, which implies leaving the manager with negative consumption at \( t = 2 \). An alternative interpretation is that the manager only values consumption at \( t = 2 \) and \( 1/\beta \) represents the return of a private investment from \( t = 1 \) to \( t = 2 \). In case of a financial restatement, shareholders can recover the amount \( \ell(w_H - w_L) \), while the manager consumes the unrecoverable pay and the net returns of the private investment.\(^{20}\)

### 4 Optimal contracts

In this section I study and delimit the candidate configurations of the optimal contract in terms of its time structure, the extent of manipulation and the possibility of clawback
adoption. I consider separately two possible scenarios. First, when clawback provisions are unenforceable. Second, when clawback provisions are enforceable but subject to frictions. After studying the contract configurations, I highlight the two main predictions of the model that I test in the empirical section.

4.1 Candidate configurations of the optimal contract

Consider a compensation contract \((w_1, w_2) = \{(w_H, w_L), (w_{HH}, w_{HL}, w_{LL})\}\) and managerial choices of effort \(e \in \{0, \overline{e}\}\) and manipulation \(m \in \{0, \overline{m}\}\). The manager’s expected utility at \(t = 0\) is

\[
ed(w_H + \beta w_{HH}) + (1 - e)[m(w_H + \beta w_{HL}) + (1 - m)(w_L + \beta w_{LL}) - \gamma(m)] + B(e) \tag{1}
\]

where \(B(0) = B, B(\overline{e}) = 0, \gamma(0) = 0\) and \(\gamma(\overline{m}) = \gamma\). To explain equation (1), notice that with probability \(e\) the firm generates high cash flows \(y_H\), while the manager obtains short-term compensation based on high earnings, \(w_H\), and long-term compensation—hence the discounting—based on terminal cash flows, \(w_{HH}\). On the other hand, with probability \(1 - e\) the firm generates low cash flows \(y_L\). However, the manager manipulates with intensity \(m\), incurs a cost \(\gamma(m) \in \{0, \gamma\}\) and receives short-term compensation \(w_H\) after announcing high earnings \(x_H\). When shareholders detect the manipulation, i.e. after a financial restatement, the manager receives \(w_{HL}\), which can be negative with a clawback. In case of a low earnings announcement \(x_L\) the manager obtains short-term compensation \(w_L\) and long-term compensation \(w_{LL}\).\(^{21}\)

Using the manager’s expected utility we can analyze the optimal effort decision at \(t = 0\) and the optimal manipulation decision at \(t = 1\). By backwards induction, I first study the manipulation decision \(m \in \{0, \overline{m}\}\). From the definition of expected utility (1) the manager chooses \(m = 0\) instead of \(m = \overline{m}\) if and only if

\[
\overline{m}[w_H - w_L + \beta(w_{HL} - w_{LL})] \leq \gamma . \tag{2}
\]

That is, the manager abstains from manipulation if the expected rents from manipulation are lower than the cost \(\gamma\). The manipulation rents consist of the excess short-term bonus, \(w_H - w_L\), and excess long-term compensation, \(w_{HL} - w_{LL}\), that the manager obtains with probability \(\overline{m}\) by manipulating earnings after observing low cash flows \(y_L\) at \(t = 1\).

\(^{21}\)The expression for the manager’s expected utility at \(t = 0\) in equation (1) follows the interpretation that the manager has a private investment from \(t = 1\) to \(t = 2\) that yields an above-market return \(1/\beta\). The alternative interpretation where the manager discounts all future payoffs involves a re-parametrization by fixing the private benefits parameter to \(B' = B/\beta\). Additionally, one can assume that the manager enjoys the private benefits at \(t = 1\).
Second, from the expression for managerial utility (1), it is clear that the manager exerts effort at \( t = 0, e = \overline{\tau} \), as long as
\[
\overline{\tau}[(1 - m)(w_H - w_L) + \beta(w_{HH} - w_{LL}) - m\beta(w_{HL} - w_{LL}) + \gamma(m)] \geq B \quad (3)
\]
where \( m = 0 \) if condition (2) holds and \( m = \overline{m} \) otherwise.\(^{22}\)

In what follows, I assume that it is optimal for shareholders to induce effort and (3) holds. Otherwise, the optimal contract features no incentive compensation at all, which rules out manipulation. Besides, the manager obtains the private benefits \( B \), while shareholders obtain \( y_L \) with certainty.\(^{23}\)

Thus, given a contract \( (w_1, w_2) = \{(w_H, w_L), (w_{HH}, w_{HL}, w_{LL})\} \), with clawback adoption decision \( c \in \{0, 1\} \) and managerial decisions \( \overline{\tau} \) and \( m \in \{0, \overline{m}\} \), the costs of the contract for shareholders are
\[
\overline{\tau}(w_H + w_{HH}) + (1 - \overline{\tau})[m(w_H + w_{HL}) + (1 - m)(w_L + w_{LL})] + \kappa c \quad (4)
\]
Shareholders choose the contract \( \{(w_1, w_2), c\} \) that minimizes equation (4) subject to the manager’s incentive compatibility constraint (3), the manager’s limited liability constraints
\[
(w_H, w_L, w_{HH}, w_{LL}) \in \mathbb{R}_+^4,
\]
the manipulation decision \( m \) being determined by condition (2) and the “relaxed” limited liability constraint
\[
w_{HL} \geq -c\ell(w_H - w_L).
\]
In the absence of a clawback provision, \( c = 0 \), the last constraint becomes a standard limited liability constraint, i.e. \( w_{HL} \geq 0 \).

The following lemma establishes the nodes in which positive levels of managerial compensation are suboptimal and the constraints that bind in the optimal contract. All proofs appear in Appendix B.

**Lemma 1.** In the optimal contract \( w_L = w_{LL} = 0 \), the clawback constraint binds, \( w_{HL} = \)

\(^{22}\)If the two values in condition (3) are equal I break the indifference assuming that the manager exerts effort. Similarly, if the manipulation condition (2) holds with equality I assume that the manager abstains from manipulating.

\(^{23}\)The assumption boils down to managerial effort generating sufficient additional cash flows — given by the term \( \overline{\tau}(y_H - y_L) \) — to compensate the incentive compensation costs. Another implicit assumption throughout is that \( y_H \) and \( y_L \) are sufficiently high, so that the firm generates sufficiently high cash flows to finance any short-term and long-term compensation to the manager.
Shareholders compensate the manager in those nodes that are more informative about the manager choosing $e = \bar{e}$ (Holmström, 1979). These nodes are the short-term high earnings report, $x_H$, and the long-term high cash flows realization, $y_H$. Moreover, shareholders exhaust the clawback— when adopted— to its legal or feasible limit, since a financial restatement is informative about a low effort decision, $e = 0$.

With $w_L = w_{LL} = 0$, $w_{HL} = -c\ell w_H$ and a binding incentive compatibility constraint, the manipulation condition, expression (2), and the effort incentive-compatibility constraint, expression (3), can be written as

$$w_H \leq \frac{\gamma}{(1 - \beta c\ell)m}$$  \hspace{0.5cm} (5)

$$[1 - m(1 - \beta c\ell)]w_H + \beta w_{HH} = \frac{B}{\bar{e}} - \gamma(m)$$  \hspace{0.5cm} (6)

From condition (6) notice that the possibility of manipulation, $m = \bar{m}$, dampens the effort incentives provided through short-term compensation. That is, the temptations to choose $e = 0$ are bigger because the manager can obtain the private benefits $B$ and manipulate earnings to obtain $w_H$. Moreover, if the manager does not manipulate, $m = 0$, each unit of short-term compensation is unambiguously more effective than long-term compensation at inducing effort, and thus cheaper, due to the manager’s discounting of deferred compensation, $\beta < 1$.

The term $\frac{\gamma}{(1 - \beta c\ell)m}$ on the right hand side of condition (5) summarizes the costs of manipulation for the manager. It represents the maximum level of short-term pay $w_H$ that prevents manipulation. Similarly, the term $\frac{B}{\bar{e}}$ on the right-hand side of condition (6) summarizes the severity of the unobservable effort problem, i.e. the severity of the standard agency problem. It represents the minimum level of short-term pay that induces effort when the manager chooses $m = 0$. Thus, if $\frac{B}{\bar{e}} > \frac{\gamma}{(1 - \beta c\ell)m}$ the manipulation problem is severe, that is, full short-term compensation contracts induce manipulation.

What is the role of clawbacks? Clawback provisions have the obvious effect of reducing compensation costs through the recovery of short-term pay, provided that the manager manipulates. But conditions (5) and (6) also show that a clawback provision, $c = 1$, (i) affects qualitatively equivalent to an increase in the personal cost of manipulation for the manager and (ii) improves the effort incentives of short-term compensation. In other words, the manipulation problem becomes less severe, and thus, short-term compensation is more effective at inducing effort. In particular, the effectiveness of the clawback increases with $\beta$ and $\ell$, since long-term and short-term rewards give similar utility to the $.\]
manager and shareholders can recover more compensation. The reduction in the costs of short-term compensation may hint in principle that deferred compensation and clawback adoption are substitutes. However, this may not always be the case as shown below.

**Contracts without clawback**

To better understand the mechanisms at play, I first study the candidate configurations of the optimal contract in the absence of clawbacks, \( c = 0 \). The next proposition shows that short-term compensation contracts are optimal when the manipulation problem is weak, and shareholders attain the minimum compensation cost, given by \( B \).

**Proposition 1.** If \( \frac{B}{\bar{\epsilon}} \leq \frac{\gamma}{m} \) the optimal contract without clawback pays only a short-term bonus \( w_H = \frac{B}{\bar{\epsilon}} \) and features no manipulation, \( m = 0 \). The expected cost of this contract is \( B \).

Conversely, when manipulation incentives are severe, the optimal contract generates compensation costs for shareholders that are higher than \( B \). I characterize the candidate configurations of the optimal contract in the next proposition.

**Proposition 2.** If \( \frac{B}{\bar{\epsilon}} > \frac{\gamma}{m} \) the optimal contract without clawback is the cheapest of the following:

1. A combination of short-term and long-term compensation that induces no manipulation, namely

   \[
   w_H = \frac{\gamma}{m} \quad \text{and} \quad w_{HH} = \frac{1}{\beta} \left( \frac{B}{\bar{\epsilon}} - \frac{\gamma}{m} \right). \tag{7}
   \]

   The expected cost of this contract is
   \[
   W_{S+L} = B + \frac{1-\beta}{\beta} \left( B - \frac{\gamma}{m} \right) > B.
   \]

2. Short-term compensation, featuring manipulation, namely

   \[
   w_H = \frac{B/\bar{\epsilon} - \gamma}{1 - \frac{m}{1-m}} \quad \text{and} \quad w_{HH} = 0. \tag{8}
   \]

   The expected cost of this contract is
   \[
   W_S = \left( \frac{\bar{\epsilon}}{\bar{\epsilon} + \frac{m}{1-m}} \right) \left( \frac{B}{\bar{\epsilon}} - \gamma \right) > B.
   \]

To sum up, when manipulation incentives are severe, the optimal contract without clawback has one of two possible configurations. The first is a partly-deferred compensation contract that deters manipulation, \( m = 0 \). In this contract, \( w_H \) and \( w_{HH} \) are set at those levels that, respectively, prevent manipulation and minimize the cost of deferrals generated by \( \beta < 1 \).
The second, meanwhile, is an entirely short-term compensation contract that features manipulation as a second-best side effect, $m = \bar{m}$. The term $\frac{1}{1 - m}$ in equation (8) shows how short-term incentive compensation must be relatively more "high-powered" to induce the desired effort incentives. That is, given a set of parameters, contracts that induce manipulation must feature higher performance sensitivity of short-term pay. Moreover, shareholders must compensate the manager more frequently, with probability $\bar{c} + (1 - \bar{c})\bar{m}$, due to manipulation.

**Contracts with clawback**

Now I study the configurations of the optimal contract conditional on clawback adoption, $c = 1$. The next two propositions show the candidate contract configurations, which are analogous to Propositions 1 and 2, with the additional feature that the clawback provision reduces the manager’s rewards from manipulation.

**Proposition 3.** If \( \frac{B}{\bar{c}} \leq \frac{\gamma}{(1 - \beta \ell)\bar{m}} \) the optimal contract with clawback pays $w_H = \frac{B}{\bar{c}}$, features no manipulation, $m = 0$, and has a cost $B + \kappa$.

The adoption of a clawback expands the region of parameters where the manipulation problem is weak and using short-term compensation is optimal. The expansion is greater as the degree of recovery, $\ell$, and managerial discounting, $\beta$, increase, since the clawback is more effective. However, a clawback may not be sufficient to remove the manipulation incentives induced by fully short-term compensation contracts. The manager may still enjoy some stream of short-term consumption that exceeds the costs of manipulation. In that case, shareholders can either tolerate manipulation or defer compensation and incur in some deferral costs in analogy with Proposition 2, as the following proposition shows.

**Proposition 4.** If \( \frac{B}{\bar{c}} > \frac{\gamma}{(1 - \beta \ell)\bar{m}} \) the optimal contract with clawback is the cheapest of the following:

1. A combination of short-term and long-term compensation that induces no manipulation, namely

   $$w_H = \frac{\gamma}{(1 - \beta \ell)\bar{m}} \text{ and } w_{HH} = \frac{1}{\beta} \left( \frac{B}{\bar{c}} - \frac{\gamma}{(1 - \beta \ell)\bar{m}} \right).$$

   The compensation cost of this contract is $W_{C,S+L} = B + \frac{1 - \beta}{\beta} \left[ B - \frac{\gamma}{(1 - \beta \ell)\bar{m}} \right] < W_{S+L}$.

2. Short-term compensation, featuring manipulation, namely

   $$w_H = \frac{B/\bar{c} - \gamma}{1 - \bar{m}(1 - \beta \ell)} \text{ and } w_{HH} = 0.$$
The compensation cost of this contract is \[ W_{C,S} = \frac{\pi+(1-\pi)\overline{m}(1-\ell)}{1-\overline{m}(1-\beta\ell)} \left( \frac{B}{\overline{r}} - \gamma \right) < W_S. \]

Then, the cost of the clawback contract is \[ W_C + \kappa = \min \{ W_{C,S} + L, W_{C,S} \} + \kappa. \]

Hence, contracts with clawback allow shareholders to reduce the direct compensation burden— net of enforcement costs \( \kappa \)— relative to the contracts without clawback. A clawback contract reduces the manager’s temptation to choose \( m = \overline{m} \) at \( t = 1 \) and, thus, \( \epsilon = 0 \) at \( t = 0 \).

Clawback provisions alleviate the manipulation problem induced by short-term compensation, but the optimal contract may differ from an exclusively short-term compensation contract. Clawbacks allow shareholders to make the final payoff to the manager contingent on the long-term realization of cash flows while avoiding the deferral costs. However, a fully short-term compensation contract may still induce manipulation and pay the manager with a higher frequency, due to the limited recovery \( \ell < 1 \), than the contract with deferred compensation. Thus, shareholders may opt to defer compensation with a clawback provision because it allows putting greater weight on short-term incentives while incurring in lower deferral costs than in the equivalent contract without clawback. The next proposition states that the partly-deferred compensation clawback contract arises as a candidate optimal contract only if shareholders face a limited recovery.

**Proposition 5.** If clawbacks have perfect recovery, \( \ell = 1 \), the optimal contract with clawback is always an exclusively short-term compensation contract.

The optimal clawback contract with perfect recovery is always short-term compensation because shareholders avoid the costs of deferrals, \( \beta < 1 \), and pay the manager with the same frequency as in a contract with long-term compensation and no manipulation— i.e., with probability \( \pi \). That is, the optimal clawback contract is equivalent to a contingent-deferred compensation contract in which shareholders save from the costs of deferrals. The existence of limited recovery makes short-term contracts with clawback less attractive because the manager can obtain rents from manipulation that exceed the costs for shareholders of partly deferring manipulation.

### 4.2 Optimal contracts and empirical predictions

Here I summarize the main implications of the model. First, I analyze the optimal contracts when clawbacks are unenforceable. In particular, I highlight the regions of parameters where manipulation is an optimal outcome and its implications on the structure
of compensation. Second, I provide predictions for the effects of clawback adoption on manipulation and the structure of managerial compensation.

The case of unenforceable clawbacks

Suppose that clawback provisions are unenforceable. For instance, the legal framework may rule out the violation of managerial limited liability or the recovery may be too costly or too limited. There exist three possible configurations of the optimal contract. First, if the manipulation problem is weak, Proposition 1 states that the optimal contract is always a short-term compensation contract that induces no manipulation. Second, under a severe manipulation problem, Proposition 2 states that shareholders choose between two contract configurations. The first is a short-term compensation contract with manipulation and cost $W_S$, which requires shareholders to pay high and frequent short-term bonuses. The second is a contract with partly deferred compensation and cost $W_{S+L}$, which deters manipulation but requires costly deferrals. The next proposition provides the conditions under which manipulation and short-term compensation are the optimal outcomes.

**Proposition 6.** Suppose that clawback provisions are unenforceable. The contract that features exclusively short-term compensation and induces manipulation is optimal ($W_S < W_{S+L}$) when $B$ is high, $\beta$ is low and $\gamma$ is low.

Figure 2 illustrates the configuration of the optimal contracts without clawbacks in the space delimited by the managerial private benefits $B$ and discount factor $\beta$. Three regions appear in the space of parameters: (i) the region $(S, 0)$ where full short-term contracts without manipulation are feasible, $B/e \leq \gamma/m$, and optimal, (ii) the region $(S + L, 0)$ where partly-deferred compensation contracts are optimal and (iii) the region $(S, m)$ where full short-term contracts with manipulation are optimal. Consistent with the predictions of Proposition 6, manipulation is optimal for high private benefits and low discount factors. Moreover, a reduction in the parameter $\gamma$ expands the region $(S, m)$, against a contraction in the other two regions.

Are the predictions of Proposition 6 consistent with the empirical literature? In the model, manipulation is the optimal outcome when the managerial discount factor, $\beta$, is sufficiently low, i.e. when deferring compensation becomes significantly expensive. Biggerstaff et al. (2015) and Hazarika et al. (2012) find that more intense forced CEO turnover, a possible proxy for a low $\beta$, is associated with more intense earnings management and misbehaviour.

Besides, manipulation is optimal when the private benefits $B$ are high since the cost of
deferrals exceeds the manipulation rents of the manager. A suitable proxy for $B$ is firm size. For instance, Gayle et al. (2015) show that firm size differentials in the level of executive compensation can be explained by shareholders receiving noisier information about managerial performance in bigger firms.\footnote{Alternative interpretations for the relationship between moral hazard, firm size, and executive compensation appear in Dicks (2012), Edmans et al. (2009) and Gayle and Miller (2009).} Regarding the relationship between accounting manipulation and firm size, Burgstahler and Dichev (1997) report that medium-sized and big firms tend to show extensive earnings management to avoid earnings decreases. In addition, Nelson et al. (2002) show that Big 4 audit firms are more likely to accept attempts of earnings management made by bigger firms.

Lastly, manipulation is optimal when the personal costs of manipulation $\gamma$ decrease, which increases the required level of costly deferrals in the partly-deferred compensation contract. Suitable proxies for $\gamma$ are measures of the strength of \textit{ex-ante} monitoring or proxies for earnings manipulation. However, manipulation is an endogenous outcome determined by the, also endogenous, structure of managerial incentives. Hence, the empirical predictions regarding $\gamma$ are harder to test.\footnote{Proposition 6 is silent about the effect of the intensity of manipulation, $\overline{m}$, and the probability of high cash flows, $\overline{\tau}$, on the optimality of manipulation contracts. This is because manipulation is the optimal outcome for intermediate values of both parameters, i.e., when manipulation represents a mild and not too frequent possibility. This is consistent with real-world cases where manipulation scandals often arise as a surprise, as argued by Peng and Röell (2014). That is, the \textit{ex-ante} adjustment in security prices is small given the little likelihood of manipulation, so the \textit{ex-post} reaction in prices after the detection must be large (Benmelech et al., 2010, Kedia and Philippon, 2009).}
Effects of clawback adoption

If clawback adoption is feasible but subject to frictions, what is the impact of clawbacks on the optimal time structure of compensation and the extent of manipulation? Here I discuss the predictions of how firms adapt their compensation structures and how manipulation changes after an exogenous reduction in the enforcement costs, $\kappa$, that leads to clawback adoption—e.g., driven by changes in regulation, firm-specific governance structures, or by spillovers that arise from peer firms’ adoption.

Figure 3 illustrates the effects of clawback adoption on the optimal contract configurations when enforcement costs drop to zero, but recovery is still limited, $\ell < 1$. In such situation, adoption is always optimal in the region where $B/\overline{e} > \gamma/\overline{m}$, since clawbacks always reduce compensation costs, while it adds no value for $B/\overline{e} \leq \gamma/\overline{m}$.

Two main features of Figure 3 are noticeable regarding the impact of clawback adoption on the extent of manipulation. The first is that, as it follows from Proposition 3, clawbacks expand the region of parameters where managers abstain from manipulation while receiving all incentives in the short-term—region $(S,0)$ expands on the right panel of Figure 3 relative to the left panel. The second feature is that clawback adoption removes manipulation in part of the region of parameters where, without clawback, manipulation is optimal—region $(S,\overline{m})$ on the left panel. Specifically, the reduction in manipulation happens because a clawback (i) is effective at deterring manipulation in a fully short-term contract—switch to region $(S,0)$—or (ii) increases the attractiveness of deferred compensation contracts—switch to region $(S + L,0)$. Importantly, as Proposition 5 highlights, the latter case is possible only because of a limited clawback recovery, $\ell < 1$.

