Voluntary Clawback Adoption and Analyst Following, Forecast Accuracy, and Bias

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Adoption of voluntary clawback provisions has been on the increase since 2002 with the passage of the Sarbanes-Oxley Act. Many studies document positive outcomes associated with the clawback adoption. We use a one-to-one propensity score matched sample of firms that voluntarily adopt restatement triggered clawback provisions and similar non-adopters. We examine analyst following, analyst forecast accuracy, and analyst forecast optimistic bias. We find that clawback adopters are followed by more analysts. Furthermore, analysts provide more accurate forecasts, and with less optimistic bias. Collectively, our results suggest that the adoption of clawback provisions is associated with meaningful effect among financial analysts.

INTRODUCTION

The Sarbanes-Oxley (SOX hereinafter) law, enacted in 2002, requires clawback of certain compensation of CEOs and CFOs under certain circumstances in the event of a financial restatement. The Securities and Exchange Commission (the SEC) has had the authority under Section 304 of the SOX to recover (or "clawback") certain compensation from chief executive officers and chief financial officers of public companies over a 12-month period in the event a company restates its financials due to "material noncompliance" with financial reporting requirements, if the noncompliance is the result of misconduct.

In recent years, many U.S. public companies have voluntarily developed their own policies of clawing back incentives paid to executives to the extent those incentives are based on erroneous corporate performance data. Most of these clawback policies give the board of directors of the corporation the discretion as to whether and how much to claw back.

Also, the Dodd-Frank Wall Street Reform and Consumer Protection Act (simply referred to as the Dodd-Frank Act) of 2010 has made various recommendations that are meant to enhance corporate governance through clawback provisions. The Act requires the S.E.C. to devise clawback rules, and its proposal would obligate publicly traded companies to recover incentive-based compensation from executives for up to three years if they ever have to restate their earnings. On July 1, 2015, the SEC proposed various rules that will require all companies listed on a national securities exchange to have a policy to recover erroneously awarded compensation.

The clawback provision has attracted a lot of interest from researchers. A stream of studies has examined the effects of clawback provision. In one of the earlier studies on clawback, Chan, Chen, Chen,

and Yu (2012), investigate the effects on restatement, earnings response coefficient (ERC), internal control material weakness (ICMW), audit fee, and audit time. Similarly, Dehaan, Hodge, and Shevlin (2013) study the effects of clawback on earnings quality. Iskandar-Datta and Jia (2013) and Chen, Greene, and Owers (2014) document the stock reactions associated with the adoption of clawback provisions.

In general, these studies find overall positive effects associated with adopting clawback provisions.[1] The adoption of clawback provisions leads to increased financial integrity and improved financial reporting quality. Since sell side analysts tend to be the most important users of financial statements, they will benefit from the improved reporting quality and integrity. In this paper we test whether clawback adoption is inconsequential for financial analysts by examining the association of clawback adoption and the sell-side analysts. In particular, we examine the association between clawback adoption and the analyst following, analyst forecast accuracy, and bias.

Based on a sample of 209 firms that have adopted clawback provisions since 2010, we find that the clawback firms have greater analyst following. Analysts' forecasts are more accurate among clawback firms relative to matched non-clawback firms. When we investigate the association between analyst forecast bias and clawback adoption, we find that the analysts' forecasts are less biased toward clawback adopting firms compared to matched non-adopting firms. Taken together, our overall findings on uncertainty and bias suggest that clawback adoption diminishes forecasting complexity.

This paper makes one major contribution to the accounting literature. Sell-side analysts are among the most important users of financial reports. While prior studies provide evidence of the link between earnings quality and clawback adoption, exactly how clawback adoption affects the users of earnings reports directly has been largely untouched. This study adds to this research by *directly* documenting a relation between clawback adoption and uncertainty along with bias of analyst forecasts. The adoption also incentivizes analysts to follow the clawback adopters. The evidence presented in this paper shows that clawback adoption can influence both the quantity and quality of analysts' forecasts.