Figure 3 also illustrates that the impact of clawback adoption on the structure of managerial compensation is heterogeneous across the pre-adoption structure of compensation. In the region where deferring some part of compensation is optimal without clawbacks—region $(S+L,0)$ on the left panel—, clawback adoption increases the performance sensitivity of short-term compensation. This is because, starting from a pre-adoption short-term payment of $\gamma/\overline{m}$ that is insufficient to provide all effort incentives, firms (i) switch to fully short-term contracts or (ii) stick to partly-deferred compensation that pays $\gamma/(1 - \beta \ell)\overline{m}$ in the short-term and defers a smaller part of incentives. Consequently, firms in region $(S + L,0)$ on the left panel also reduce the performance sensitivity of long-term compensation.\(^{27}\)

\(^{26}\)Therefore, the discussion about the effects of clawback adoption is meaningful for the space of parameters where $B/\overline{e} > \gamma/\overline{m}$ and clawbacks have some effect.

\(^{27}\)The increased reliance on short-term compensation structures may have side effects on the intensity
Figure 3: Configuration of optimal contracts in the \((B, \beta)\) space. The left panel depicts the case where clawback provisions are unenforceable. \((S, 0)\) denotes the region where short-term contracts are optimal without manipulation, \((S, m)\) denotes the region where short-term contracts are optimal and induce manipulation, \((S + L, 0)\) denotes the region where contracts with deferred compensation are optimal. The right panel depicts the case where clawback provisions are enforceable at no cost, \(\kappa = 0\), but recovery is limited, \(\ell < 1\). The dashed lines on the right-hand panel represent the frontiers that delimit the three regions of optimal contracts on the left panel.

In the region where manipulation is optimal without clawbacks—\((S, m)\) on the left panel of Figure 3—, firms reduce the performance sensitivity of short-term compensation. This is because (i) firms stick to fully short-term compensation contracts, with clawbacks reducing the slope of short-term incentives, or (ii) firms switch to partly-deferred compensation structures because of the limited enforcement of clawbacks. More specifically, in the latter group, firms increase the performance sensitivity of long-term compensation relative to the pre-adoption scenario.\(^{28}\) I summarize the above discussion in the following prediction.

\(^{28}\) It is easily verified that the level of short-term compensation in a contract with manipulation and without clawback exceed the level of short-term compensation in a clawback contract with partly-deferred compensation.
Prediction. Effects of clawback adoption on the structure of managerial compensation:

- Adopting firms that rely on deferred compensation and deter manipulation before the adoption increase the performance sensitivity of short-term compensation and reduce the performance sensitivity of long-term compensation after the adoption.

- In contrast, adopting firms that rely on short-term compensation and induce manipulation before the adoption reduce the performance sensitivity of short-term compensation after the adoption. Moreover, in the presence of enforcement frictions, this subset of firms may increase the performance sensitivity of long-term compensation.

5 Empirical evidence

In this section, I provide empirical evidence about the predictions of the model. First, I show that firm size, director independence and clawback adoption in the same two-digit SIC industry are the most relevant determinants of clawback adoption. Second, I posit an instrumental variables strategy that exploits the cross-industry variation in clawback adoption. I find that the presence of a clawback provision reduces the intensity of accounting manipulation. However, the reduction is lower for firms that pre-adoption rely relatively more on short-term compensation, firms that also increase the level of deferred compensation after the adoption decision. The empirical evidence, interpreted through the lenses of the theoretical model, lends itself to provide a policy evaluation of the effects of clawback adoption.

5.1 Data

I compile a dataset that includes information on executive compensation, earnings announcements and clawback adoption in U.S. public firms for the 2002-2016 period. I extract executive compensation and firm-level information from Execucomp and Compustat, earnings forecasts and announcements from IBES, director information from ISS and restatement information from Audit Analytics. Moreover, I construct a clawback adoption database by using a web crawler that extracts keywords related to clawback provisions from DEF14A proxy statements in the SEC’s EDGAR database.29

As a measure of managerial incentives, I consider the wealth-performance sensitivity of executive compensation, following Edmans et al. (2009). This variable, denoted by $\Delta_{Total}$, measures the increase in an executive’s wealth (in million dollars) out of a one

29I provide further details on the construction of the dataset in Appendix D.
percent increase in shareholder value. To analyze the time structure of incentive pay, I split $\Delta_{Total}$ into two components. First, I denote by $\Delta_S$ the wealth increase from the portfolio of vested stock and stock options, whose liquidation value is more sensitive to short-term manipulation decisions. The remaining part of $\Delta_{Total}$ represents the long-term component of incentives, denoted by $\Delta_L$.\(^{30}\)

Firms tend to embark on earnings management around analysts’ forecasts, or “meet-or-beat” behavior (Dechow et al., 2010).\(^{31}\) Managers with stock-based compensation have incentives to embark in earnings management because firms that meet or beat analyst forecasts obtain higher valuations or abnormal returns (Bird et al., 2016, Kasznik and McNichols, 2002).\(^{32}\) Therefore, I define the indicator variable $Meet$ that takes a value of one when a firm reports earnings per share $\$0.01$ below or above the median of the last record of analysts’ forecasts, and zero otherwise (Dehaan et al., 2013). As an alternative measure of accounting manipulation, I also consider financial restatements, denoted by the indicator variable $Restate$.\(^{33}\)

I report in Appendix D univariate tests across the samples of $Meet$ and $Restate$ as well as the definitions of other variables. The tests show that firms that accounting manipulation is associated with less intense monitoring— proxied by the number of independent directors and CEO tenure— and steeper short-term incentives— proxied by the ratio $\Delta_S/\Delta_{Total}$. Furthermore, in Appendix E I provide empirical evidence that suggests that compensation structures tilted towards the short-term are linked to accounting manipulation practices. Specifically, I show that short-term incentives are relatively steeper when executives display a high frequency of past manipulation, proxied by the meet behavior and financial restatements. The results hold controlling for several firm characteristics, firm fixed effects and firm-executive fixed effects. Thus, the results are in line with share-

\(^{30}\)Appendix D provides the details on the computation of the wealth-performance sensitivities. Some part of the long-term wealth-performance sensitivity, $\Delta_L$, may vest in a few months, akin to a short-term component. Thus, the measured $\Delta_L$ represents an upper bound on the value of illiquid securities held by an executive.

\(^{31}\)Dechow et al. (2010) argue that “meet-or-beat” behavior is informative about earnings management practices. Firms use several mechanisms to meet earnings forecasts, such as managing tax expenses or accruals (Dhaliwal et al., 2004), managing the classification of items (McVay, 2006), managing accruals (Moehrl, 2002), or repurchasing stock, and selling fixed assets or marketable securities (Bens et al., 2003, Herrmann et al., 2003, Hribar et al., 2006). Moreover, this type of behavior is related to lower audit quality (Frankel et al., 2002).

\(^{32}\)Keung et al. (2010) and Koh et al. (2008) find that “meet and beat” generates abnormal returns that decreased after the early 2000s accounting scandals. Firms seem to obtain lower rewards despite “meet and beat” being associated with higher future cash flows. Thus, investors and analysts must associate certain firms with manipulation activities. However, firms that systematically meet or beat the earnings forecasts obtain longer strings of higher returns (Myers et al., 2007, Kasznik and McNichols, 2002, Barth et al., 1999). In a regression-discontinuity setting Bird et al. (2016) find that investors reward firms that just-meet the consensus forecast with 1.5 percentage points higher cumulative market-adjusted returns.

\(^{33}\)The frequency of financial restatements is a less powerful measure of earnings manipulation. The amendment of financial statements depends largely on the willingness of executives to accept a restate-

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holders having to provide steeper incentives to induce better decision-making by those managers that report accounting information of lower quality. Moreover, results from logit estimations suggest that steeper *ex-ante* short-term incentives are associated with *ex-post* higher probability of meeting or beating the analysts’ forecasts.\textsuperscript{34} Thus, managers behave opportunistically to boost their compensation by meeting the earnings forecasts.

### 5.2 The determinants and effects of clawback adoption

Table 1 reports estimation results that uncover the main determinants of clawback adoption. Specifically, I estimate logit models for the probability of a firm having a clawback provision, conditional on a set of firm characteristics. The first column reports that firm size, director independence, and peer adoption have a positive and statistically significant relationship with the likelihood of clawback adoption. The analysis by different time windows, second to fourth columns, confirms that smaller firms tend to adopt later, while peer adoption—measured by the adoption share in the same two-digit SIC industry—becomes significant in the post-Dodd Frank (2010) period. Furthermore, adoption is negatively associated with firms having a Big 4 audit firm in the initial years of the period.

These descriptive results hint that early adopters are bigger, either because these firms face more severe agency problems (Gayle et al., 2015), they face smaller enforcement costs or are subject to stronger monitoring from regulators or proxy advisory firms.\textsuperscript{35} In addition, the fact that early adopters have more independent directors suggest that lower enforcement frictions are an important determinant of clawback adoption. The correlation between individual and industry adoption—even after controlling for other relevant firm characteristics—highlights that adoption by more firms within and industry provides useful information or generates spillovers or complementarities over other firms.

In the remainder of this section I estimate the effects of clawback adoption on outcome variables of interest, namely the time structure of executive compensation and the frequency of manipulation. In particular, the interest lies on testing the implications of the model that state the heterogeneous response of compensation structures to clawback adoption across the pre-adoption importance of short-term incentives, taken as a proxy for the weakness of internal monitoring and accounting manipulation incentives. I postulate the following empirical specification for an outcome variable $y$ for executive $i$, firm $\textsuperscript{34}$The results are in line with those of Burns and Kedia (2006) that find that the slope of the vested stock options is steeper for firms that *ex-post* embark on fraud.

\textsuperscript{35}I report in Appendix D univariate tests across the samples of clawback adopters and non-adopters.
## Table 1: Determinants of clawback adoption: Logit estimations

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<th>(2)</th>
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<td>0.172</td>
<td>0.115</td>
</tr>
<tr>
<td>Adopters</td>
<td>3,684</td>
<td>90</td>
<td>970</td>
<td>2,431</td>
</tr>
<tr>
<td>Pr. of clawback</td>
<td>0.298</td>
<td>0.019</td>
<td>0.308</td>
<td>0.753</td>
</tr>
<tr>
<td>Year FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

This table reports the results from logit estimations for the probability of a firm having a clawback provision in the 2002-2016 period. I define industry adoption as the lagged leave-one-out value-weighted share of adopting firms in the same industry at the two-digit SIC level. Meet Freq., Restate Freq. and Loss Freq. represent, respectively, the average frequency of forecasts-meeting, financial restatements and loss across a firm’s executives. Adopters reports the number of firm-year observations in which a clawback exists. Pr. of adoption reports the predicted probability of adoption when the explanatory variables take their average value. The remaining variable definitions appear in Appendix D. Standard errors clustered at the two-digit SIC industry level in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. 

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\( y_{ijgt} = \alpha_1 \text{Clawback}_{ijgt} + \alpha_2 \text{Clawback}_{ijgt} \times \left( \frac{\Delta S}{\Delta \text{Total}} \right)_{jg2002} + \Lambda' X_{ijgt} + \eta_j + \varepsilon_{ijgt} \) (9)

where \( i \) indexes an executive, \( j \) a firm, \( k \) an industry and \( t \) time. \( \text{Clawback}_{ijgt} \) is an indicator variable that identifies a clawback adopter and \((\Delta S/\Delta \text{Total})_{jg2002}\) is the average share of short-term incentives in firm \( j \) in year 2002. I choose the year 2002 as the reference pre-adoption period since clawback adoption was negligible and clawback regulations were non-existent at that point. \( \eta_j \) represents firm fixed effects that control for fixed unobservable determinants of the outcome variables and \( X_{ijkt} \) is a set of controls—explained below in detail—that include time fixed effects.

The empirical prediction of the model states that, first, if \( y \) is the measure of long-term compensation, \( \Delta_L \), the coefficient \( \alpha_1 \) is negative, since clawbacks reduce the relative cost of short-term incentive compensation. But, importantly, the model predicts that a positive net effect of clawbacks, \( \alpha_1 + \alpha_2 \Delta S/\Delta \text{Total} > 0 \), happens only because enforcement entails frictions that limit the recovery and provide an advantage to deferred compensation. Such frictions are more prevalent in firms with weaker monitoring, which must provide greater short-term rents to the manager.

Second, if \( y \) represents the short-term part of compensation, \( \Delta_S \), the model predicts a positive value for \( \alpha_1 \) and a negative value for \( \alpha_2 \). That is, firms switch to short-term incentive compensation since it becomes cheaper than deferred pay, but firms with already relatively high short-term incentives will reduce the slope of short-term compensation because the clawback provision reduces the manipulation rewards. Lastly, if \( y \) is a measure of total incentives, \( \Delta \text{Total} \), \( \alpha_1 \) is negative and \( \alpha_2 \) is positive. That is, clawbacks reduce the cost of inducing effort, but the reduction is smaller for those firms with weaker monitoring structures.

The main identification concern is that clawback adoption may be correlated with unobservable, omitted time-varying factors that are also correlated with the outcome variables. For instance, firms can experience changes in ownership or governance that shift preferences of shareholders or directors. Such shift in preferences may lead firms to set short-term performance targets as well as adopting additional governance provisions that improve the monitoring of managerial actions. Thus, the adoption of clawbacks may be correlated with unobservable factors that increase the relative importance of short-term incentives and simultaneously reduce manipulation.\(^{36}\)

\(^{36}\)In addition, firms may be constrained by (unobservable) competition for talent constraints that limit the capacity of shareholders to adopt the clawback and the structure of compensation and manipulation (Dicks, 2012 and Acharya and Volpin, 2009). Thus, the adoption of a clawback may be correlated with changes in competitive pressures that lead to additional changes in the incentive compensation.
I posit an instrumental variables (IV) strategy to ameliorate the endogeneity of clawback adoption. Specifically, I exploit the wave of clawback adoption and the cross-industry variation in clawback adoption shares as a source of exogenous variation. I construct the instrumental variable as follows. For each industry $g$— defined at the two-digit SIC level— I compute the value-weighted share of clawback adoption, that is

$$\text{Adoption}_{gt} = \frac{\sum_j \text{Firm value}_{jgt}}{\sum_h \text{Firm value}_{hgt}} \times \text{Clawback}_{jgt}.$$ 

The reason for weighting by firm value is that—as reported in Table 1— bigger firms are early-adopters, and their adoption decision may be more informative about the value of clawbacks for the remaining, smaller, firms in an industry. However, $\text{Adoption}_{gt}$ is not a suitable instrument for individual clawback adoption. For instance, adoption by other firms in an industry can relax competitive pressures for talent within the industry and alter compensation structures at the individual firm (Dicks, 2012 and Acharya and Volpin, 2009). Moreover, firms may face reputation losses if their managers manipulate while shareholders in peer firms can use clawbacks at disposal to deter or punish manipulation. Such a reputation channel may induce changes in compensation structures and monitoring structures beyond the adoption of a clawback. Thus, to circumvent these issues, I choose as an instrumental variable the “leave-one-out” average adoption share for each industry

$$\text{Adoption Other}_{ht} = \frac{1}{G-1} \sum_{g\neq h} \text{Adoption}_{gt}$$

where $G$ denotes the total number of industries. The relevance of the instrument $\text{Adoption Other}_{ht}$ rests on the existence of cross-industry variation in the pace of clawback adoption. That is, the instrument exploits the within-industry peer effects that—as suggested by the results in Table 1— determine clawback adoption by individual firms and that generate industry-specific movements above/below the economy-wide trend of clawback adoption. That is, due to within-industry spillovers, individual adoption is negatively correlated with the trend of adoption in the remaining industries.

In addition, the IV strategy deals with potential misclassification issues that follow from the web crawler algorithm that I use to identify clawback adoption. This approach also deals with the fact that firms and managers may not disclose the adoption of a clawback in their proxy statements.

The approach to the construction of the instrument is related to the so-called Bartik instruments literature (Goldsmith-Pinkham et al., 2017). In standard applications, the Bartik instrument exploits cross-industry and cross-regional variation to estimate the relationship between regional-level aggregate variables, e.g., wage growth and employment growth at the state level. In contrast, the strategy in this paper differs from the standard Bartik approach in three dimensions. First, I exploit variation at an aggregated level (industry) to estimate the relationship between variables at a more disaggregated level (firm-specific). Second, the instrument is at the same time a weight (averaged across industries) and an aggregate measure. Third, I use the time-varying shares to circumvent the fact that clawback adoption at the beginning of the period of analysis is negligible.
The validity of the instrument rests on the exclusion restriction that unobservable time-varying factors that determine clawback adoption in other industries are uncorrelated with the firm-level outcomes. This condition is satisfied if shareholders value managers according to their industry-specific skills, so competitive pressures are independent of clawback adoption decisions in a different two-digit SIC industry. Moreover, firms must be unaffected by reputation issues when clawback adoption takes place in other industries.

To further alleviate the identification issues (i) I use the lagged value of Adoption Other_{gt} as the instrumental variable in the estimations and (ii) I interact this variable with the inverse of (log) firm value measured as of 2002. The first transformation alleviates the simultaneity of executive compensation decisions across firms. The second maintains the relevance of the instrument since bigger firms are more likely to adopt—as reported in Table 1—when the level of adoption in other industries is small, relative to their industries. Moreover, the interaction with the inverse of firm size makes the exclusion arguments are less restrictive. More specifically, the instrument is valid if omitted factors that determine simultaneously firm size in 2002 and the adoption of clawbacks in other industries in later periods are uncorrelated with the omitted determinants of firm-level outcomes.

The control variables $X_{ijkt}$ in equation (9) include contemporaneous values of firm characteristics: firm size, independent directors and reported earnings. To alleviate endogeneity concerns associated with these controls, I instrument them by their value measured as of 2002, when clawback regulations were non-existent, interacted with time-effects to capture common exogenous trends across firms. The controls also include, depending on the left-hand side variable, the frequency of past forecasts-meeting, the frequency of past negative reported earnings, the frequency of a Big 4 firm being the audit in the past and the (log) average dispersion of past earnings forecasts.

Table 2 reports the estimation results.\textsuperscript{39} The first three columns in the table report the effects of clawback adoption on the structure of executives’ incentives. The estimates in the first column show that clawback adoption reduces the slope of short-term compensation, with the reduction being larger for firms with greater pre-adoption reliance on short-term incentives. In the second column, the estimates suggest that clawback adoption reduces the level of long-term incentives, given by $\Delta_L$, but the reduction is smaller for those firms that relied more on short-term incentives before the adoption. Specifically,\textsuperscript{39}

\textsuperscript{39}For brevity, I report the first stage estimation and OLS results in Appendix E. The OLS results provide a qualitative interpretation similar to 2SLS. However, the estimated net effects of clawback adoption might on the structure of compensation differ from the 2SLS estimates. In particular, the OLS estimates suggest a reduction in the slope of incentives of a smaller magnitude than the 2SLS estimates. Hence, the results suggest that clawback adoption is positively correlated with omitted factors that increase the slope of executive compensation.
the net effect of adoption on the size of long-term incentives is positive for firms with a higher pre-adoption importance of short-term incentives. The third column reports that clawbacks reduce the steepness of total incentives, $\Delta_{Total}$. The reduction is in line with clawbacks being effective at inducing effort incentives at a lower cost. Again, the reduction is smaller for firms with greater pre-adoption reliance on short-term incentives.

Quantitatively, the estimated effects of clawback adoption on the structure of compensation are large. In particular, firms at the 10th percentile of $\Delta_S/\Delta_{Total}$ reduce the slope of long-term incentives by 60 percent. In contrast, firms at the 90th percentile of $\Delta_S/\Delta_{Total}$ increase the slope of long-term incentives by 34 percent. Thus, for the latter subset of firms, clawback adoption leads to an increase in the level of long-term incentives, second column, and a reduction the level of short-term incentives, first column.\(^4\) Similarly, the clawback-induced decrease in the slope of short-term compensation is, respectively, of 24 and 47 percent.

The last two columns in Table 2 confirm that clawback adoption is less effective in firms where short-term incentives are more important in the pre-adoption period. The fourth and fifth column report, respectively, the estimated effects of clawback provisions on the frequency of forecasts-meeting and financial restatements. The results uncover that clawback adoption reduces the frequency of forecasts-meeting and restatements. However, the effect (in absolute value) decreases in the pre-adoption importance of short-term incentives.

In Appendix E I provide robustness tests. First, I show that the results are qualitatively similar when excluding firms in the financial sector and utilities. One important difference is the positive estimated direct effect of clawback adoption on the slope short-term compensation. This suggests that firms with weak monitoring problems substitute deferred pay schemes for short-term pay in the presence of clawbacks.

Second, the effects of clawback adoption are stronger in the pre-Dodd-Frank period—i.e. in the 2002-2011 period. Specifically, the direct effect of clawback adoption on the level of short-term incentives is positive, in line with the theoretical implication that short-term incentive schemes are more effective in the presence of a clawback.

Third, I report the results of including firm-executive fixed effects in the specifications. The results are similar than in the baseline model, which suggests that the adoption of clawbacks in other industries are not systematically correlated with unobservable determin-

\(^4\)From the results in Table 2, the estimated effect at the 10th percentile of $\Delta_S/\Delta_{Total}$ in 2002 (0.39) is $-1.90+2.50 \times 0.39 \approx -0.93$, so the net effect is $\exp(-0.93) - 1 = -0.60$. Similarly, the estimated effect at the 90th percentile of $\Delta_S/\Delta_{Total}$ in 2002 (0.87) is $-1.90+2.50 \times 0.87 \approx 0.29$, so the net effect is $\exp(0.29) - 1 = 0.34$.\]
Table 2: Effects of clawback adoption on executive compensation and earnings manipulation

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ln(Δ_S)</td>
<td>Ln(Δ_L)</td>
<td>Ln(Δ_Total)</td>
<td>Meet</td>
<td>Restate</td>
</tr>
<tr>
<td>Clawback</td>
<td>0.015</td>
<td>-1.902***</td>
<td>-0.536***</td>
<td>-0.144***</td>
<td>-0.076**</td>
</tr>
<tr>
<td></td>
<td>(0.096)</td>
<td>(0.081)</td>
<td>(0.053)</td>
<td>(0.038)</td>
<td>(0.039)</td>
</tr>
<tr>
<td>Clawback × (\frac{Δ_S}{Δ_Total})</td>
<td>-0.754***</td>
<td>2.499***</td>
<td>0.370***</td>
<td>0.096***</td>
<td>0.168***</td>
</tr>
<tr>
<td></td>
<td>(0.160)</td>
<td>(0.120)</td>
<td>(0.095)</td>
<td>(0.022)</td>
<td>(0.057)</td>
</tr>
<tr>
<td>Observations</td>
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<td>32,015</td>
<td>32,492</td>
<td>5,262</td>
<td>5,259</td>
</tr>
<tr>
<td>F 1st stage (2)</td>
<td>109.867</td>
<td>130.573</td>
<td>118.335</td>
<td>116.537</td>
<td>123.789</td>
</tr>
<tr>
<td>J test p-value</td>
<td>.645</td>
<td>.404</td>
<td>.787</td>
<td>.515</td>
<td>.468</td>
</tr>
<tr>
<td>Controls</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Year FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Firm FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

This table reports the results from two-stage least squares regressions of executive incentive measures and earnings manipulation proxies on clawback adoption for the 2002-2016 period. I instrument clawback adoption by the leave-one-out average share of adoption across industries lagged one period and interacted with the inverse of (log) firm size in 2002. In the first three columns control variables are log firm size, reported earnings, independent directors, meet frequency and earnings forecasts dispersion. In the last two columns control variables are log firm size, reported earnings, loss frequency, Big 4 frequency, independent directors, CEO tenure and earnings forecasts dispersion. In all columns I instrument log firm size, reported earnings and independent directors by their values measured as of 2002 interacted with year dummies. F 1st stage and F 1st stage (2) denote, respectively, the F statistics of the first stage regressions of clawback adoption and its interaction with \(Δ_S/Δ_{Total}\) in 2002 on the instrumental variable and its interaction with \(Δ_S/Δ_{Total}\) in 2002. The F statistics correspond first stage regressions where exogenous variables are partialled-out. J test p-value reports the p-value for the test of over-identifying restrictions. Variable definitions appear in Appendix D and first stage estimations results in Appendix E. Standard errors clustered at the two-digit SIC industry level in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01.
nants of executive compensation. The quantitative results differ because the identification of the effects of clawbacks relies on the subset of firm-executive pairs with information before and after the adoption of the clawback by the firm.

Fourth, I also report results from augmenting equation (9) with further interaction terms of clawback adoption. Regarding the effects of clawbacks on the size of deferred compensation $\Delta L$, the results suggest that firms that are smaller, have fewer independent directors and have higher leverage increase the slope of long-term compensation after the adoption. The estimated effects of clawback adoption confirm that firms that face more severe *ex-ante* information asymmetries, less effective monitoring or greater enforcement frictions increase the importance of long-term compensation in their incentive packages.

Lastly, I show that the results in Table 2 are very similar when I construct the instrumental variable exploiting firm-specific board interlocks outside from the same industry. This strategy allows the inclusion of industry-time fixed effects that control for industry-specific trends in corporate governance and competition for talent. However, the invariance of the results suggest that Adoption Other$_{gt-1}$ is reasonably exogenous.

6 Discussion of the empirical results and extensions

6.1 Discussion and policy implications

The empirical results suggest that clawback adoption reduces the frequency of accounting manipulation. This is consistent with other results in the literature (Chan et al., 2013, Dehaan et al., 2013). However, the reduction is smaller for firms that before the wave of clawback adoption had compensation structures based on short-term incentives. Besides, the same firms shift towards long-term compensation structures after the adoption. Thus, despite the possibility of clawing back past compensation, some firms switch to compensation schemes where long-term incentives are more important than in the pre-adoption scenario.

From the perspective of the model, the results suggest that shareholders in firms with weaker monitoring— which offer steeper short-term incentives— also face clawback enforcement frictions. In other words, firms that face severe manipulation incentives also face important frictions from recovering previously-awarded short-term pay. The relatively lower reduction in the frequency of manipulation in this subset of firms also suggests that clawbacks have a limited ability to curb earnings manipulation in firms with weak monitoring structures.
From a policy perspective, the process of generalized clawback adoption has achieved two possible objectives of regulators. First, the estimated response of incentive compensation structures to clawback adoption suggests that shareholders reduce the incentive compensation costs associated with earnings manipulation. This reduction unambiguously increases shareholder value in the model. Second, regulators may be especially interested in reducing the frequency of earnings manipulation, for instance, to improve the allocation of capital. The empirical results suggest that clawback adoption reduces the intensity of manipulation and, for some firms, lengthens the horizon of incentive pay. However, clawback provisions seem a less effective tool in firms with already weak monitoring.\footnote{Anecdotal evidence hints that firms prefer to forfeit contingent long-term pay, rather than clawing back past compensation and facing enforcement issues. For instance, of the $69 million clawed back by Wells Fargo from John Stumpf, $41 million took the form of forfeited unvested compensation, while the remaining part was deducted from his pension benefits. In 2012, JP Morgan CEO Jamie Dimon also experienced the forfeiture of 11.5$ million in awards, as well as other senior executives, due to the company’s restatement. See “Wells Fargo CEO’s $41 million ranks only third among executive-pay clawbacks, forfeitures”, MarketWatch, September 29, 2016.}

The new set of worldwide financial regulations foster the lengthening of pay horizons and the adoption of clawbacks.\footnote{See Financial Stability Forum (2009) and “Guidance on sound incentive compensation policies” Federal Register, Vol. 75, No. 122, Friday, June 25, 2010, available at https://occ.gov/news-issuances/federal-register/75fr36395.pdf.} The results provide evidence that firms that respond to eased clawback enforcement by adopting clawbacks and simultaneously increasing the length of executive pay. Thus, policymakers can achieve both objectives of clawback adoption and longer pay horizon by reducing the costs associated with clawback enforcement. However, the severity of the agency and enforcement problems reduce the effectiveness of clawbacks.

### 6.2 A model of governance spillovers

The analysis in the baseline model provides predictions on the determinants and effects of clawback adoption from the perspective of an individual firm. In reality, the share of clawback adopters has increased from almost zero in the early 2000s to 80 percent in 2016. Importantly, this behavior happens in an environment of “soft” government regulation without mandatory compliance. Here, I explore theoretically how governance complementarities or spillovers provide a rationale for “waves” in clawback adoption. Besides, the extensions motivate the empirical strategy of using cross-industry variation in adoption as an instrumental variable to estimate the effects of clawback adoption at the individual firm level.
Consider an economy populated by a unit continuum of identical firms that face the same agency problem as in the baseline model. Suppose that in the absence of clawbacks the manipulation problem is severe, so I let $W = \min\{W_S, W_{S+L}\}$ denote the cost of the optimal contract in the absence of clawbacks. Similarly, I denote by $W_C$ the cost of the optimal contract conditional on clawback adoption.

Firms decide simultaneously on the structure of incentive compensation and clawback adoption, whose enforcement cost depends on the share of firms that have adopted a clawback provision. Specifically, I assume that the cost of clawback enforcement is $\kappa g(q)$ when a share $q \in [0, 1]$ of firms adopt a clawback provision, where $g(q) > 0$ and $g'(q) < 0$. I assume that $g(0) = 1$, so $\kappa$ represents the clawback enforcement costs of a single adopter.

Enforcement costs may decrease with the share of adopters because, for instance, adoption by several firms may convey information about the reduction of clawback enforcement frictions. Moreover, litigations with managers may be less costly or less frequent if clawback provisions represent a standard in corporate governance among peer firms. This assumption is consistent with empirical evidence of Foroughi et al. (2016) and Bouwman (2011) who find that a firm’s propensity to adopt governance provisions increases after other firms in the same board interlock network choose to adopt similar policies. Thus, spillovers are likely drivers of governance trends, such as those related to clawback adoption.\footnote{In Appendix C I derive a micro-foundation for the reduced-form effect of governance spillovers. The derivations show that firms may have reasons to induce the participation of stakeholders by hiding information about the industry profitability through earnings manipulation. In such situation, earnings manipulation decisions become strategic complements, and multiple equilibria may arise regarding the intensity of manipulation and clawback adoption. An alternative story is that shareholders in big firms are constrained in their governance policies by competitive pressures related to the retention of managerial talent, as in Dicks (2012) and Acharya and Volpin (2009). The sudden increase in clawback adoption after the regulatory reforms in 2006 seems consistent with firms experiencing a reduction in their costs of clawback enforcement and larger firms benefit the most, or first, from that reduction. Alternatively, big firms may have benefited from looser competition for talent during and after the 2007-2010 financial crisis. However, the beginning of the clawback adoption wave starts in 2006, before the onset of the crisis, as I show in Figure A.1 in Appendix A.}

Complementarities in the choice of incentive contracts arise since adoption by one firm increases the likelihood of adoption by the remaining firms. This can give rise to a multiplicity of equilibria as follows.\footnote{Formally, the payoff function has increasing differences in other firms’ clawback adoption decision (Vives, 2005). The arguments below also follow if one assumes a discrete number of firms deciding simultaneously the clawback adoption, where $\kappa$ is decreasing in the number of adopters.} An individual firm adopts the clawback if the cost of adoption is below the cost of no adoption, taking $q$ as given:

$$W \geq W_C + \kappa g(q)$$

Hence, multiple equilibria arise if the net gains of a single isolated adoption are negative,
but generalized adoption at the economy level, \( q = 1 \), makes adoption valuable. Thus, the next proposition follows without proof.

**Proposition 7.** There exist parameter configurations satisfying

\[
\kappa \geq W - W_C \geq \kappa g(1)
\]

for which two stable Nash equilibria exist: one with no adoption, \( q = 0 \), and another with full adoption, \( q = 1 \).

The multiplicity of equilibria regarding clawback adoption also represents multiplicity regarding earnings manipulation if the clawback provision deters manipulation. In one equilibrium, firms adopt governance tools that deter manipulation and become legal standards with a low enforcement cost for each firm. In the other equilibrium, firms do not adopt due to enforcement costs, manipulation takes place, and managers extract higher rents.\(^{45}\)

### 6.3 Governance spillovers and firm heterogeneity

In the presence of multiple equilibria, what fundamentals can determine the early or late-adopter nature of a single firm or an industry? Here I explore the effects of firm heterogeneity on the timing of clawback adoption decisions after regulations that reduce the clawback enforcement costs. Suppose that firms are heterogeneous across a dimension \( \theta \) that impacts the cost of clawback enforcement and follows a distribution function \( F \) on the interval \([\underline{\theta}, \overline{\theta}]\). That is, assume that \( \kappa(\theta) \) represents the clawback enforcement costs, for a firm of type \( \theta \), with \( \kappa'(\theta) > 0 \). The idea is that firms are heterogeneous in the strength of their *ex-post* enforcement or the legal protection of managers. Therefore, clawback adoption of a type \( \theta \) takes place if, for a share of adoption \( q \),

\[
W_C - \kappa(\theta)g(q) < W
\]

Thus, adoption is optimal at least for a share \( F(\theta) \) of firms.

For illustration purposes I make the next assumptions. Assume that \( \underline{\theta} \geq 0 \) and \( \kappa(\theta) = k_0 \theta^{k_1} \), where \( k_1 > 0 \) determines the importance of firm heterogeneity on the costs of clawback enforcement.\(^{46}\) Moreover, I assume that the enforcement costs decrease in proportion to the share of adopters, \( g(q) = 1 - q \).

Suppose that \( k_0 \) is a policy parameter that can be affected by clawback regulations. A decrease in \( k_0 \) reduces the importance of heterogeneity in clawback enforcement costs but also reduces the enforcement costs for those firms that are more likely to find adoption

---

\(^{45}\)When multiple equilibria are present there is an unstable equilibrium with a partial share of adopters \( \hat{q} \) that satisfies \( W - W_C = \kappa g(\hat{q}) \).

\(^{46}\)The specification provides equivalent results to assuming that the difference \( W - W_C \) decreases in proportion to \( k_0 \theta^{k_1} \).
individually optimal. The next proposition describes how clawback regulations can affect the equilibrium outcomes and trigger an adoption wave.

**Proposition 8.** Assume that $[1 - F(\theta)]k_0^0\theta^{k_1}$ is concave in $[\theta, \bar{\theta}]$. If $k_0^0\theta^{k_1} \geq W - W_C$ the model has two stable equilibria: No adoption and full adoption. A change in clawback regulations that reduce $k_0$ to $k_0'$ such that $k_0'\theta^{k_1} < W - W_C$ leads to two stable equilibria with positive shares of clawback adoption or to a single equilibrium with full adoption.

Notice that, starting from an equilibrium with no adoption, clawback regulations affect first those firms that enjoy lower firm-specific enforcement costs, lower $\kappa(\theta)$. Thus, cross-industry heterogeneity in the share of clawback adopters can be explained by a prevalence of firms with better ex-post enforcement structures, such as the degree of director independence. Equivalently, the argument is valid if firms are heterogeneous regarding the direct compensation savings from clawback adoption, $W - W_C$. That is, industry adoption will take place first in industries where firms face more severe agency and manipulation problems.

**7 Conclusions**

In this paper, I study both theoretically and empirically the role of adopting clawback provisions when enforcement frictions are present. I develop a theoretical model to provide a rationale for the determinants and effects of the adoption of clawback provisions that are directed to alleviate earnings manipulation problems. The model offers a stylized but general framework with three key mechanisms: (i) manipulation incentives induced by short-term compensation structures, (ii) managerial impatience that makes long-term compensation costly and (iii) clawback provisions that are costly to enforce and have a limited recovery.

The model predicts that contracts that induce accounting manipulation must feature steeper short-term compensation. Besides, clawback adoption reduces earnings manipulation through two channels. First, when the threat of recovery deters manipulation in contracts that feature exclusively short-term compensation. Second, when shareholders find valuable to shift to partly-deferred compensation structures, due to their limited enforcement capacity. Thus, clawback adoption and deferred compensation schemes may become complementary tools to deter manipulation.

I posit an instrumental variables strategy to identify the effects of clawbacks, by exploiting cross-industry variation in clawback adoption. The estimations show that clawback adoption reduces the frequency of accounting manipulation, with the reduction be-
ing lower for firms that before the adoption rely more on short-term compensation. This subset of firms also tilts their compensation towards the long-term. Thus, clawbacks allow firms to reduce the rent-extraction and the intensity of manipulation. Nonetheless, from the perspective of the theoretical model, some firms expect a limited recovery and also limited effectiveness of clawbacks as a way to deter manipulation. Thus, clawback adoption and deferred compensation are both necessary to reduce the rent-extraction of managers associated with accounting manipulation.

Additional theoretical extensions deserve further discussion. For instance, manipulation may generate real costs to shareholders regarding reputation or lower liquidity services. These considerations can be captured in a reduced-form manner by a decrease in clawback enforcement costs and favor the clawback adoption decision. In a similar vein, shareholders may need to induce the participation of the manager against alternative outside options. Then, the optimal contract is determined by the potential side-effects of manipulation faced by shareholders, since the expected compensation costs are pinned down by the outside option of the manager. With a binding participation constraint, the criterion for the choice of optimal contracts differ. However, I conjecture that the impact of manipulation and clawback adoption on the time structure of compensation, the focus of this paper, remains very similar.

While the reduced-form results provide a qualitative assessment of the theoretical mechanisms, it is of quantitative relevance to measuring the size of the clawback enforcement frictions and the extent of manipulation incentives. For this purpose, the theoretical model offers a suitable framework for structural estimation. A strategy that combines the structural and reduced-form approaches and that exploits the exogeneity of peer adoption may provide deeper insights for future research.

To conclude, policymakers agree on the need to regulate executive pay, but academics have not found the exact market failures that executive pay regulation may solve vis-à-vis other, and in principle more simple, regulation tools. Edmans et al. (2017b) argue that regulation that directly targets shareholder incentives or disclosure policies are more effective than outright interventions in executive pay. Further research effort must be devoted to studying these conflicting views. Moreover, cyclical increases in executive compensation provide early signals of imbalances and manipulation or misconduct at the industry or economy-wide level (Albuquerque et al., 2017). Thus, understanding compensation cycles and its relationship with accounting manipulation represents an interesting field for future research.
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A  Institutional background: The rise of clawbacks

In this Appendix, I describe the institutional background underlying the generalized adoption of clawback provisions across U.S. publicly-traded firms. In general, clawback
provisions are contractual clauses that specify the conditions under which the firm can recover previously paid-out compensation. Importantly, while shareholders can, in general, prosecute and ask for recoupment from managers that embark in misconduct, clawback provisions allow the recovery of managerial pay at a lower risk of facing legal disputes due to its contractual nature. Publicly-traded firms have adopted their private clawback provisions independent of any regulatory requirements. Nevertheless, these provisions have become much more common in recent years, especially after the enactment of Dodd-Frank.

Figure A.1 illustrates the clawback adoption wave in the U.S. since the year 2002, when the Sarbanes-Oxley Act was enacted. Clawback adoption is measured as the value-weighted percentage of firms within an industry with clawbacks, i.e., it measures the share of aggregate industry value that has a clawback provision. The figure shows how adoption across industries shares a common pattern, starting in 2007, evolving to almost full adoption at the end of the period in 2016. Despite the common pattern of adoption, some cross-industry variation in the pace of adoption prevails throughout the period, with the interquartile difference being above 30%.

**Sarbanes-Oxley clawback (2002)**

The U.S. federal government’s first attempt at regulating clawbacks is section 304 of Sarbanes-Oxley Act (SOX), which enables the Securities and Exchange Commission (SEC) to require the CEO and CFO of a firm to return any bonus or other incentive-
based compensation received within 12 months of an accounting restatement. The SOX clawback allows the SEC to intervene if there is some misconduct associated with the financial restatement, even without the targeted executive being at fault. The SEC has established through case law that only the SEC has the power to enforce SOX section 304. Thus, there is no private right of action.\textsuperscript{47} That is, shareholders must wait for the SEC to trigger the enforcement of SOX section 304.

Fried (2016) reports 14 enforcement actions—covering 21 executives—by the SEC under SOX 304 in the 2002-2012 period. This is despite the thousands of accounting restatements taking place in that period.\textsuperscript{48} Thus, the SOX clawback seems a very unreliable policy to deter manipulation. This is a likely outcome given the limited resources of the SEC, the frequency of restatements and the expensive litigation process needed to prove misconduct.

\textbf{Regulation S-K reform (2006)}

In 2006, the SEC develops new disclosure norms that require publicly-traded firms to disclose in their annual proxy statement\textsuperscript{49}

\begin{quote}
“(…) policies and decisions regarding the adjustment or recovery of awards or payments if the relevant registrant performance measures upon which they are based are restated or otherwise adjusted in a manner that would reduce the size of an award or payment.”
\end{quote}

This reform represents a first milestone in the trend of clawback adoption and disclosure across firms. Companies gradually disclosed in their proxies their ability to recover bonuses to comply with the new rules, which are incremental to SOX 304.

\textbf{TARP clawback (2009)}

In 2009, firms receiving public support through the Troubled Asset Relief Program (TARP) are required by the U.S. government to adopt clawback provisions. The TARP

\textsuperscript{47}See In Re Digimarc Corp. Derivative Litigation, 549 F.3d 1223 (9th Cir. 2008).
\textsuperscript{48}In one of the enforcement actions by the SEC the former CEO of CSK Auto Corporation Maynard Jenkins had to return $2.8 million due to accounting fraud in the years 2002, 2003 and 2004 (Edmans et al., 2017b). Media coverage of SOX clawback enforcement actions appear in “Wells Fargo CEO’s $41 million ranks only third among executive-pay clawbacks, forfeitures”, \textit{MarketWatch}, September 29, 2016.
clawback represents the precursor for the Dodd-Frank clawback. The misconduct or wrongdoing element in the SOX clawback is not present, and it covers parties beyond the CEO and CFO. Indeed, Fried (2016) argues that the TARP clawback is more effective to curb manipulation and misconduct since it does not require a financial restatement or the performance metrics to be based only on accounting measures.

Dodd-Frank Act (2010)

In the aftermath of the financial crisis, the Congress passed the Dodd-Frank Wall Street Reform and Consumer Protection Act. Title IX of the Dodd-Frank Act contains seven sections related to corporate governance issues. Section 954 in its item (b)(2) states that:

“(…) in the event that the issuer is required to prepare an accounting restatement due to the material noncompliance of the issuer with any financial reporting requirement under the securities laws, the issuer will recover from any current or former executive officer of the issuer who received incentive-based compensation (including stock options awarded as compensation) during the 3-year period preceding the date on which the issuer is required to prepare an accounting restatement, based on the erroneous data, in excess of what would have been paid to the executive officer under the accounting restatement.”

Section 954: (i) applies to all current and former executive officers, (ii) requires only material noncompliance without misconduct, and (iii) provides for a three-year lookback. As in the case of firms covered by the TARP program, the trigger of the clawback is automatic and represents a no-fault clause. However, the Dodd-Frank clawback is restricted to financial accounting measures.

Private clawback provisions

Directors or compensation committees can privately seek the recovery of excess pay through a private clawback policy. Usually, clawback provisions specify certain behaviors, such as misconduct, financial misstatements or leaving the company to work for a competitor, that will trigger a clawback (Erkens et al., 2014). However, the frequency of director-initiated recoveries seems low. This is because almost all voluntarily-adopted clawback policies give directors discretion to forego the recovery of excess pay. Directors seem to have strong personal reasons to avoid the recovery of executive pay. Moreover,
in many cases the recovery is impractical, and the legal bill may exceed the amounts to recover.\textsuperscript{50} In any case, anecdotal evidence suggests that recovery is forgone in many cases, but clawbacks are still triggered after severe cases of misconduct, misstatements or misrepresentation. We can expect that clawbacks are here to stay and their enforcement will be more frequent given that most public firms acknowledge the possibility of recovering executive pay.

**Disclosure of clawback policies in DEF 14A proxies**

Here I describe clawback policies, as disclosed by firms in their proxies. I stress how firms react to regulation, highlighting the discretion of boards or certain behaviors that trigger the clawback.

The next excerpt from the 2007 SPRINT Corp. proxy reports the adoption of a clawback provision. This adoption probably responds to the 2006 reform of Regulation S-K. Notice that this clawback policy provides discretion to the board of directors or its committees in the recovery decision. However, this clawback policy is not restricted to financial accounting measures.

"**Clawback Policy**

In December 2006, our board adopted a clawback policy. The policy provides that, in addition to any other remedies available to us under applicable law, we may recover (in whole or in part) any bonus, incentive payment, commission, equity-based award or other compensation received by certain executives, including our named executive officers, if the board or any committee of the board determines that such bonus, incentive payment, commission, equity-based award or other compensation is or was based on any financial results or operating metrics that were impacted by the officer’s knowing or intentional fraudulent or illegal conduct, and our board or a committee of the board determines that recovery is appropriate. We intend to incorporate this policy into our short and long-term incentive plans, and awards granted under those plans, beginning in 2007."

The following excerpt from the 2014 Coca-Cola Co. proxy is representative for the clawback policies after the enactment of Dodd-Frank. It reports a wide range of situations

under which compensation can be clawed back but, in particular, it stresses the case of financial misstatements. More specifically, it highlights the company’s willingness to comply with the requirements of the rulings on the Dodd-Frank clawback regulation.

“Awards under the 2014 Plan will be subject to any compensation recoupment policy that the Company may adopt from time to time that is applicable to the participant. An award agreement may specify that an award will be reduced, cancelled, forfeited or recouped upon certain events, including (i) termination of employment for cause, (ii) violation of material Company and affiliate policies, (iii) breach of noncompetition, confidentiality or other restricted covenants that may apply to the participant, (iv) other conduct by the participant that is detrimental to the business or reputation of the Company or any affiliate, (v) a later determination that the vesting of, or amount realized from, a performance award was based on materially inaccurate financial statements or performance metric criteria, whether or not the participant caused or contributed to such inaccuracy. The Company will also seek to recover any awards made as required by the provisions of the Dodd-Frank Wall Street Reform and Consumer Protection Act or any other law or the listing standards of the NYSE.”

Lastly, the following excerpt from the proxy statement of Bank of America Corporation in 2009 is an example of those firms in the TARP program.

“On February 17, 2009, the American Recovery and Reinvestment Act of 2009, which includes additional restrictions on executive compensation applicable to companies participating in the TARP, was signed into law by President Obama. This law will provide further restrictions on the amount and type of compensation we pay to our executive officers and certain other highly compensated employees; however, the details of those restrictions will not be known until the Treasury Department proposes and finalizes regulations to effectuate the law.

Recoupment Policy

In addition to the recoupment requirements described above as a result of our participation in TARP, if our Board or an appropriate Board committee has determined that any fraud or intentional misconduct by one or more executive officers caused us, directly or indirectly, to restate our financial statements, the Board or committee will take, in its sole discretion, such action as it deems necessary to remedy the misconduct and prevent its recurrence.
The Board or committee may require reimbursement of any bonus or incentive compensation awarded to such officers or cancel unvested restricted stock or outstanding stock option awards previously granted to such officers in the amount by which such compensation exceeded any lower payment that would have been made based on the restated financial results.9

The Wells Fargo scandal

The development of several recent scandals manifests that policymakers, corporate governance practitioners, and the public opinion consider the application of clawbacks as an important and relevant device. The Wells Fargo bogus accounts scandal illustrates this view. The anecdotal evidence highlights three issues. First, the importance of the design of incentive compensation in inducing manipulation or misconduct across all management levels of a company. Second, how compensation practices that undoubtedly lead to misbehavior can ex-ante be accepted by firm shareholders. Third, that the public exposure drawn by the media and policy-makers concerning corporate scandals represent an additional force that eases clawback adoption and enforcement. This last feature is mostly relevant for bigger firms.

In the summer of 2016, it comes public that thousands of Wells Fargo employees have created 1.5 millions of unauthorized bank accounts and filed 500,000 credit card applications without customer consent since 2011 or even before. The bogus accounts earned the bank unwarranted fees, allowing Wells Fargo employees to boost their compensation through aggressive incentive schemes. Several government agencies fined Wells Fargo $185 million for this fraudulent behavior.51

The fraud appears to stem directly from the mantra of the then Wells Fargo CEO John G. Stumpf: “eight is great” or get eight Wells Fargo products into the hands of each customer. Later, internal investigations find that Stumpf and Carrie L. Tolsted, chief of the community banking division, ignored clear signs of misconduct regarding the bogus accounts. After the scandal goes public, government officials and the public opinion pushed for Stumpf’s resignation and the bank board to claw back his compensation. Effectively, Wells Fargo has a clawback provision since its participation in TARP and continues disclosing this possibility in later proxy statements.

Stumpf testified before the U.S. Congress and resigned after some resistance, while Tolsted left the company without severance pay. Moreover, the board of directors clawed

51 More specifically, the Wells Fargo was fined $100 million by the Consumer Financial Protection Bureau, $50 million by the Office of the Comptroller of the Currency and $35 million by the city and county of Los Angeles.
back around $41 million and $19 million, respectively, from Stumpf and Tolsted’s un-
vested compensation. After internal investigations, in April 2017 further $47 million were
clawed back from Tolsted’s compensation, and $28 million were deducted from Stumpf’s
pension benefits. These amounts are sizeable for both executives relative to their annual
compensation. The total recovery of 69$ million for Stumpf represents four times the
annual compensation in 2015. The figure increases to more than seven times for the case
of Tolsted.\footnote{This computation uses the imputed figure of 19,318,604 of the variable “tdc1” in Execucomp for
John G. Stumpf and 9,068,586 for Carrie L. Tolsted in 2015. This variable captures the value of total
executive compensation comprised of the salaries, cash bonuses, the value of equity and option awards,
among other concepts. The proportions over annual salary represent an upper bound estimate on the
size of the clawback since the realized value from option exercise and stock-vesting are not considered.}

In the summer of 2017, it also comes public that Wells Fargo has charged hundreds of
thousands of customers for auto insurance they did not request. As a result, thousands
of customers had overdrawn accounts, fees, lower credit scores, or even defaults that led
to car repossessions. This has led some legal authorities to request the Federal Reserve
to oust all the members of the bank’s board.\footnote{See “As Wells Fargo’s woes mount, its board may be on the firing line”, MarketWatch, August 9, 2017.}

\section*{B Proofs}

\textbf{Proof of Lemma 1}

As a preliminary step, first I show that either \(w_H > 0\) or \(w_{HH} > 0\), or both. Notice that
in the incentive compatibility constraint (3) the term on the right-hand side must be
positive. By contradiction, if \(B/e - \gamma(m) < 0\) then \(w_H = w_L = w_{HH} = w_{HL} = w_{LL} = 0\)
would be optimal. But, by condition (2), this would lead to \(m = 0\) and \(\gamma(m) = 0\). Thus,
any or both of the terms that contribute positively to effort incentives, \(w_H\) and \(w_{HH}\),
must be positive.

Now assume that a contract with \(w_{LL} > 0\) is optimal. Consider a new contract such
that \(w'_{LL} = w_{LL} - \varepsilon\) and \(w'_L = w_L + \beta \varepsilon\), with \(\varepsilon > 0\) arbitrarily small. Notice that the new
contract still satisfies the incentive compatibility constraint (3). Moreover, the decision \(m\)
is unchanged with respect to the original contract from condition (2). The new contract
reduces the expected compensation costs by \((1 - \bar{c})(1 - m)(1 - \beta)\varepsilon > 0\) and is feasible.
Thus, the original contract cannot be optimal.

Next, assume that a contract with \(w_{HL} > -c(\ell(w_H - w_L))\) is optimal, for any \(c \in\)
Consider a new contract such that \( w_{HL}^\prime = w_{HL} - \varepsilon \), with \( \varepsilon > 0 \) arbitrarily small. Consider first the case in which the decision \( m \) is unchanged with respect to the original contract through condition (2). Notice that the new contract adds slack to the incentive compatibility constraint (3). The new contract also reduces the expected compensation costs by \( (1 - \varepsilon)m\varepsilon > 0 \) and is feasible. If \( m = \overline{m} \) the reduction in expected costs is strictly positive, so the initial contract cannot be optimal. If \( m = 0 \) there are no financial restatements and the payment \( w_{HL} \) is off-the-equilibrium. In that case any \( w_{HL} \) that satisfies (2) would be optimal, but I can assume that \( w_{HL} = -\ell(w_H - w_L) \) without loss of generality.

Consider now the case in which the reduction in \( w_{HL} \) to \( w_{HL}^\prime \) changes the manipulation decision from \( m = \overline{m} \) to \( m = 0 \). In terms of equation (2), this means that

\[
\overline{m}(w_H - w_L) + \overline{m}\beta w_{HL} > \gamma \\
\overline{m}(w_H - w_L) + \overline{m}\beta(w_{HL} - \varepsilon) \leq \gamma
\]

With \( w_{LL} = 0 \), the incentive compatibility constraint (3) can be rewritten as

\[
(w_H - w_L) + \beta w_{HH} - [m(w_H - w_L) + m\beta w_{HL} - \gamma(m)] \geq \frac{B}{\varepsilon}
\]

Notice that in the original contract \( m = \overline{m} \) and the term in brackets is positive. Under the new contract \( m = 0 \) and \( \gamma(0) = 0 \). Thus, if the original contract is incentive compatible, the new contract is incentive compatible too. Moreover, in the new contract the expected compensation costs are reduced by

\[
(1 - \varepsilon)\overline{m}(w_H - w_L + w_{HL})
\]

which is positive since \( w_{HL} > -(w_H - w_L) \) and \( \overline{m}(w_H - w_L) + \overline{m}\beta w_{HL} > \gamma > 0 \). Thus, the new contract dominates the original one.

Similarly, consider a contract with \( w_L > 0 \) and assume that it is optimal. Consider a new contract such that \( w_L^\prime = w_L - \varepsilon \), with \( \varepsilon > 0 \) arbitrarily small. Suppose first that the decision \( m \) is unchanged concerning the original contract through condition (2). Notice that the new contract adds slack to the incentive compatibility constraint (3). The new contract reduces the expected compensation costs by \( (1 - \varepsilon)(1 - m)\varepsilon > 0 \) and is feasible. Thus, the original contract cannot be optimal.

Suppose now that the reduction in \( w_L \) to \( w_L^\prime \) changes the manipulation decision from \( m = 0 \) to \( m = \overline{m} \). Notice that, since \( w_{HL} = -\ell(w_H - w_L) \) and \( w_{LL} = 0 \), this means that \( w_H > \frac{\gamma}{m(1 - \beta\ell)} + w_L - \varepsilon \). One can still design an alternative contract with \( m = 0 \) by setting \( w_H^\prime = \frac{\gamma}{m(1 - \beta\ell)} + w_L - \varepsilon \). Then \( w_H^\prime - w_L^\prime = \frac{\gamma}{m(1 - \beta\ell)} > 0 \) implying that the new contract adds
slack to the incentive compatibility constraint (3) since $w_H - w_L \leq \frac{\gamma}{m(1-\beta)}$, so $m = 0$, in the original contract. Thus, if the original contract is feasible, the new contract is also feasible. Moreover, because $w_H' < w_H$ and $w_L' < w_L$ the expected compensation costs in the new contract are unambiguously smaller.

Finally, the incentive compatibility constraint (3) binds. Otherwise, nodes with positive compensation, $(w_H, w_{HH})$, can be readjusted until the incentive compatibility condition binds, reducing the expected compensation costs. Moreover, a reduction in $w_H$ can reduce $m$ which also reduces the expected compensation costs.

Proof of Proposition 1

Assume that $m = 0$. Paying with deferred compensation $w_{HH}$ is more expensive because of managerial discounting. Formally, in the $(w_H, w_{HH})$ space the isocost curves are linear with slope $-1$ and the (binding) incentive compatibility constraint has a slope $-1/\beta$ in all its domain. Then, the contract that minimizes the cost of incentive compensation pays $w_H = B/\bar{e}$ and zero elsewhere. From condition (2) the contract effectively induces no manipulation, $m = 0$, since $B/\bar{e} \leq \gamma/m$.

Proof of Proposition 2

If $B/\bar{e} > \gamma/m$ shareholders cannot pay exclusively in the short-term without inducing manipulation. The incentive compatibility constraint becomes a piecewise linear function in the $(w_H, w_{HH})$ space, with slope $-1/\beta$ for $w_H \in [0, \gamma/m]$ and $-(1-m)/\beta$ for $w_H > \gamma/m$. Correspondingly, the isocost curves have slopes $-1$ and $-\left[1 + (1-\bar{e})\frac{m}{e}\right] < -1$.

Because of the linearity of the objective function and the constraints, it suffices to search for the corners of the feasible region delimited by (5) and (6) in the $(w_H, w_{HH})$ space.

Suppose that $m = 0$ in the optimal contract. A contract with fully deferred compensation is clearly suboptimal, since some short-term compensation can be used with neither inducing manipulation nor incurring in the cost of deferrals. Shareholders will be willing to use short-term compensation up to the point where condition (5) binds. Thus, from the incentive compatibility constraint (6), for $m = 0$ the optimal contract is

$$w_H = \frac{\gamma}{m} \text{ and } w_{HH} = \frac{1}{\beta} \left( \frac{B}{\bar{e}} - \frac{\gamma}{m} \right) > 0.$$

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The expected cost of the contract with deferred compensation is given by
\[ W_{S+L} = \bar{e}\frac{\gamma}{\bar{m}} + \frac{1}{\beta} \left( \frac{B}{\bar{e}} - \frac{\gamma}{\bar{m}} \right) \]
\[ = B + \frac{1 - \beta}{\beta} \left( \frac{\bar{e}\gamma}{\bar{m}} - \frac{B}{\bar{e}} \right). \]

The last term on the right hand side represents the excess cost for shareholders from deferring the part of compensation that would induce manipulation otherwise. The expected costs go to \( B \) as the discount rate of the manager \( \beta \) goes to 1.

The other corner, with \( m = \bar{m} \), is represented by a contract that uses fully short-term compensation and shareholders bear with the manipulation rents, \( \left( \frac{B}{e} - \gamma, 0 \right) \). This contract induces manipulation since \( B/e \geq \gamma \) implies that \( \frac{B}{e} - \gamma \geq \gamma/\bar{m} \).

The expected compensation costs for shareholders are given by
\[ W_S = \left[ \bar{e} + (1 - \bar{e})\bar{m} \right] \frac{B/e - \gamma}{1 - \bar{m}} \]
\[ = \left( \bar{e} + \frac{\bar{m}}{1 - \bar{m}} \right) \left( \frac{B/e - \gamma}{1 - \bar{m}} \right) \]

Can the cost of this contract be smaller or equal than \( B \)? The answer is no. Notice that \( W_S \leq B \) is equivalent to
\[ \left( \frac{\bar{m}}{1 - \bar{m}} \right) \gamma \geq \frac{\bar{m}}{1 - \bar{m}} \frac{B}{\bar{e}} \]
\[ \frac{\gamma}{\bar{m}} \geq \frac{1}{(1 - \bar{m}) \bar{e}} \frac{B}{\bar{e}} \]

But, since \( \bar{e} \leq 1 \) the term on the right hand side of the inequality is greater than \( B/\bar{e} \), meaning that \( \gamma/\bar{m} \geq B/\bar{e} \). This contradicts with the assumption that \( B/\bar{e} > \gamma/\bar{m} \).

**Proof of Proposition 3**

Assume that \( B/\bar{e} \leq \frac{\gamma}{(1 - \bar{m})\bar{m}} \). This case corresponds to the case in which the incentive compatibility constraint has slope \(-1\) in its whole domain in \((w_H, w_{HH})\) space. This means that shareholders can use fully short-term compensation, paying \( w_H = B/\bar{e} \) without inducing manipulation, \( m = 0 \), and without incurring in the cost of deferring compensation. The expected cost of this contract is \( B + \kappa \).
Proof of Proposition 4

Consider now the case where \( B/e > \frac{\gamma}{(1-\beta\ell)m} \). Shareholders cannot pay exclusively in the short-term without inducing manipulation. The incentive compatibility constraint becomes a piecewise linear function in the \((w_H, w_{HH})\) space, with slope \(-1/\beta\) for \(w_H \in [0, \gamma/(1-\beta\ell)m]\) and \(-(1-m(1-\beta\ell))/\beta < -1\) for \(w_H < \gamma/(1-\beta\ell)m\). The isocost curves have slope \(-[1+(1-e\bar{m}(1-\ell)\bar{e}] < -1\) in all the domain. I analyze the two relevant corners in the feasible set following the lines of the proof to Proposition 2. On the one hand, shareholders can induce \(m = 0\) by setting

\[
w_H = \frac{\gamma}{(1-\beta\ell)m} \quad \text{and} \quad w_{HH} = \frac{1}{\beta} \left( \frac{B}{\bar{e}} - \frac{\gamma}{(1-\beta\ell)m} \right).
\]

This contract has a compensation cost equal to

\[
W_{C,S+L} = \bar{e}w_H + \bar{e}w_{HH} = \frac{\bar{e}\gamma}{\bar{m}(1-\beta\ell)} + \frac{1}{\beta} \left( B - \frac{\bar{e}\gamma}{\bar{m}(1-\beta\ell)} \right)
\]

and total costs \(W_{C,S+L} + \kappa\). On the other hand, the optimal contract may be located in the corner where the manager only receives short-term compensation

\[
w_H = \frac{B/\bar{e} - \gamma}{1-m(1-\beta\ell)} \quad \text{and} \quad w_{HH} = 0
\]

but under this contract the manager will manipulate, \(m = \bar{m}\), since \(B/\bar{e} > \frac{\gamma}{(1-\beta\ell)m}\). The corresponding expected compensation costs are

\[
W_{C,S} = [\bar{e} + (1-\bar{e})\bar{m}(1-\ell)]w_H = [\bar{e} + (1-\bar{e})\bar{m}(1-\ell)]\frac{B/\bar{e} - \gamma}{1-\bar{m}(1-\beta\ell)} \quad \text{(B.1)}
\]

and total costs \(W_{C,S} + \kappa\).

Proof of Proposition 5

Fix \(\ell = 1\). For \(B/\bar{e} \leq \frac{\gamma}{(1-\beta\ell)m}\) the optimality of short-term contracts arises directly from the proof of Proposition 3. For the case \(B/\bar{e} > \frac{\gamma}{(1-\beta\ell)m}\) we can express the compensation costs for each type of contract as

\[
W_{C,S} = \bar{e} \frac{B/\bar{e} - \gamma}{1-\bar{m}(1-\beta\ell)}
\]

\[
W_{C,S+L} = \frac{\bar{e}\gamma}{\bar{m}(1-\beta\ell)} + \frac{1}{\beta} \left( B - \frac{\bar{e}\gamma}{\bar{m}(1-\beta\ell)} \right)
\]

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Suppose that the partly-deferred compensation contract dominates the short-term compensation contract. Then, parameters must satisfy that
\[
\frac{\bar{e} \gamma}{m} + \frac{1}{\beta} \left( B - \frac{\bar{e} \gamma}{m} \right) \leq \frac{B - \bar{e} \gamma}{1 - m(1 - \beta)} \\
\frac{1}{\beta} \left( B - \frac{\bar{e} \gamma}{m} \right) \leq \frac{B - \bar{e} \gamma}{1 - m(1 - \beta)}.
\]
Rearranging the previous expression one gets to
\[
\frac{B}{\bar{e}} \leq \frac{\gamma}{(1 - \beta)m},
\]
which contradicts the initial assumption. Thus, for \(\ell = 1\), clawback contracts only feature short-term compensation.

**Proof of Proposition 6**

First, notice that for high \(B\) and low \(\gamma\) the manipulation problem becomes severe, \(B/\bar{e} > \gamma/m\), so we must check the conditions under which \(W_S < W_{S+L}\). The difference in expected compensation costs between a short-term compensation contract and a deferred compensation contract, \(W_S - W_{S+L}\), arises from Proposition 3 and is given by the following function
\[
F(B, \gamma, \bar{e}, m, \beta) = \frac{m}{1 - m} \frac{B}{\bar{e}} - \left( \bar{e} + \frac{m}{1 - m} \right) \gamma - \frac{1 - \beta}{\beta} \left( B - \frac{\bar{e} \gamma}{m} \right)
\]
which simplifies to
\[
F(B, \gamma, \bar{e}, m, \beta) = \frac{B}{\bar{e}} \left( \frac{m}{1 - m} - \frac{\bar{e} \gamma}{m} \right) - \left[ \frac{m}{1 - m} \left( \bar{e} + \frac{m}{1 - m} \right) \right] \gamma
\]  
(B.2)
The short-term contract with manipulation dominates when \(F\) is negative and the long-term compensation contract dominates otherwise. Recall that \(F\) determines the optimal incentive compensation contract only when \(\frac{B}{\bar{e}} > \frac{\gamma}{m}\).

Next, notice that the first term in parentheses in the definition of \(F\) is greater or equal than the term in brackets
\[
\frac{m}{1 - m} \geq \frac{m}{1 - m} \left( \bar{e} + \frac{m}{1 - m} \right)
\]
\[
\frac{1}{1 - m} \geq \bar{e} + \frac{m}{1 - m}
\]
\[1 \geq \bar{e} \]
Then, since $\frac{B}{\bar{\tau}} > \frac{\gamma}{m}$, $F$ is negative only if the first term in parenthesis is negative, yielding

$$\beta < \hat{\beta} = \frac{\bar{\tau}}{\bar{\tau} + \frac{m}{1-m}}.$$  

The comparative statics results arise from the impact of parameters on (B.2). Partial derivatives are given by

$$\frac{\partial F}{\partial B} = \frac{1}{\bar{\tau}} \left( \frac{m}{1-m} - \frac{1-\beta}{\beta} \right),$$

$$\frac{\partial F}{\partial \gamma} = \frac{\bar{\tau}}{m} \frac{1-\beta}{\beta} - \bar{\tau} - \frac{m}{1-m},$$

$$\frac{\partial F}{\partial \beta} = \frac{\bar{\tau}}{\beta^2} \left( \frac{B}{\bar{\tau}} - \gamma \right).$$

Notice that $\partial F/\partial B$ is negative for $\beta < \hat{\beta}$. Moreover, $\beta < \hat{\beta}$ implies that $\partial F/\partial \gamma$ is positive. Lastly, $\partial F/\partial \beta$ is positive for $B/\bar{\tau} > \gamma/m$. The remaining partial derivatives have an ambiguous sign:

$$\frac{\partial F}{\partial m} = \frac{B/\bar{\tau} - \gamma}{(1-m)^2} - \frac{1-\beta}{\beta} \frac{\bar{\tau} \gamma}{m^2},$$

$$\frac{\partial F}{\partial e} = -\gamma - \frac{m}{1-m} \frac{B}{e^2} + \frac{1-\beta}{\beta} \frac{\gamma}{m}.$$  

Proof of Proposition 8

Since $[1 - F(\theta)]k_0 \theta^{k_1}$ is concave, by Weierstrass theorem it reaches a maximum and a minimum in $[\bar{\theta}, \bar{\theta}]$. Moreover, the minimum is reached in $\bar{\theta}$ and, since $W - W_C > 0$ a full share of adoption, $q = 1$, is an equilibrium. Similarly, if $k_0 \hat{\theta}^{k_1} > W - W_C$ firms with the lowest type $\hat{\theta}$ abstain from adopting the clawback.

Then, consider the regulation change from $k_0$ to $k_0' < k_0$. Assume that the change in parameters is big enough so that the lowest firm types find clawback adoption optimal, i.e. $k'_0 \hat{\theta}^{k_1} \leq W - W_C$. Then, the multiplicity of equilibria persists if for $\hat{\theta} = \arg \max[1 - F(\theta)]k_0 \theta^{k_1}$ we find that $k'_0 \hat{\theta}^{k_1} > W - W_C$ and $\hat{\theta} > \theta$. If it is the case the two stable equilibria consist of an interior equilibrium $\theta$ and a full-adoption equilibrium. If $k'_0 \hat{\theta}^{k_1} \leq W - W_C$ the single equilibrium is a full adoption equilibrium.
C Further theoretical extensions

C.1 Manipulation and costly deferrals: An explicit model

Here I provide a micro-foundation for \( \beta < 1 \) that links the manipulation incentives of managers and the costs for shareholders of retaining talent. More specifically, I show how shareholders may be interested in inducing the manager to manipulate, so that outsiders receive a noisier signal about managerial talent, reducing their willingness to attract the manager. Therefore, shareholders can reduce the cost of managerial retention after the earnings announcement. This mechanism is reminiscent of the signal-jamming models of Stein (1988, 1989).

Furthermore, the model provides an additional argument for the unenforceability of clawbacks based on managerial retention constraints. The mechanisms that I highlight here are more likely to be relevant in small, high-tech and high-growth firms where shareholders prefer to “hide” for some time the actual value of their investments to avoid outside interference.

Consider the following modification to the baseline model with \( \beta = 1 \). As in Holmström (1999), the manager has some talent \( \eta \) that enhances the probability of the firm obtaining high cash flows under managerial effort. The manager can be talented or not. At \( t = 0 \) the probability that the manager is talented is assessed to be \( \eta \) by shareholders as well as the manager and outsiders. If the manager is talented the probability of high cash flows under managerial effort is \( e^+ \), otherwise the probability of high cash flows under managerial effort is \( e^- \), with \( e^+ > e^- \). Therefore, the prior probability of high cash flows under managerial effort can be written as \( \bar{\tau} = \eta e^+ + (1 - \eta) e^- \), as in the baseline model.

The arrival of information through earnings at \( t = 1 \) allows all agents to update their assessment about the manager’s talent. In particular, outsiders are willing to pay \( v^+ \) if the manager is talented and \( v^- \) otherwise. By Bayes’ rule the posterior probability about the manager’s talent after a high earnings announcement \( x_H \) is given by

\[
\eta_H(m) = \frac{e^+ + (1 - e^+)m}{\bar{\tau} + (1 - \bar{\tau})m - \eta}
\]

Thus, conditional on an announcement \( x_H \) at \( t = 1 \) the manager can leave the firm and enjoy an outside option of value \( v(m) = \eta_H(m)v^+ + (1 - \eta_H(m))v^- \). \( \eta_H(m) \) is decreasing in \( m \) since \( e^+ > e^- \), i.e. manipulation reduces the effectiveness of learning about managerial talent. Hence, the manager’s outside option is also decreasing in \( m \), \( v(\bar{m}) < v(0) \) (Gao
and Zhang, 2016, Makarov and Plantin, 2015).

The manager’s human capital is unalienable, meaning that shareholders can only obtain the final cash flows $y$ if the manager is retained at $t = 1$. Thus, the optimal contract must satisfy, on top of conditions (5) and (6), the retention condition\(^{55}\)

$$w_H + w_{HH} \geq v(m).$$

where $m$ is anticipated by outsiders as determined by condition (5). The next proposition shows that there exists a mapping between the baseline model and the modified model with the managerial retention problem. Since retention is costly, short-term compensation has the relative advantage of making retention less expensive.\(^{56}\)

**Proposition C.1.** Assume that $v(0) > B/\tau > \gamma/m$ and $B/\tau > v(m)$. There exists a mapping between the model with managerial retention and the benchmark model with $\beta' < 1$ defined as

$$\beta' = \frac{B/\tau - \gamma/m}{v(0) - \gamma/m}.$$  

The candidate optimal contract configurations are fully short-term or partly long-term and both configurations are cost-equivalent to those in the baseline model.

**Proof.** First, notice that the incentive compatibility constraint has slope $-1$ for $w_H \in [0, \gamma/m]$ and $-(1 - m) > -1$ for $w_H > \gamma/m$. Correspondingly, the isocost curves have slopes $-1$ and $-\left[1 + \left(1 - \tau \frac{\tau}{m}\right)\right] < -1$. Since $v(0) > B/\tau$ the retention constraint will always bind when $m = 0$— or equivalently when $w_H \in [0, \gamma/m]$— and the optimal contract will have a partly long-term structure with

$$w_H \in [0, \gamma/m] \text{ and } w_{HH} = v(0) - w_H$$

or an exclusively short-term structure with

$$w_H = \frac{B/\tau - \gamma}{1 - m} \text{ and } w_{HH} = 0.$$  

\(^{54}\)For simplicity, I assume that after an announcement of low earnings $x_L$ there are no outside opportunities for the manager and stays in the firm until $t = 2$. It would be immediate to include this possibility but it is not necessary to highlight the theoretical mechanism.

\(^{55}\)Once the manager observes privately the realization of cash flows at $t = 1$ there is asymmetric information about the manager’s talent perceptions. In any case, a manager that manipulates will always replicate the actions of a manager that does not manipulate. Otherwise, the manipulation would be uncovered and shareholders would withdraw the short-term compensation $w_H$ and outsiders would not be willing to pay $v(m)$.

\(^{56}\)The results in Lemma 1 follow without loss in this version of the model.
Thus the modified model with $\beta = 1$ yields the cost-equivalent outcomes to the benchmark model, where $\beta'$ is defined by the equality of the cost of a long-term compensation contract and the contract with retention:

$$
\bar{v}(0) = B + \frac{1 - \beta'}{\beta'} \left( B - \frac{v_m}{m} \right).
$$

Shareholders may optimally generate noise in short-term performance measures to reduce the cost of retaining a talented manager, tolerating the costs associated with manipulation. Thus, the extended model represents a reparametrization of the benchmark model. The costs of deferrals arise from the retention cost in case of no manipulation, $v(0)$, instead of the manager’s time preferences.

What are the implications for clawback adoption? With $\beta = 1$ and perfect clawback recovery a clawback contract always deters manipulation. However, the compensation costs of a manager that does not manipulate are determined by $v(0)$, so adoption will not be translated into lower costs of incentive compensation. Recall also that clawback enforcement implies a cost $\kappa$ for shareholders. Thus, clawback adoption will increase the total costs for shareholders, whatever is the optimal compensation structure in the absence of clawback. This has the same effect of assuming that clawbacks are unenforceable, where the mechanism underlying the unenforceability is the existence of interim competitive pressures for managerial talent.

### C.2 Stakeholders, industry performance, and clawback adoption

Here I explore and provide a micro-foundation for the reduced-form spillovers considered in the main text. In this extension, I show that shareholders may abstain from adopting clawbacks when earnings announcements alter the perception of outsiders about the profitability of an industry. Since spillovers can explain the clawback unenforceability, I assume that the reduced-form enforcement costs are zero, $\kappa = 0$.

Consider the game played by two identical firms $i$ and $j$ in a given industry that face the same agency problem as in the baseline model and simultaneously choose their compensation contracts. Suppose that the distribution of cash flows for the individual firm depends on the realization of an industry state denoted by $s$. In particular, if the state of the industry is good, $s = g$, firms obtain high cash flows $y_{H}$ with certainty, and
if the state is bad, \( s = b \), the probability of high cash flows is \( \bar{e}_b < 1 \). The state of the industry is unknown, but all agents assess the probability of the good state as being \( \pi \) at \( t = 0 \). Thus, we can define \( \overline{e} = \pi + (1 - \pi)\overline{e}_b \) as in the baseline model.

Following Almazan et al. (2009) the individual firm can enhance their profitability with the participation of a stakeholder—for instance, a supplier or technological partner—that provides some additional cash flows \( \Delta y > 0 \) to the firm. However, the value of participation for the stakeholder depends on the state of the industry. Specifically, stakeholders make a unit investment at \( t = 1 \) and obtain a value \( v_g > 1 \) if the industry is in a good state and \( v_b < 1 \) otherwise. For instance, collaboration with certain suppliers may allow the firm to exploit economies of scope, while suppliers may increase their reputation from serving successful industries.

Importantly, the assessment of stakeholders about the state of the industry at \( t = 1 \)—and thus, their participation—depends on both firms’ simultaneous earnings announcements. In the good state all firms announce earnings equal to \( x_H \), so an announcement \( x_L \) by any firm reveals the bad state, in which case stakeholders refuse to participate, \( v_b < 1 \).

In contrast, participation may have positive value for stakeholders when both firms announce high earnings, no matter the degree of earnings manipulation by managers.\(^{57}\) To explore this possibility, let \( Pr(x_H, x_H | m_i, m_j) \) denote the probability of both firms announcing high earnings given the managerial manipulation decisions \( (m_i, m_j) \). Thus, we have that

\[
Pr(x_H, x_H | m_i, m_j) = \pi + \left[ \overline{e}_b + (1 - \overline{e}_b)m_j \right] \overline{e}_b + (1 - \overline{e}_b)m_j \] \( (1 - \pi) \),

which is increasing in firm \( i \)'s managerial manipulation decision \( m_i \) and has positive cross-derivative with respect to firm \( j \)'s managerial manipulation \( m_j \). Let \( \pi_{HH}(m_j, m_i) \) denote the posterior probability of the industry being in the good state, given earnings announcements \( (x_H, x_H) \) and manipulation decisions by managers \( (m_i, m_j) \). By Bayes’ rule \( \pi_{HH}(m_j, m_i) \) is defined as

\[
\pi_{HH}(m_j, m_i) = \frac{\pi}{\pi + \left[ \overline{e}_b + (1 - \overline{e}_b)m_j \right] \overline{e}_b + (1 - \overline{e}_b)m_j \] \( (1 - \pi) \)

Hence, participation by the stakeholder after announcements \( (x_H, x_H) \) requires that

\[
\pi_{HH}(\overline{m}, \overline{m})v_g + [1 - \pi_{HH}(\overline{m}, \overline{m})]v_b > 1 . \] \( (C.1) \)

\(^{57}\)The theoretical mechanism is similar to Rajan (1994) and Rotemberg and Scharfstein (1990). Freeman and Tse (1992) document that earnings announcements provide information about the performance of firms in the same industry. See also Thomas and Zhang (2008) and Savor and Wilson (2016).
This means that the information distortions generated by manipulation are small or that the gains of participation for the stakeholder are high enough, $v_g$ and $v_b$ are high.\footnote{\(v_{HH}(m_i, m_j)\) is decreasing in both of its arguments. Therefore, the condition above is sufficient for the participation of the stakeholder when there is no manipulation by either one firm or both.} Therefore, if the stakeholder participates and the manager exerts effort the expected cash flows for the individual firm are given by

\[ \bar{v}y_H + (1 - \bar{v})y_L + Pr(x_H, x_H|m_i, m_j)\Delta y \]

Positive strategic complementarities appear, since the last term is increasing in the own managerial manipulation by the manager and has a positive cross-derivative with respect to the manipulation in the other firm. That is, if shareholders in firm $i$ allow its manager to manipulate, shareholders in firm $j$ have more incentives to do so, and vice versa. This is because both firms benefit from retaining the stakeholder in the bad state. The gains from stakeholder participation may discourage the adoption of a clawback provision that removes manipulation, despite the reduction in managerial compensation. The next proposition, analogous to the results in Proposition 7, follows.\footnote{It is not optimal to use the other firm’s earnings announcements as another determinant of the structure of incentive contracts. This is because the other firm’s earnings announcements are uninformative about the effort or manipulation decision of the individual manager. Thus, the structure of contracts is the same as in the baseline model.}

**Proposition C.2.** Suppose that condition (C.1) holds, $W_S < W_{S+L}$ and clawback adoption deters manipulation. There exist parameter configurations for which two pure-strategy stable Nash equilibria exist, one where both firms adopt and another where none adopts. The configurations satisfy

\[
\left[ Pr(x_H, x_H|m, m) - Pr(x_H, x_H|0, m) \right] \Delta y \geq W_S - W_C \quad \text{and} \\
W_S - W_C \geq \left[ Pr(x_H, x_H|m, 0) - Pr(x_H, x_H|0, 0) \right] \Delta y .
\]

Notice that the “enforcement costs” are now endogenous to the level of manipulation induced simultaneously by both firms. Thus, there exists a mapping between this version of the model and the reduced-form interpretation. As a final note, the prevalence of either of the two clawback equilibria are determined not only by changes in clawback regulations but also more general changes in disclosure requirements, which alter the benefits from obscuring information to outsiders.
D Data appendix

D.1 Construction of the database

The procedure to construct the database is as follows. I merge Execucomp with ISS data using CUSIP codes. I merge the data set with AuditAnalytics restatement information using the CIK number for each firm. Lastly, I merge the database with IBES by using the ICLINK database that allows matching IBES tickers with Compustat “permno” and “gvkey” identifiers. I also merge using CUSIP codes to obtain a greater number of correct matches. I express variables in real terms using the average yearly CPI index (CPIAUCSL series extracted in FRED Economic Data), and I winsorize each variable at the 1% and 99% levels for each year, except the variable “tdc1” that I winsorize at the 2% level as in Edmans et al. (2009). I define firm size in the data as the total value of the firm, computed as the stock price at the end of the fiscal year times the number of shares outstanding, plus the difference of the total value of assets and the value of common equity. Moreover, I compute CEO tenure following Taylor (2013).

Moreover, I construct a clawback adoption database through a web crawler algorithm that searches for keywords in firms’ proxy statements that are online at the SEC’s EDGAR database. I use the dataset available at http://www.wrds.us/index.php/repository/view/25 that provides the URL for each firm filing from 1992 to 2016 in EDGAR. I focus on DEF14A proxies to search for clawback-related keywords such as “clawback”, “recovery,” “recoupment,” “reduction,” “recapture” and several variants with connection with executive compensation. Specifically, the set of keywords are:


Whenever I find a match in any proxy statement with these keywords, I denote the firm as a clawback adopter. Besides, I assume that the firm is a clawback adopter for all years after the first year in which there exists a match. I merge the clawback database with the remaining information using CIK identifiers.
D.2 Computation of the wealth-performance sensitivities

The construction of the wealth-performance sensitivities, $\Delta_{\text{Total}}$, $\Delta_S$ and $\Delta_L$, or simply “deltas”, is as follows. These measures of incentives arise from the portfolio of stock and stock options held by an executive at the end of a fiscal year. More specifically, the portfolio is composed of vested or exercisable securities— which can be liquidated at will in the short-term— and unvested securities— that belong to the executive but cannot be sold by the executive. The wealth-performance sensitivity of the vested and unvested stock is equal to the stock price, while for the stock options I use the Black-Scholes formulae, taking into account the stream of dividends.

Due to changes in the reporting rules of executive compensation, I compute the deltas separately for the periods 1993-2006 and 2006-2013. In 2006 the Securities and Exchange Commission (SEC) adopted new disclosure requirements concerning, among other items, CEO compensation. Firms had to comply with the new rules if their fiscal year ended on or after December 15th, 2006. This is why the periods overlap. Some firms’ executive compensation reports in 2006 appear in the previous reporting format according to each firm’s fiscal year-end. In the following, I discuss separately the construction of the deltas for both reporting formats. The discussion here largely overlaps the descriptions in Coles et al. (2013) and Edmans et al. (2009). Variables within quotes denote those variables that are available in Execucomp.

For the new reporting format, Execucomp provides a separate record for each outstanding option tranche (denoted by a different value of “outawdnum”), indicating the number of vested, unvested, and unearned options of each tranche, and their corresponding exercise price and expiration date. To compute the Black-Scholes value of options I need the exercise price and expiration date of the option tranche and estimates of the dividend yield, the volatility of the firm stock and the risk-free rate of return.

Execucomp stopped providing the estimate of the stock return volatility, through the variable “bs_volatility”, as of 2006. I follow the Execucomp methodology as closely as possible. Accordingly, I (i) use the annualized standard deviation of (log) stock returns estimated over the 60 months prior to the beginning of each fiscal year; (ii) require at least 12 months of returns data; (iii) use mean volatility (across all firms) for that year if 12 months of data are not available; and (iv) winsorize the volatility estimates at the 5th and 95th levels. The Black-Scholes volatility is denoted by $bs_{\text{vol}}_{it}$.

I also compute estimates of the dividend yield because Execucomp stopped providing this variable, “bs_yield”, as of 2006. Following their methodology as closely as possible: I (i) use the average of “divyield” provided by Compustat/CRSP over the current year
and the two prior years and (ii) winsorize the values at the 5th and 95th levels. The “divyield” is expressed as a percentage in Execucomp and I divide by 100 to use it in the Black-Scholes formula. The dividend yield is denoted by \( b_s \text{divy}_{it} \).

I impute the risk-free rate of return as that corresponding to the (rounded) maturity of the options as of fiscal year-end. The risk-free rate is obtained from historical data provided by the Federal Reserve on their website for “Treasury constant maturities” using the “annual” series: (https://www.federalreserve.gov/datadownload/Build.aspx?rel=H15). The website provides data for 1, 2, 3, 5, 7, and 10 year Treasury securities. I interpolate the rates to obtain the risk-free rates for 4, 6, 8, and 9 years. If the option maturity is more than 10 years, I use the 10-year rate. The rates are expressed as a percentage and divided by 100 to use them in the Black-Scholes formula. I denote this variable with the name \( r_{jit} \).

I define the deltas of the options by the change in the value of the option after a percent increase in stock price:

\[
\Delta_{Options} = \text{prccf} \times e^{-b_s \text{divy} \times t^2 m} \Phi \left( \ln \left( \frac{\text{prccf}}{\text{expric}} \right) + t^2 m \times \frac{r - b_s \text{divy} + \frac{b_s \text{vol}^2}{2}}{b_s \text{vol} \times \sqrt{t^2 m}} \right)
\]

where \( \Phi(.) \) denotes the cdf of a standard normal random variable, “prccf” is the fiscal year-end stock price, “expric” is the exercise price of the option tranche and \( t^2 m \) denotes the time-to-maturity. Thus, I compute the delta of vested options, the short-term delta, by multiplying the delta of each tranch by the number of exercisable options and summing across all tranches:

\[
\Delta_{S,Options}^{new} = \sum_j \Delta_{Options,j} \times \text{“opts_unex_exer”}_j
\]

Similarly, for unvested options:

\[
\Delta_{L,Options}^{new} = \sum_j \Delta_{Options,j} \times \text{“opts_unex_unexer”}_j
\]

Whenever these values give a negative number I set them to zero.

Concerning the old reporting format, firms were required to report tranche level details only for the current year’s option grants. That is, we have the number of options granted “numsecur”, the exercise price “expric,” and the maturity of each tranche of options awarded in the current year “exdate.” With this information, I need the variables \( b_s \text{vol} \) and \( b_s \text{divy} \) to compute the delta of the options, which I denote by \( \text{deltanew} \).

In contrast, firms were not required to report tranche-level details on previously
granted options. Instead, they only had to report the intrinsic value and number separately for the portfolio of vested options and the portfolio of unvested options. For unvested options, the exercise price is given by

\[
\text{strike}_\text{un} = \text{prccf} - \frac{\left(\text{opt\_unex\_unexer\_est\_val} - \text{ivnew}\right)^+}{\text{opt\_unex\_unexer\_num} - \text{numnewop}}
\]

Where \(\text{ivnew}\) is the intrinsic value of the newly-granted options, \((P - \text{expric})^+ \times \text{numsecr}\), and \(\text{numnewop}\) is the total number of newly granted options, “numsecr”. The deduction of \(\text{ivnew}\) and \(\text{numnewop}\) in the expression above arises from the fact that nearly all newly granted options are always exercisable. However, if \(\text{numnewop} \geq \text{opt\_unex\_unexer\_num} + \text{opt\_unex\_exer\_num}\) the number of new options exceed the number of options held at the end of the fiscal year. In that case, all options are assumed to be newly granted, setting \(\text{deltanew}\) to zero. Thus, I assume that there are “opt\_unex\_unexer\_num” options with strike price

\[
\text{strike}_\text{un} = \text{prccf} - \frac{\text{opt\_unex\_unexer\_est\_val}}{\text{opt\_unex\_unexer\_num}}
\]

If “opt\_unex\_unexer\_num” \(\leq\) \(\text{numnewop}\) < “opt\_unex\_unexer\_num” + “opt\_unex\_exer\_num” the number of newly granted options exceeds that of unexercisable options at year end, but is less than the total number of options. In this case I assume that there are no additional pre-existing unvested options and new grants of \(\text{numnewop} - \text{opt\_unex\_unexer\_num}\) exercisable options.

For vested options, similar reasoning gives rise to the following strike price:

\[
\text{strike}_\text{ex} = \text{prccf} - \frac{\text{opt\_unex\_exer\_est\_val}}{\text{opt\_unex\_exer\_num}}
\]

If “opt\_unex\_unexer\_num” \(\leq\) \(\text{numnewop}\) and \(\text{numnewop} \leq “opt\_unex\_unexer\_num” + “opt\_unex\_exer\_num”\) I subtract the number of new grants from the denominator of the previous expression. If the value of new grants is greater than that of unexercisable grants, i.e., \(\text{ivnew} > \text{opt\_unex\_unexer\_est\_val}\), I subtract this excess from the numerator. If \(\text{ivnew} > \text{opt\_unex\_unexer\_est\_val} + \text{opt\_unex\_exer\_est\_val}\), the intrinsic value of new grants exceeds that of all existing grants so I assume that all existing exercisable options are always at the money. Thus, the strike price is calculated as

\[
\text{strike}_\text{ex} = \text{prccf} - \frac{(\text{opt\_unex\_exer\_est\_val} - (\text{ivnew} - \text{opt\_unex\_unexer\_est\_val})^+)^+}{\text{opt\_unex\_exer\_num} - (\text{numnewop} - \text{opt\_unex\_unexer\_num})^+}
\]

For the option maturities, I assume a maturity for existing unexercisable options of one year less than the maturity of newly granted options—I consider the longest maturity option if there are multiple grants. If there were no new grants, I set it to 9.5 years. The maturity of exercisable options is assumed to be three years less than for unexercisable
options. I multiply the maturities of all options by 70 per cent to capture the fact that CEOs typically exercise options prior to maturity. If the estimated maturity is negative, I assume a maturity of one day. Using the estimated maturities and exercise prices of vested options then I can compute their Black-Scholes deltas, $\Delta_{\text{Options,ex}}$ for exercisable options and $\Delta_{\text{Options,un}}$ for unexercisable options. For that means, I use the estimated volatilities and dividend yields, together with the risk-free returns, as explained above for the new reporting framework. Therefore, the incentives arising from each type of options are given by $\text{delta}_{\text{ex}}$ and $\text{delta}_{\text{un}}$, defined by

$$
\text{delta}_{\text{ex}} = \text{numexop} \times \Delta_{\text{Options,ex}}
$$

$$
\text{delta}_{\text{un}} = \left(\text{opt}_{\text{unex,exer}}\text{num} - \text{numnewop}\right)^+ \times \Delta_{\text{Options,un}}
$$

where

$$
\text{numexop} = \left(\text{opt}_{\text{unex,exer}}\text{num} - \left(\text{numnewop} - \text{opt}_{\text{unex,unexer}}\text{num}\right)^+\right)^+.
$$

The short-term and long-term deltas arising from an executive’s option holdings are, respectively, given by

$$
\Delta_{\text{old,Option}}^{\text{S}} = \text{delta}_{\text{ex}}
$$

$$
\Delta_{\text{old,Option}}^{\text{L}} = \text{deltanew} + \text{delta}_{\text{un}}
$$

I compute the deltas of the stock portfolio as follows for both reporting formats. The number of unvested shares held by the executive are given by “stock_unvest_num”, while I compute the number of vested shares by the difference between “shrown_excl_opts” and “stock_unvest_num”, setting it to zero whenever it returns a negative number. Thus, the short-term and long-term deltas arising from an executive’s holdings of stock are, respectively, given by

$$
\Delta_{\text{S,Stock}} = \text{stock}_{\text{unvest,stock}} \times \text{prccf}
$$

$$
\Delta_{\text{L,Stock}} = \left(\text{shrown,excl,opts} - \text{stock}_{\text{unvest,stock}}\right) \times \text{prccf}
$$

Since Execucomp reports the number of securities in thousands I divide all the measures by 1000, thus measures of incentives represent the increase in an executive’s wealth in millions of dollars after a one per cent increase in shareholders value. The resulting measures that I use in the estimations are

$$
\Delta_{\text{S}}^{\text{old}} = \left(\Delta_{\text{S,Stock}} + \text{delta}_{\text{ex}}\right)/1000
$$

$$
\Delta_{\text{L}}^{\text{old}} = \left(\Delta_{\text{L,Stock}} + \text{deltanew} + \text{delta}_{\text{un}}\right)/1000
$$

for the old reporting format, with $\Delta_{\text{Total}}^{\text{old}} = \Delta_{\text{S}}^{\text{old}} + \Delta_{\text{L}}^{\text{old}}$. Similarly, for the new reporting
form I compute

\[ \Delta_{S}^{\text{new}} = \left( \Delta_{S,\text{Stock}} + \Delta_{S,\text{Options}}^{\text{new}} \right) / 1000 \]

\[ \Delta_{L}^{\text{new}} = \left( \Delta_{L,\text{Stock}} + \Delta_{L,\text{Options}}^{\text{new}} \right) / 1000 \]

and \[ \Delta_{\text{Total}}^{\text{new}} = \Delta_{S}^{\text{new}} + \Delta_{L}^{\text{new}}. \]

D.3 Variable definitions and descriptive statistics

In this appendix first I show results from descriptive univariate tests for forecasts-meeting and restate behavior. Lastly, I report results from descriptive univariate tests across samples of clawback adopters.

Variable definitions. Meet takes a value of one if a firm announces earnings in a $0.01 distance from the median analysts’ forecasts and zero otherwise. Restate takes a value of one if a firm restates earnings and zero otherwise. Loss takes a value of one if a firm announces negative earnings and zero otherwise. Reported earnings is the announced level of earnings per share. \( \ln(1 + \text{Forecast disp.}) \) is the log of one plus the average dispersion of earnings across an executive’s tenure. \( \ln(\text{Analysts}) \) is the number of analysts producing earnings forecasts for each firm. Big4 takes a value of one if the audit firm is a Big 4 firm and zero otherwise. \( \ln(\text{Firm value}) \) is the log of total firm value computed as in Edmans et al. (2009). Specifically, using Execucomp’s terminology, it is defined as the sum of the market value of equity, \( \text{prccf} \times \text{shrsout} \), plus the book value of debt, approximated by the difference between the value of assets and the value of common equity, \( \text{assets} - \text{comeq} \). Leverage ratio is defined as the ratio of the book value of debt and the market value of equity. Independent directors is the number of independent directors on the board. \( \ln(\Delta_{\text{Total}}) \) is the log of the wealth-performance sensitivity. \( \Delta_{S}/\Delta_{\text{Total}} \) is the ratio of short-term, vested, incentives over total incentives. \( \ln(\Delta_{S}) \) is the log of the wealth-performance sensitivity of vested compensation. \( \ln(\Delta_{L}) \) is the log of the wealth-performance sensitivity of unvested compensation. \( \ln(\text{Total compensation}) \) is the log of item “tdc1” in Execucomp. CEO tenure is the number of years that the current CEO of the firm has been in office.

Descriptive statistics, forecasts-meeting and univariate tests. Table D.1 reports that forecasts-meeting is associated with more frequent restatements, less frequent reports of losses, lower reported earnings, lower leverage, lower forecasts dispersion and more analysts following the firm. Executives that exhibit forecasts-meeting receive steeper incentives, higher \( \Delta_{\text{Total}} \), receive relatively steeper short-term incentives, but lower total compensation and CEOs have longer tenures. Similar implications follow from restate-
ment behavior, the exception being that restating firms are smaller, have higher leverage, but executives still receive relatively more short-term incentives than non-restating firms.

**Table D.1: Meet and restatement behavior: Univariate tests**

|                      | (1)          | (2)          |                  |                  |                  |                  |
|----------------------|--------------|--------------|------------------|------------------|
|                      | Meet Restate | Meet Restate | Difference       | Difference       |                  |
| Meet                 | 0.272        | 0.327        | -0.055           |                  |
| [9,253]              | [1,460]      |              |                  |                  |
| Restatement          | 0.127        | 0.159        | -0.032***        |                  |
| [7,716]              | [2,997]      |              |                  |                  |
| Loss                 | 0.111        | 0.043        | 0.068***         | 0.082            | 0.084           | -0.003           |
| [9,970]              | [4,036]      | [9,253]      | [1,460]          |                  |
| Reported earnings    | 1.672        | 1.292        | 0.379***         | 1.737            | 1.433           | 0.304***         |
| [9,970]              | [4,036]      | [9,253]      | [1,460]          |                  |
| Ln(1+Forecast disp.) | 0.0103       | 0.041        | 0.062***         | 0.091            | 0.080           | 0.011***         |
| [9,473]              | [3,974]      | [8,917]      | [1,389]          |                  |
| Ln(Analysts)         | 2.127        | 2.302        | -0.175***        | 2.205            | 2.149           | 0.055***         |
| [9,970]              | [4,036]      | [9,253]      | [1,460]          |                  |
| Big 4                | 0.930        | 0.922        | 0.008            | 0.920            | 0.918           | 0.002            |
| [7,716]              | [2,997]      |              |                  | [17,715]         | [2,618]         |                  |
| Ln(Firm value)       | 15.029       | 14.998       | 0.031            | 15.184           | 15.015           | 0.169***         |
| [9,938]              | [4,019]      | [17,618]     | [2,611]          |                  |
| Leverage ratio       | 1.615        | 1.027        | 0.588***         | 1.737            | 1.956           | -0.219*          |
| [9,938]              | [4,019]      | [17,621]     | [2,611]          |                  |
| Independent directors| 7.312        | 7.096        | 0.216***         | 7.401            | 7.159           | 0.242***         |
| [7,367]              | [3,104]      | [12,856]     | [1,878]          |                  |
| Ln(∆Total)           | 1.446        | 1.733        | -0.286***        | 1.496            | 1.449           | 0.047            |
| [9,446]              | [3,829]      | [16,490]     | [2,448]          |                  |
| Ln(∆S)               | 0.829        | 1.176        | -0.348***        | 0.890            | 0.886           | 0.004            |
| [9,392]              | [3,838]      | [16,404]     | [2,448]          |                  |
| Ln(∆L)               | 0.278        | 0.488        | -0.209***        | 0.314            | 0.153           | 0.161***         |
| [9,313]              | [3,814]      | [16,150]     | [2,406]          |                  |
| Ln(Total compensation)| 7.282        | 7.207        | 0.074***         | 7.322            | 7.161           | 0.160***         |
| [9,942]              | [4,022]      | [17,649]     | [2,607]          |                  |
| CEO tenure           | 8.353        | 8.689        | -0.336**         | 8.353            | 8.435           | -0.082           |
| [9,934]              | [4,001]      | [17,625]     | [2,597]          |                  |

This table reports the results from univariate mean tests across the sample of meet and restatement behavior in the 2002-2016 period. The size of each subsample is reported within brackets. * p < 0.1, ** p < 0.05, *** p < 0.01.
Descriptive statistics: Clawback adoption. Table D.2 reports that clawback adopters, before clawback adoption, are more likely to embark in forecasts-meeting and restate financials, are less likely to report losses, announce higher earnings per share, have lower forecasts dispersion, are followed by more analysts and are more likely to have a Big 4 audit firm. Moreover, adopters are bigger, less leveraged and have more independent directors. Executives at adopting firms receive steeper incentives, both in its short-term and long-term component. Moreover, in adopting firms, executives receive a bigger pay and CEOs have shorter tenures.

Within the observations of clawback adopters, clawback adoption is associated with less frequent forecast-meeting and restatements, less frequent reports of losses, higher reported earnings and higher forecast dispersion. After the adoption, firms are followed by more analysts but are less likely to have a Big 4 audit firm. Moreover, firms adoption is associated on average with bigger size, lower leverage and more independent directors on the board. The slope of executive incentives does not change after the adoption, but its time structure changes. In particular, clawback adoption is associated with an increase in vested compensation and a decrease in the slope of unvested compensation. All in all, the relative importance of short-term incentives increases. Lastly, the adoption of a clawback is associated with an increase in the level of executive compensation.
Table D.2: Univariate tests: No clawback vs. Clawback

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<td>0.319</td>
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<td></td>
<td>[2,780]</td>
<td>[6,071]</td>
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<td>0.157</td>
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<td>[9,405]</td>
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<td>0.088</td>
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<td></td>
<td>[2,780]</td>
<td>[6,071]</td>
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<tr>
<td>Reported earnings</td>
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<td>[6,071]</td>
</tr>
<tr>
<td>Ln(1+Forecast disp.)</td>
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<td>0.080</td>
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<td>[2,603]</td>
<td>[5,818]</td>
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<td>Ln(Analysts)</td>
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<tr>
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<td>[2,780]</td>
<td>[6,071]</td>
</tr>
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<td>Big 4</td>
<td>0.838</td>
<td>0.941</td>
</tr>
<tr>
<td></td>
<td>[2,414]</td>
<td>[9,405]</td>
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<td>14.824</td>
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<td>Leverage ratio</td>
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<td></td>
<td>[5,905]</td>
<td>[11,614]</td>
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<td></td>
<td>[3,697]</td>
<td>[8,017]</td>
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<td>Ln(Δ_Total)</td>
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<td>1.490</td>
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<td>[5,462]</td>
<td>[10,947]</td>
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<tr>
<td>Ln(Δ_S)</td>
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<td>[5,457]</td>
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<td>Ln(Δ_L)</td>
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<td>[5,351]</td>
<td>[10,822]</td>
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<td>Ln(Total compensation)</td>
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<td>[11,562]</td>
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<td></td>
<td>[5,870]</td>
<td>[11,559]</td>
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</table>

This table reports the results from univariate mean tests across the samples of clawback adopters in the 2002-2016 period. The size of each subsample is reported within brackets.

* p < 0.1, ** p < 0.05, *** p < 0.01.
E Further empirical results

In this Appendix, first I provide evidence of the relationship between meet and restate-ment behavior and the relative steepness of short-term incentive compensation. Second, I report the first stage results from estimating equation (9). Lastly, I show robustness and additional tests for the results in Table 2.

E.1 Accounting manipulation and the structure of executive pay

Here I provide evidence on the relationship between the time structure of executive compensation and the tendency of executives to meet analysts’ earnings forecasts and restate financials as proxies of accounting manipulation and weak internal monitoring in general. Figure E.1 depicts the histogram of earnings surprise bins, defined as the difference between the consensus forecast and the actual annual earnings announcement. The consensus forecast is the median forecasts across analysts recorded one month by IBES before the actual earnings announcements. The figure shows how earnings announcements are distributed asymmetrically around the consensus forecast. That is, earnings announcements cluster at the zero surprise and the $0.01 surprise bins.

What is the relationship between the structure of executive pay and the clustering of earnings announcements in the around-zero earnings surprise bin? In Figure E.2 I display the behavior of average wealth performance sensitivities across earnings surprise bins and corresponding quadratic polynomial fits below and above the zero surprise threshold. The left panel depicts the behavior of the wealth-performance sensitivity of executive
Figure E.2: Wealth-performance sensitivity and earnings surprises 1992-2016. The scatterplots show the mean (log) wealth-performance sensitivity of total ($\Delta_{\text{Total}}$, left panel), vested ($\Delta_S$, middle panel) and unvested ($\Delta_L$, right panel) executive compensation across earnings per share surprise bins. The wealth-performance sensitivities are measured as of the end of the fiscal year, and earnings announcements take place at the beginning of the following fiscal year. Each scatterplot depicts fitted quadratic polynomials below and above the zero surprise threshold. Shaded areas correspond to 95% confidence intervals.

pay, $\Delta_{\text{Total}}$, which features a kink around the zero earnings surprise bin. The middle and right panels show that most of the kink of $\Delta_{\text{Total}}$ around the zero surprise bin can be accounted by the vested part of compensation, $\Delta_S$. The wealth-performance sensitivities are measured as of the end of the fiscal year, while earnings announcements are mostly made in the first quarter of the following fiscal year. Thus, the behavior of incentive compensation measures around the zero surprise bins suggest that managers can obtain a large boost in their compensation and have incentives to manage earnings in anticipation of a positive stock reaction to meeting (or beating) the earnings forecasts.

In Table E.1 I report the results from estimating logit models for the probability of forecasts-meeting and the probability of restating financials, conditional on the structure of (average) executive incentives and other firm-level characteristics. The results in columns (1)-(3) show that the slope of short-term incentives predicts future meet behavior, while the results for financial restatements are inconclusive.

In the analysis above I considered the relationship between ex-ante incentives and ex-post manipulation. Now I study the reverse relationship, i.e. do executives that display ex-ante greater likelihood of embarking in earnings manipulation do receive ex-post steeper short-term incentives? From the perspective of the theoretical model in the main text tolerating manipulation requires shareholders to provide steeper incentives than in the absence of manipulation, which is achieved by deferring manipulation. In order to achieve the correct effort decision by the manager then shareholders must offer greater short-term rewards to the manager. Thus, I consider the forecasts-meeting frequency for
Table E.1: Probability of “meet-or-beat”: Logit estimations

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<tr>
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<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
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<td>Meet</td>
<td>0.107***</td>
<td>0.095***</td>
<td>0.120***</td>
<td>0.033</td>
<td>-0.030</td>
<td>-0.055</td>
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<td></td>
<td>(0.022)</td>
<td>(0.025)</td>
<td>(0.037)</td>
<td>(0.042)</td>
<td>(0.041)</td>
<td>(0.048)</td>
</tr>
<tr>
<td>Meet</td>
<td>0.026</td>
<td>0.046*</td>
<td>0.055</td>
<td>-0.077*</td>
<td>-0.059</td>
<td>-0.047</td>
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<td></td>
<td>(0.026)</td>
<td>(0.026)</td>
<td>(0.045)</td>
<td>(0.043)</td>
<td>(0.046)</td>
<td>(0.052)</td>
</tr>
<tr>
<td>Meet</td>
<td>-0.065*</td>
<td>-0.032</td>
<td>0.008</td>
<td>-0.005</td>
<td>0.030</td>
<td>0.055</td>
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<td></td>
<td>(0.038)</td>
<td>(0.040)</td>
<td>(0.050)</td>
<td>(0.032)</td>
<td>(0.032)</td>
<td>(0.039)</td>
</tr>
<tr>
<td>Meet</td>
<td>-0.200***</td>
<td>-0.153***</td>
<td>-0.164***</td>
<td>-0.069***</td>
<td>-0.021</td>
<td>-0.034</td>
</tr>
<tr>
<td></td>
<td>(0.030)</td>
<td>(0.031)</td>
<td>(0.033)</td>
<td>(0.023)</td>
<td>(0.021)</td>
<td>(0.023)</td>
</tr>
<tr>
<td>Meet</td>
<td>-11.168***</td>
<td>-11.167***</td>
<td>-10.804***</td>
<td>-0.592*</td>
<td>-0.396</td>
<td>-0.349</td>
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<td></td>
<td>(0.888)</td>
<td>(0.879)</td>
<td>(1.441)</td>
<td>(0.332)</td>
<td>(0.373)</td>
<td>(0.461)</td>
</tr>
<tr>
<td>Meet</td>
<td>0.381***</td>
<td>0.286***</td>
<td>0.262***</td>
<td>0.005</td>
<td>-0.030</td>
<td>-0.066</td>
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<tr>
<td></td>
<td>(0.068)</td>
<td>(0.067)</td>
<td>(0.091)</td>
<td>(0.073)</td>
<td>(0.073)</td>
<td>(0.086)</td>
</tr>
<tr>
<td>Meet</td>
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<tr>
<td></td>
<td>(0.016)</td>
<td>(0.019)</td>
<td></td>
<td></td>
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<tr>
<td>Meet</td>
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<td>-0.333*</td>
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<td></td>
<td>(0.134)</td>
<td>(0.173)</td>
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<td>Observations</td>
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<td>17,056</td>
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<td>9,562</td>
<td>9,286</td>
<td>7,296</td>
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<td>Pseudo $R^2$</td>
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<td>0.104</td>
<td>0.102</td>
<td>0.005</td>
<td>0.044</td>
<td>0.046</td>
</tr>
<tr>
<td>Year FE</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

This table reports results from logit estimations for the probability of a firm meeting the earnings forecasts and filing a financial restatement for the period 1992-2016. Variable definitions appear in Appendix D. Columns (4)-(7) are restricted to observations in the 2002-2016 period. Standard errors clustered at the two-digit SIC industry level in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. 
each executive $i$ in firm $j$ observed after $t$ periods, that is

$$Meet\ Freq_{ijt} = \frac{1}{t} \sum_{s=1}^{t} Meet_{ij s}.$$ 

Now I consider compensation variables that are measured as of fiscal year-end, while earnings announcements usually take place in the first quarter of the fiscal year. Thus, $Meet\ Freq$ is a predetermined variable from the perspective of executive incentives at fiscal year-end. I test the relationship between the structure of short-term incentives and manipulation incentives with the following specification:

$$\ln(\Delta S)_{ijt} = \beta_0 + \beta_1 Meet\ Freq_{ijt} + \Gamma'X_{ijt} + \varepsilon_{ijt}.$$ (E.1)

$X_{ijt}$ represents a set of controls, including firm size (Edmans et al., 2009), year fixed effects, and executive-firm fixed effects. Arguably, forecasts-meeting is likely to be involuntary if a firm displays a low forecasts dispersion — i.e., analysts may have low uncertainty and the firm provides accurate information. To rule out such interpretation, the controls $X_{ijt}$ include the (log) average dispersion in earnings forecasts across the executive’s tenure, which is also informative about the detectability of manipulation. In addition, I control for the actual earnings report to separate the explanatory power of forecasts-meeting from the level of reported earnings.

The coefficient $\beta_1$ in (E.1) is positive if executives that have a higher record of past earnings management display steeper short-term incentives. The coefficient measures the percentage change in the level of short-term incentives for an executive that meets the forecasts in every period. The identification of the effect relies on two assumptions. First, that past forecasts-meeting behavior is a pre-determined variable uncorrelated with omitted, unobservable, determinants of $\Delta S$. Second, that past forecasts-meeting behavior is a proxy for contemporaneous accounting manipulation tendencies. I rule out the possibility of sorting between firms and executives since I include executive-firm fixed effects, which allow to compare the compensation structure of the same executive with a different earnings management record.

I present the results in Table E.2, which confirm the prediction that managers with a higher record of earnings management receive steeper short-term compensation. Furthermore, results in columns (4) to (7) also confirm that a higher record of past restatements also translates into steeper short-term compensation. Table E.3 reports similar results when the ratio $\Delta S/\Delta Total$ is used as a dependent variable in equation (E.1).

All in all, the results suggest that accounting manipulation is related to executives receiving steeper short-term incentives, which is consistent with the model predictions.
Table E.2: Executive compensation and past manipulation records. Dependent variable: \( \ln(\Delta S) \)

<table>
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<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
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<th>(7)</th>
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<td>Meet Freq.</td>
<td>0.972***</td>
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<td>1.047***</td>
<td>1.554***</td>
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<td>(0.075)</td>
<td>(0.070)</td>
<td>(0.071)</td>
<td>(0.089)</td>
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<tr>
<td>Ln(Firm value)</td>
<td>0.451***</td>
<td>0.750***</td>
<td>0.751***</td>
<td>0.445***</td>
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<td>(0.017)</td>
<td>(0.035)</td>
<td>(0.040)</td>
<td>(0.017)</td>
<td>(0.039)</td>
<td>(0.045)</td>
<td>(0.046)</td>
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<td>Reported earnings</td>
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<td>0.073***</td>
<td>0.073***</td>
<td>0.059***</td>
<td>0.064***</td>
<td>0.062***</td>
<td>0.068***</td>
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<td>(0.018)</td>
<td>(0.018)</td>
<td>(0.017)</td>
<td>(0.016)</td>
<td>(0.014)</td>
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<tr>
<td>Ln(1+Forecast disp.)</td>
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<td>-1.748***</td>
<td>-2.962***</td>
<td>-1.363***</td>
<td>-1.271***</td>
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<td>88,662</td>
<td>87,938</td>
<td>56,414</td>
<td>56,414</td>
<td>56,216</td>
<td>56,216</td>
</tr>
<tr>
<td>Adjusted ( R^2 )</td>
<td>0.242</td>
<td>0.108</td>
<td>0.112</td>
<td>0.215</td>
<td>0.082</td>
<td>0.087</td>
<td>0.109</td>
</tr>
<tr>
<td>Year FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Industry FE</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firm FE</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

This table reports results from estimations of equation (E.1) for executive-firm level observations for the period 1992-2016. The dependent variable is the percentage of total executive incentives arising from vested securities. Columns (4)-(7) are restricted to observations in the 2002-2016 period. Standard errors clustered at the two-digit SIC industry level in parentheses. * \( p < 0.1 \), ** \( p < 0.05 \), *** \( p < 0.01 \).

That is, shareholders must provide steeper short-term incentives when managers are more likely to manipulate to induce effort, i.e., more effective decision-making. At the same time, this relationship provides greater incentives for managers to embark on earnings manipulation \textit{ex-post}, whenever managers have private information about firm performance below the forecasts.

The empirical results justify using meet behavior as an indicator of earnings manipulation and weak \textit{ex-ante} monitoring. This is because (i) managers can accumulate vested securities after manipulating earnings or (i) shareholders anticipate the potential manipulation behavior and have to provide steeper incentives to induce effort. Additionally, if executives with greater meet tendencies tend to receive more short-term incentives, they have more reasons to continue with this behavior soon, confirming the first set of results illustrated in Figure E.2. The theoretical model shows this as the outcome of optimal contracting.
Table E.3: Executive compensation and past manipulation records. Dependent variable: $\Delta_S/\Delta_{Total}$

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(0.767)</td>
<td>(1.092)</td>
<td>(1.119)</td>
<td></td>
<td></td>
<td></td>
<td>(1.030)</td>
</tr>
<tr>
<td>Ln(Firm value)</td>
<td>-1.522***</td>
<td>-0.549</td>
<td>-1.231**</td>
<td>-1.508***</td>
<td>-0.370</td>
<td>-1.368*</td>
<td>-1.627**</td>
</tr>
<tr>
<td></td>
<td>(0.261)</td>
<td>(0.452)</td>
<td>(0.545)</td>
<td>(0.317)</td>
<td>(0.703)</td>
<td>(0.802)</td>
<td>(0.752)</td>
</tr>
<tr>
<td>Reported earnings</td>
<td>0.915***</td>
<td>0.999***</td>
<td>0.956***</td>
<td>0.845***</td>
<td>1.102**</td>
<td>1.032***</td>
<td>1.120***</td>
</tr>
<tr>
<td></td>
<td>(0.170)</td>
<td>(0.151)</td>
<td>(0.158)</td>
<td>(0.172)</td>
<td>(0.155)</td>
<td>(0.155)</td>
<td>(0.151)</td>
</tr>
<tr>
<td>Ln(1+Forecast disp.)</td>
<td>4.752</td>
<td>21.503***</td>
<td>22.771***</td>
<td>-4.188</td>
<td>19.985***</td>
<td>20.942***</td>
<td>22.758***</td>
</tr>
<tr>
<td>Ln(Analysts)</td>
<td>1.332**</td>
<td></td>
<td></td>
<td>2.216**</td>
<td></td>
<td></td>
<td>1.624*</td>
</tr>
<tr>
<td></td>
<td>(0.629)</td>
<td></td>
<td></td>
<td>(0.852)</td>
<td></td>
<td></td>
<td>(0.824)</td>
</tr>
<tr>
<td>CEO tenure</td>
<td>0.325***</td>
<td></td>
<td></td>
<td>0.340***</td>
<td></td>
<td></td>
<td>0.279***</td>
</tr>
<tr>
<td></td>
<td>(0.047)</td>
<td></td>
<td></td>
<td>(0.062)</td>
<td></td>
<td></td>
<td>(0.062)</td>
</tr>
<tr>
<td>Observations</td>
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<td>90,943</td>
<td>90,235</td>
<td>58,767</td>
<td>58,767</td>
<td>58,567</td>
<td>58,567</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td>0.089</td>
<td>0.065</td>
<td>0.069</td>
<td>0.080</td>
<td>0.055</td>
<td>0.060</td>
<td>0.083</td>
</tr>
<tr>
<td>Year FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Industry FE</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firm FE</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

This table reports results from estimations of equation (E.1) for executive-firm level observations for the period 2002-2016, where the ratio $\Delta_S/\Delta_{Total}$ is the dependent variable, instead of $\Delta_S$. Columns (4)-(7) are restricted to observations in the 2002-2016 period. Standard errors clustered at the two-digit SIC industry level in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. 

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Table E.4: Effects of clawback adoption on executive compensation and earnings manipulation: First stage regression results (I)

<table>
<thead>
<tr>
<th></th>
<th>(1) Clawback</th>
<th>(2) Clawback × (ΔS/ΔTotal) 2002</th>
<th>(3) Clawback</th>
<th>(4) Clawback × (ΔS/ΔTotal) 2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adoption other&lt;sub&gt;-1&lt;/sub&gt; Ln(Firm size)&lt;sub&gt;2002&lt;/sub&gt;</td>
<td>-84.766***</td>
<td>-59.952***</td>
<td>-88.131***</td>
<td>-62.717***</td>
</tr>
<tr>
<td></td>
<td>(21.920)</td>
<td>(13.700)</td>
<td>(17.500)</td>
<td>(10.986)</td>
</tr>
<tr>
<td>Adoption other&lt;sub&gt;-1&lt;/sub&gt; Ln(Firm size)&lt;sub&gt;2002&lt;/sub&gt; × (ΔS/ΔTotal) 2002</td>
<td>-1.719</td>
<td>14.638***</td>
<td>-2.352</td>
<td>14.115***</td>
</tr>
<tr>
<td></td>
<td>(1.478)</td>
<td>(1.015)</td>
<td>(1.445)</td>
<td>(0.960)</td>
</tr>
<tr>
<td>Observations</td>
<td>31,266</td>
<td>31,266</td>
<td>33,641</td>
<td>33,641</td>
</tr>
<tr>
<td>F 1st stage</td>
<td>217.82</td>
<td>108.071</td>
<td>20.504</td>
<td>109.867</td>
</tr>
<tr>
<td>Controls</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Year FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Firm FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

This table reports first stage estimation results for 2SLS estimations of equation (9) when the dependent variables are executive-level compensation measures. The dependent variables are Clawback<sub>t</sub> and Clawback<sub>t</sub> × (ΔS/ΔTotal) 2002. Columns (1) and (2) report the results when controls variables are log firm size, reported earnings, independent directors, meet frequency and earnings forecasts dispersion. I further instrument log firm size, reported earnings and independent directors by their values measured as of 2002 interacted with year dummies. Columns (3) and (4) report the results when controls variables are log firm size, reported earnings, independent directors, meet frequency and earnings forecasts dispersion. Log firm size, reported earnings and independent directors are given by their values measured as of 2002 interacted with year dummies F 1st stage reports the F statistic that tests the null hypothesis that all coefficients, including those of the additional instrumented controls, are equal to zero. Variable definitions appear in Appendix D. Standard errors clustered at the two-digit SIC industry level in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01.
### E.2 The effects of clawback adoption: First stage regressions and OLS results

#### Table E.5: Effects of clawback adoption on executive compensation and earnings manipulation: First stage regression results (II)

<table>
<thead>
<tr>
<th></th>
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<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Clawback</td>
<td>Claw. × (ΔS/ΔTotal)$_{2002}$</td>
<td>Clawback</td>
<td>Claw. × (ΔS/ΔTotal)$_{2002}$</td>
</tr>
<tr>
<td>Adoption other$<em>{t-1}$ × Ln(Firm size)$</em>{2002}$</td>
<td>-68.672***</td>
<td>-49.695***</td>
<td>-74.868***</td>
<td>-52.910***</td>
</tr>
<tr>
<td>Adoption other$<em>{t-1}$ × Ln(Firm size)$</em>{2002}$ × (ΔS/ΔTotal)$_{2002}$</td>
<td>-0.573</td>
<td>15.447***</td>
<td>-1.569</td>
<td>14.684***</td>
</tr>
<tr>
<td></td>
<td>(1.570)</td>
<td>(1.002)</td>
<td>(1.603)</td>
<td>(0.961)</td>
</tr>
<tr>
<td>Observations</td>
<td>5,262</td>
<td>5,262</td>
<td>5,603</td>
<td>5,603</td>
</tr>
<tr>
<td>F 1st stage</td>
<td>80.732</td>
<td>130.959</td>
<td>9.998</td>
<td>116.678</td>
</tr>
<tr>
<td>Controls</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Year FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Firm FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

This table reports first stage estimation results for 2SLS estimations of equation (9) when the dependent variables are firm-level accounting manipulation measures. The dependent variables are Clawback$_t$ and Clawback$_t$ × (ΔS/ΔTotal)$_{2002}$. Columns (1) and (2) report the results when controls variables are log firm size, reported earnings, loss frequency, Big 4 frequency, independent directors, CEO tenure and earnings forecasts dispersion. I further instrument log firm size, reported earnings and independent directors by their values measured as of 2002 interacted with year dummies. Columns (3) and (4) report the results when controls variables are log firm size, reported earnings, loss frequency, Big 4 frequency, independent directors, CEO tenure and earnings forecasts dispersion. Log firm size, reported earnings and independent directors are given by their values measured as of 2002 interacted with year dummies F 1st stage reports the F statistic that tests the null hypothesis that all coefficients, including those of the additional instrumented controls, are equal to zero. Variable definitions appear in Appendix D. Standard errors clustered at the two-digit SIC industry level in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. 

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Table E.6: Effects of clawback adoption on executive compensation and earnings manipulation: Ordinary Least Squares

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ln(ΔS)</td>
<td>0.143***</td>
<td>-0.994***</td>
<td>-0.261***</td>
<td>-0.041***</td>
<td>-0.054**</td>
</tr>
<tr>
<td>Ln(ΔL)</td>
<td>(0.053)</td>
<td>(0.044)</td>
<td>(0.040)</td>
<td>(0.010)</td>
<td>(0.022)</td>
</tr>
<tr>
<td>Ln(ΔTotal)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meet</td>
<td>-0.373***</td>
<td>1.522***</td>
<td>0.301***</td>
<td>0.059***</td>
<td>0.162***</td>
</tr>
<tr>
<td>Restate</td>
<td>(0.079)</td>
<td>(0.070)</td>
<td>(0.053)</td>
<td>(0.015)</td>
<td>(0.040)</td>
</tr>
</tbody>
</table>

Observations | 31,581     | 32,331     | 32,824     | 5,317      | 5,314      |
J test p-value | 0.527      | 0.283      | 0.756      | 0.598      | 0.378      |

Controls: Yes Yes Yes Yes Yes
Year FE: Yes Yes Yes Yes Yes
Firm FE: Yes Yes Yes Yes Yes

Standard errors clustered at the two-digit SIC industry level in parentheses
* p < 0.1, ** p < 0.05, *** p < 0.01

This table reports the results from Ordinary Least Squares (OLS) regressions of executive incentive measures and earnings manipulation proxies on clawback adoption for the 2002-2016 period. In the first three columns control variables are log firm size, reported earnings, independent directors, meet frequency and earnings forecasts dispersion. In the last two columns control variables are log firm size, reported earnings, loss frequency, Big 4 frequency, independent directors, CEO tenure and earnings forecasts dispersion. In all columns I instrument log firm size, reported earnings and independent directors by their values measured as of 2002 interacted with year dummies. Standard errors clustered at the two-digit SIC industry level in parentheses. J test p-value reports the p-value for the test of over-identifying restrictions. Variable definitions appear in Appendix D. * p < 0.1, ** p < 0.05, *** p < 0.01.

E.3 The effects of clawback adoption: Robustness

Here I report 2SLS estimation results removing firms in the financial sector and utilities, Table E.7, and allowing for different effects of clawbacks in the pre and post Dodd-Frank period, Table E.8. Table E.9 reports the results from including firm-executive fixed effects in the specifications. Lastly, I show in Table E.10 results from alternative specifications of equation (9) including the interaction of clawback adoption with (i) the number of independent directors (ii) firm size and (iii) firm leverage.
Table E.7: Effects of clawback adoption on executive compensation and earnings manipulation: Excluding financial firms and utilities

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ln($\Delta_S$)</td>
<td>Ln($\Delta_L$)</td>
<td>Ln($\Delta_{Total}$)</td>
<td>$Meet$</td>
<td>$Restate$</td>
</tr>
<tr>
<td>Clawback</td>
<td>0.541***</td>
<td>-1.604***</td>
<td>-0.304***</td>
<td>-0.079***</td>
<td>-0.123***</td>
</tr>
<tr>
<td></td>
<td>(0.075)</td>
<td>(0.090)</td>
<td>(0.040)</td>
<td>(0.022)</td>
<td>(0.034)</td>
</tr>
<tr>
<td>Clawback × ($\frac{\Delta_S}{\Delta_{Total}}$)$_{2002}$</td>
<td>-1.443***</td>
<td>2.271***</td>
<td>0.143**</td>
<td>0.006</td>
<td>0.132**</td>
</tr>
<tr>
<td></td>
<td>(0.130)</td>
<td>(0.113)</td>
<td>(0.066)</td>
<td>(0.018)</td>
<td>(0.059)</td>
</tr>
<tr>
<td>Observations</td>
<td>26,661</td>
<td>27,408</td>
<td>27,661</td>
<td>4,495</td>
<td>4,492</td>
</tr>
<tr>
<td>F 1st stage</td>
<td>20.152</td>
<td>17.236</td>
<td>19.982</td>
<td>9.113</td>
<td>13.047</td>
</tr>
<tr>
<td>F 1st stage (2)</td>
<td>93.433</td>
<td>118.672</td>
<td>103.871</td>
<td>92.708</td>
<td>96.283</td>
</tr>
<tr>
<td>J test p-value</td>
<td>0.243</td>
<td>0.406</td>
<td>0.689</td>
<td>0.401</td>
<td>0.439</td>
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<tr>
<td>Controls</td>
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<td>Yes</td>
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<td>Year FE</td>
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<td>Yes</td>
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<tr>
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<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

This table reports the results from two-stage least squares regressions of executive incentive measures and earnings manipulation proxies on clawback adoption for the 2002-2016 period. I instrument clawback adoption by the leave-one-out average share of adoption across industries lagged one period and interacted with the inverse of (log) firm size in 2002. Financial firms are defined by SIC codes 6000-6799 and utilities are defined by SIC codes 4900-4942. In the first three columns control variables are log firm size, reported earnings, independent directors, meet frequency and earnings forecasts dispersion. In the last two columns control variables are log firm size, reported earnings, loss frequency, Big 4 frequency, independent directors, CEO tenure and earnings forecasts dispersion. In all columns I instrument log firm size, reported earnings and independent directors by their values measured as of 2002 interacted with year dummies. Standard errors clustered at the two-digit SIC industry level in parentheses. F 1st stage and F 1st stage (2) denote, respectively, the F statistics of the first stage regressions of clawback adoption and its interaction with $\Delta_S/\Delta_{Total}$ in 2002 on the instrumental variable and its interaction with $\Delta_S/\Delta_{Total}$ in 2002. The F statistics correspond first stage regressions where exogenous variables are partialled-out. J test p-value reports the p-value for the test of over-identifying restrictions. Variable definitions appear in Appendix D. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. 

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Table E.8: Effects of clawback adoption on executive compensation and earnings manipulation: Pre/Post-Dodd-Frank Act (2010)

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ln(ΔS)</td>
<td>Ln(ΔL)</td>
<td>Ln(Δ_{Total})</td>
<td>Meet</td>
<td>Restate</td>
</tr>
<tr>
<td>Clawback pre-2011</td>
<td>1.692***</td>
<td>-2.907***</td>
<td>0.188*</td>
<td>-0.542***</td>
<td>-0.173**</td>
</tr>
<tr>
<td></td>
<td>(0.151)</td>
<td>(0.141)</td>
<td>(0.099)</td>
<td>(0.071)</td>
<td>(0.069)</td>
</tr>
<tr>
<td>Clawback pre-2011 × (ΔS/Δ_{Total})_{2002}</td>
<td>-3.343***</td>
<td>4.133***</td>
<td>-0.783***</td>
<td>0.527***</td>
<td>0.327***</td>
</tr>
<tr>
<td></td>
<td>(0.232)</td>
<td>(0.221)</td>
<td>(0.159)</td>
<td>(0.081)</td>
<td>(0.089)</td>
</tr>
<tr>
<td>Clawback post-2011</td>
<td>0.292*</td>
<td>-2.025***</td>
<td>-0.457***</td>
<td>0.163***</td>
<td>-0.095***</td>
</tr>
<tr>
<td></td>
<td>(0.149)</td>
<td>(0.076)</td>
<td>(0.068)</td>
<td>(0.040)</td>
<td>(0.036)</td>
</tr>
<tr>
<td>Clawback post-2011 × (ΔS/Δ_{Total})_{2002}</td>
<td>-1.001***</td>
<td>2.470***</td>
<td>0.105</td>
<td>0.121***</td>
<td>0.148***</td>
</tr>
<tr>
<td></td>
<td>(0.179)</td>
<td>(0.104)</td>
<td>(0.089)</td>
<td>(0.018)</td>
<td>(0.052)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Observations</th>
<th>J test p-value</th>
<th>Controls</th>
<th>Year FE</th>
<th>Firm FE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>31,266</td>
<td>32,015</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>32,492</td>
<td>5,262</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>5,259</td>
<td>5,259</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

This table reports the results from two-stage least squares regressions of executive incentive measures and earnings manipulation proxies on clawback adoption for the 2002-2016 period. I instrument clawback adoption by the leave-one-out average share of adoption across industries lagged one period and interacted with the inverse of (log) firm size in 2002. In the first three columns control variables are log firm size, reported earnings, independent directors, meet frequency and earnings forecasts dispersion. In the last two columns control variables are log firm size, reported earnings, loss frequency, Big 4 frequency, independent directors, CEO tenure and earnings forecasts dispersion. In all columns I instrument log firm size, reported earnings and independent directors by their values measured as of 2002 interacted with year dummies. Standard errors clustered at the two-digit SIC industry level in parentheses. J test p-value reports the p-value for the test of over-identifying restrictions. Variable definitions appear in Appendix D. * p < 0.1, ** p < 0.05, *** p < 0.01.
Table E.9: Effects of clawback adoption on executive compensation: Firm-executive fixed effects

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ln(ΔS)</td>
<td>Ln(ΔL)</td>
<td>Ln(ΔTotal)</td>
</tr>
<tr>
<td>Clawback</td>
<td>0.040</td>
<td>-1.545**</td>
<td>-0.521***</td>
</tr>
<tr>
<td></td>
<td>(0.080)</td>
<td>(0.089)</td>
<td>(0.049)</td>
</tr>
<tr>
<td>Clawback × ΔS/ΔTotal 2002</td>
<td>-0.449***</td>
<td>2.524***</td>
<td>0.728***</td>
</tr>
<tr>
<td></td>
<td>(0.106)</td>
<td>(0.130)</td>
<td>(0.075)</td>
</tr>
</tbody>
</table>

Observations: 29,500 30,146 30,673
F 1st stage: 18.548 16.287 18.71
F 1st stage (2): 76.867 75.803 85.535
J test p-value: 0.549 0.554 0.491
Controls: Yes Yes Yes
Year FE: Yes Yes Yes
Firm FE: Yes Yes Yes

This table reports the results from two-stage least squares regressions of executive incentive measures on clawback adoption for the 2002-2016 period. I instrument clawback adoption by the leave-one-out average share of adoption across industries lagged one period and interacted with the inverse of (log) firm size in 2002. Control variables are log firm size, reported earnings, independent directors, meet frequency and earnings forecasts dispersion. I instrument log firm size, reported earnings and independent directors by their values measured as of 2002 interacted with year dummies. Standard errors clustered at the two-digit SIC industry level in parentheses. F 1st stage and F 1st stage (2) denote, respectively, the F statistics of the first stage regressions of clawback adoption and its interaction with ΔS/ΔTotal in 2002 on the instrumental variable and its interaction with ΔS/ΔTotal in 2002. The F statistics correspond first stage regressions where exogenous variables are partialled-out. J test p-value reports the p-value for the test of over-identifying restrictions. Variable definitions appear in Appendix D. * p < 0.1, ** p < 0.05, *** p < 0.01.
Table E.10: Effects of clawback adoption on executive compensation and earnings manipulation: Other interactions

<table>
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<tr>
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<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ln(ΔS)</td>
<td>Ln(ΔL)</td>
<td>Ln(ΔTotal)</td>
<td>ΔS/ΔTotal</td>
<td>Meet</td>
<td>Restate</td>
</tr>
<tr>
<td>Clawback</td>
<td>2.694***</td>
<td>0.321</td>
<td>1.374***</td>
<td>0.312***</td>
<td>-0.320***</td>
<td>-0.158</td>
</tr>
<tr>
<td></td>
<td>(0.283)</td>
<td>(0.199)</td>
<td>(0.198)</td>
<td>(0.049)</td>
<td>(0.110)</td>
<td>(0.112)</td>
</tr>
<tr>
<td>Clawback × ΔS/ΔTotal 2002</td>
<td>-1.138***</td>
<td>2.083***</td>
<td>-0.048</td>
<td>-0.359***</td>
<td>0.158***</td>
<td>0.225***</td>
</tr>
<tr>
<td></td>
<td>(0.145)</td>
<td>(0.101)</td>
<td>(0.054)</td>
<td>(0.026)</td>
<td>(0.023)</td>
<td>(0.065)</td>
</tr>
<tr>
<td>Clawback × Ln(Firm value) 2002</td>
<td>-0.161***</td>
<td>-0.080***</td>
<td>-0.097***</td>
<td>-0.013***</td>
<td>-0.012*</td>
<td>-0.007</td>
</tr>
<tr>
<td></td>
<td>(0.025)</td>
<td>(0.010)</td>
<td>(0.014)</td>
<td>(0.003)</td>
<td>(0.006)</td>
<td>(0.007)</td>
</tr>
<tr>
<td>Clawback × Leverage Ratio 2002</td>
<td>0.089***</td>
<td>0.068***</td>
<td>0.073***</td>
<td>-0.005***</td>
<td>0.020***</td>
<td>-0.004***</td>
</tr>
<tr>
<td></td>
<td>(0.006)</td>
<td>(0.008)</td>
<td>(0.003)</td>
<td>(0.001)</td>
<td>(0.001)</td>
<td>(0.001)</td>
</tr>
<tr>
<td>Clawback × Independent directors 2002</td>
<td>0.023</td>
<td>-0.080***</td>
<td>-0.012</td>
<td>0.019***</td>
<td>0.031***</td>
<td>0.025***</td>
</tr>
<tr>
<td></td>
<td>(0.015)</td>
<td>(0.011)</td>
<td>(0.012)</td>
<td>(0.002)</td>
<td>(0.003)</td>
<td>(0.004)</td>
</tr>
</tbody>
</table>

Observations: 31,266 32,015 32,492 32,492 5,262 5,259
J test p-value: 0.473 0.473 0.455 0.765 0.467 0.683
Controls: Yes Yes Yes Yes Yes Yes
Year FE: Yes Yes Yes Yes Yes Yes
Firm FE: Yes Yes Yes Yes Yes Yes

This table reports the results from two-stage least squares regressions of executive incentive measures and earnings manipulation proxies on clawback adoption for the 2002-2016 period. I instrument clawback adoption by the leave-one-out average share of adoption across industries lagged one period and interacted with the inverse of (log) firm size in 2002. In the first four columns control variables are log firm size, reported earnings, independent directors, meet frequency and earnings forecasts dispersion. In the last two columns control variables are log firm size, reported earnings, loss frequency, Big 4 frequency, independent directors, CEO tenure and earnings forecasts dispersion. In all columns I instrument log firm size, reported earnings and independent directors by their values measured as of 2002 interacted with year dummies. Standard errors clustered at the two-digit SIC industry level in parentheses. J test p-value reports the p-value for the test of over-identifying restrictions. Variable definitions appear in Appendix D.

* p < 0.1, ** p < 0.05, *** p < 0.01.

E.4 The effects of clawback adoption: Board interlocks

The identification strategy in the main text exploits the existence of within-industry peer effects that influence the clawback adoption decision by the individual firm. An alternative strategy is to exploit board interlocks between firms as a potential channel through which firms understand the benefits of clawback adoption (Gantchev et al., 2017, Foroughi et al., 2016, Bouwman, 2011). Thus, using the ISS directors database I extract the first-order and second-order board interlocks between firms. That is, for each firm
I find whether a director holds a position in the board of a second firm and whether directors from a third firm also hold a position in the second.

Table E.11 reports the results of logit estimations for the probability of a firm having a clawback provision, conditional on a set of firm characteristics and on the share of clawback adoption across firms in the same board interlock and outside of the same two-digit SIC industry. The estimation results confirm that board interlocks, either direct or indirect, also play a role in the clawback adoption decision.

Similarly to the descriptions in the main text, I follow an IV strategy that exploits the share of clawback adoption in firms that are outside of the board interlock and the two-digit SIC industry of each firm. I also interact the resulting variable with the inverse of firm size in 2002. The identification relies on omitted factors that affect the share of adopters outside of the board interlock being uncorrelated with the determination of the structure of executive compensation. In the estimations, I include industry-time year effects since board interlock varies at the firm-year level. This strategy controls for time-industry specific factors that affect the determination of clawback adoption and the structure of compensation, such as competition for talent concerns.

The results remain largely invariant with respect to the baseline estimations in the main text. Tables E.12 and E.13 report the first stage estimation results, while Table E.13 reports the 2SLS estimation results.
Table E.11: Determinants of clawback adoption: Board interlocks

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ln(Firm value)</td>
<td>0.218***</td>
<td>0.335***</td>
<td>0.257***</td>
<td>0.160**</td>
</tr>
<tr>
<td></td>
<td>(0.066)</td>
<td>(0.118)</td>
<td>(0.067)</td>
<td>(0.077)</td>
</tr>
<tr>
<td>Independent directors</td>
<td>0.167***</td>
<td>0.019</td>
<td>0.172***</td>
<td>0.174***</td>
</tr>
<tr>
<td></td>
<td>(0.059)</td>
<td>(0.077)</td>
<td>(0.063)</td>
<td>(0.067)</td>
</tr>
<tr>
<td>Peer adoption</td>
<td>0.722***</td>
<td>1.423</td>
<td>0.504*</td>
<td>0.909***</td>
</tr>
<tr>
<td></td>
<td>(0.187)</td>
<td>(0.918)</td>
<td>(0.287)</td>
<td>(0.271)</td>
</tr>
<tr>
<td>CEO tenure</td>
<td>-0.019*</td>
<td>-0.001</td>
<td>-0.009</td>
<td>-0.026**</td>
</tr>
<tr>
<td></td>
<td>(0.012)</td>
<td>(0.050)</td>
<td>(0.013)</td>
<td>(0.012)</td>
</tr>
<tr>
<td>Big 4</td>
<td>-0.886***</td>
<td>-0.655</td>
<td>-0.940**</td>
<td>-1.015*</td>
</tr>
<tr>
<td></td>
<td>(0.340)</td>
<td>(0.822)</td>
<td>(0.403)</td>
<td>(0.532)</td>
</tr>
<tr>
<td>Meet Freq.</td>
<td>-0.358</td>
<td>-0.344</td>
<td>-0.460</td>
<td>-0.421</td>
</tr>
<tr>
<td></td>
<td>(0.340)</td>
<td>(0.818)</td>
<td>(0.455)</td>
<td>(0.401)</td>
</tr>
<tr>
<td>Restate Freq.</td>
<td>-0.610</td>
<td>-0.322</td>
<td>-0.003</td>
<td>-1.012</td>
</tr>
<tr>
<td></td>
<td>(0.595)</td>
<td>(2.165)</td>
<td>(0.827)</td>
<td>(0.668)</td>
</tr>
<tr>
<td>Loss Freq</td>
<td>-1.115</td>
<td>-0.585</td>
<td>-0.531</td>
<td>-1.498*</td>
</tr>
<tr>
<td></td>
<td>(0.726)</td>
<td>(1.769)</td>
<td>(0.912)</td>
<td>(0.783)</td>
</tr>
<tr>
<td>Observations</td>
<td>5,994</td>
<td>1,657</td>
<td>1,880</td>
<td>2,403</td>
</tr>
<tr>
<td>Pseudo $R^2$</td>
<td>0.455</td>
<td>0.175</td>
<td>0.164</td>
<td>0.106</td>
</tr>
<tr>
<td>Adopters</td>
<td>2,807</td>
<td>80</td>
<td>768</td>
<td>1,847</td>
</tr>
<tr>
<td>Pr. of clawback</td>
<td>0.352</td>
<td>0.027</td>
<td>0.388</td>
<td>0.799</td>
</tr>
<tr>
<td>Year FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

This table reports the results from logit estimations for the probability of a firm having a clawback provision in the 2002-2016 period. I define peer adoption as the lagged value-weighted share of adopting firms in the same board interlock of the individual firm. Meet Freq., Restate Freq. and Loss Freq. represent, respectively, the average frequency of forecasts-meeting, financial restatements and loss across a firm’s executives. Adopters reports the number of firm-year observations in which a clawback exists. Pr. of adoption reports the predicted probability of adoption when the explanatory variables take their average value. The remaining variable definitions appear in Appendix D. Standard errors clustered at the two-digit SIC industry level in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. 
### Table E.12: Effects of clawback adoption on executive compensation and earnings manipulation: First stage with board interlocks as IV (I)

<table>
<thead>
<tr>
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<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Clawback</td>
<td>Clawback × (ΔS/ΔTotal)</td>
<td>Clawback</td>
<td>Clawback × (ΔS/ΔTotal)</td>
</tr>
<tr>
<td>Adoption No peers−1</td>
<td>-42.543***</td>
<td>-35.511***</td>
<td>-40.334***</td>
<td>-33.814***</td>
</tr>
<tr>
<td>Ln(Firm size)</td>
<td>(8.120)</td>
<td>(5.520)</td>
<td>(8.129)</td>
<td>(5.491)</td>
</tr>
<tr>
<td>Adoption No peers−1</td>
<td>2.043</td>
<td>12.100***</td>
<td>1.503</td>
<td>12.374***</td>
</tr>
<tr>
<td>× (ΔS/ΔTotal)</td>
<td>(1.927)</td>
<td>(1.372)</td>
<td>(1.917)</td>
<td>(1.347)</td>
</tr>
</tbody>
</table>

| Observations | 26,779 | 26,779 | 27,610 | 27,610 |
| F            | 4.792  | 6.47   | 14.111 | 50.004 |
| Controls     | Yes    | Yes    | No     | No     |
| Industry × Year FE | Yes | Yes | Yes | Yes |
| Firm FE      | Yes    | Yes    | Yes    | Yes    |

This table reports first stage estimation results for 2SLS estimations of equation (9) when the dependent variables are executive-level compensation measures. The dependent variables are Clawbacks and Clawbacks × (ΔS/ΔTotal). Columns (1) and (2) report the results when controls variables are log firm size, reported earnings, independent directors, meet frequency and earnings forecasts dispersion. I further instrument log firm size, reported earnings and independent directors by their values measured as of 2002 interacted with year dummies. Columns (3) and (4) report the results when controls variables are log firm size, reported earnings, independent directors, meet frequency and earnings forecasts dispersion. Log firm size, reported earnings and independent directors are given by their values measured as of 2002 interacted with year dummies. F 1st stage reports the F statistic that tests the null hypothesis that all coefficients, including those of the additional instrumented controls, are equal to zero. Variable definitions appear in Appendix D. Standard errors clustered at the firm level in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01.

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Table E.13: Effects of clawback adoption on executive compensation and earnings manipulation: First stage with board interlocks as IV (II)

<table>
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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Clawback</td>
<td>Claw × (ΔS/ΔTotal)</td>
<td>Clawback</td>
<td>Claw × (ΔS/ΔTotal)</td>
</tr>
<tr>
<td>Adoption No peer( t - 1 ) ( \text{Ln(Firm size)}_{2002} )</td>
<td>-38.798***</td>
<td>-33.657****</td>
<td>-35.892***</td>
<td>-31.568***</td>
</tr>
<tr>
<td></td>
<td>(8.466)</td>
<td>(5.035)</td>
<td>(8.301)</td>
<td>(4.921)</td>
</tr>
<tr>
<td>Adoption No peer( t - 1 ) ( \text{Ln(Firm size)}<em>{2002} ) × (ΔS/ΔTotal)</em>{2002}</td>
<td>-2.187</td>
<td>12.391***</td>
<td>-1.825</td>
<td>12.581***</td>
</tr>
<tr>
<td></td>
<td>(1.631)</td>
<td>(1.123)</td>
<td>(1.648)</td>
<td>(1.118)</td>
</tr>
<tr>
<td>Observations</td>
<td>4,617</td>
<td>4,617</td>
<td>4,701</td>
<td>4,701</td>
</tr>
<tr>
<td>F</td>
<td>-</td>
<td>-</td>
<td>11.036</td>
<td>79.587</td>
</tr>
<tr>
<td>Controls</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Industry × Year FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Firm FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

This table reports first stage estimation results for 2SLS estimations of equation (9) when the dependent variables are firm-level accounting manipulation measures. The dependent variables are Clawback and Clawback × (ΔS/ΔTotal)_{2002}. Columns (1) and (2) report the results when controls variables are log firm size, reported earnings, loss frequency, Big 4 frequency, independent directors, CEO tenure and earnings forecasts dispersion. I further instrument log firm size, reported earnings and independent directors by their values measured as of 2002 interacted with year dummies. Columns (3) and (4) report the results when controls variables are log firm size, reported earnings, loss frequency, Big 4 frequency, independent directors, CEO tenure and earnings forecasts dispersion. Log firm size, reported earnings and independent directors are given by their values measured as of 2002 interacted with year dummies. F 1st stage reports the F statistic that tests the null hypothesis that all coefficients, including those of the additional instrumented controls, are equal to zero. Variable definitions appear in Appendix D. Standard errors clustered at the firm level in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01.
Table E.14: Effects of clawback adoption on executive compensation and earnings manipulation: Board interlocks

<table>
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<th>(4)</th>
<th>(5)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ln(ΔS)</td>
<td>Ln(ΔL)</td>
<td>Ln(ΔTotal)</td>
<td>Meet</td>
<td>Restate</td>
</tr>
<tr>
<td>Clawback</td>
<td>0.277</td>
<td>-1.539***</td>
<td>-0.178</td>
<td>-0.110***</td>
<td>-0.060***</td>
</tr>
<tr>
<td></td>
<td>(0.320)</td>
<td>(0.257)</td>
<td>(0.236)</td>
<td>(0.009)</td>
<td>(0.008)</td>
</tr>
<tr>
<td>Clawback × ΔS/ΔTotal 2002</td>
<td>-0.790*</td>
<td>2.242***</td>
<td>0.089</td>
<td>0.086***</td>
<td>0.050***</td>
</tr>
<tr>
<td></td>
<td>(0.435)</td>
<td>(0.355)</td>
<td>(0.333)</td>
<td>(0.007)</td>
<td>(0.011)</td>
</tr>
<tr>
<td>Observations</td>
<td>26,779</td>
<td>27,535</td>
<td>27,918</td>
<td>4,617</td>
<td>4,615</td>
</tr>
<tr>
<td>F 1st stage</td>
<td>14.111</td>
<td>14.396</td>
<td>14.82</td>
<td>11.036</td>
<td>10.889</td>
</tr>
<tr>
<td>F 1st stage (2)</td>
<td>50.004</td>
<td>52.816</td>
<td>54.927</td>
<td>79.587</td>
<td>82.911</td>
</tr>
<tr>
<td>J test p-value</td>
<td>0.578</td>
<td>0.125</td>
<td>0.705</td>
<td>0.433</td>
<td>0.42</td>
</tr>
<tr>
<td>Controls</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Industry × Year FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Firm FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

This table reports the results from two-stage least squares regressions of executive incentive measures and earnings manipulation proxies on clawback adoption for the 2002-2016 period. I instrument clawback adoption by the value-weighted share of adoption across firms outside the board interlock of each firm and interacted with the inverse of (log) firm size in 2002. In the first three columns control variables are log firm size, reported earnings, independent directors, meet frequency and earnings forecasts dispersion. In the last two columns control variables are log firm size, reported earnings, loss frequency, Big 4 frequency, independent directors, CEO tenure and earnings forecasts dispersion. In all columns I instrument log firm size, reported earnings and independent directors by their values measured as of 2002 interacted with year dummies. F 1st stage and F 1st stage (2) denote, respectively, the F statistics of the first stage regressions of clawback adoption and its interaction with ΔS/ΔTotal in 2002 on the instrumental variable and its interaction with ΔS/ΔTotal in 2002. The F statistics correspond first stage regressions where exogenous variables are partialled-out. J test p-value reports the p-value for the test of over-identifying restrictions. Variable definitions appear in Appendix D. Standard errors clustered at the firm level in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01.