Our paper is similar, in some senses, to Dehaan et al. (2013). They use the argument of Lang and Lundholm (1996) that dispersion between analysts is increasing relative to the amount of private information used by analysts in the forecasting process. If clawbacks improve market participants' beliefs about financial statement quality, analysts will make greater use of this common information source in their analysis. They hypothesize and find that analyst forecast dispersion indeed decreases following clawback adoption.

However, our study differs from Dehaan et al. (2013) in two important aspects. First, Dehaan et al. examine the analyst forecast dispersion associated with the clawback adoption. As noted by Sheng and Thevenot (2012): "Dispersion, as a proxy for uncertainty, has several advantages. It is easy to calculate and gives a measure of uncertainty around the time the forecast is made, i.e. in real time." On the other hand, Sheng and Thevenot (2012) comment that dispersion tends to be a noisy and unreliable proxy for earnings forecast uncertainty when the uncertainty shared by all analysts becomes dominant or when the change in uncertainty is the construct of interest.

We, therefore, use the accuracy measure developed by Lang and Lundholm (1996) which has been used widely in the accounting and finance literature. Other than the forecast accuracy, we also investigate the forecast bias. The argument is that if clawback improves the reporting quality and integrity, the forecast bias should diminish also.

Second, Dehaan et al.'s (2013) study uses data to the year 2007-2009. Our study uses data for the period 2010-2013. This time period difference is significant because Dehaan et al.'s data is for a period when the markets were depressed due to the economic meltdown and before the passing of the Dodd-Frank Act of 2010. The clawback provisions we examine are, therefore, not only based on SOX section 304, but are also based on the Dodd-Frank Act of 2010 section 954.

The paper is organized as follows. We first review the literature and develop our hypotheses. We then describe the sample selection process and explain our research design and methodology. Lastly, we present the results and conclusions are presented.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Clawback provisions are also referred to as recoupment clauses and refer to the rights of a firm to claw back from an executive of the firm benefits already earned and paid following a predetermined triggering event (Earlie & Wilkerson, 2012). The triggering events may include: misconduct, breach of restrictive covenants such as (e.g., non-competition and non-solicitation agreements), influence on employees, termination of employment due to unethical behavior, and financial statement restatement.

Clawback provisions have been argued to have three key functions in corporate governance: limiting the risk of manipulation, penalizing bad behavior, and preventing windfall earnings (Earlie & Wilkerson, 2012)[2]. In addition, Babenko. Bennett, Bizjak, and Coles (2015) argue that adoption of clawback provisions may facilitate better managerial decisions and improve the informativeness of reported earnings.

Existing literature provides two hypotheses to explain voluntary clawback adoption, the causal hypothesis (Chan et al., 2012) and the signaling hypothesis (Chan et al., 2012; Dehaan et al., 2013; Iskandar-Datta & Jia, 2013). The causal hypothesis argues that clawback adoption would lead to changes in executive behavior resulting in certain positive outcomes. Instead, the signaling hypothesis argues that adopting clawback provisions may signal already high financial reporting quality rather than cause reporting quality to improve. These two hypotheses are not mutually exclusive. It is likely that adopting firms may adopt the clawback to improve financial reporting quality and, at the same time, to signal investors that adopting firms' financial statements are already reliable.

The literature provides plenty of support for the causal explanation of clawback adoption. Using difference-in-difference approach, Chan et al. (2012) find many positive outcomes associated with adopting clawback provisions. Clawback provisions adopting firms exhibit a decline in the number of incidences of accounting restatements, an increase in earnings response coefficient, a decrease in the likelihood that auditors report material internal control weaknesses, a reduction in audit fees, and a decrease in the time it takes for auditors to issue audit reports after initiating clawback provisions.

Dehaan et al. (2013) corroborate Chan et al.'s findings. They find that clawback adoption is associated with a reduction in the probability of accounting restatements, an increase in earnings response coefficients, decrease in analyst forecast dispersion, and increase in pay-for-performance sensitivity. Iskandar-Datta and Jia (2013) document a reduction in bid-ask spreads and favorable market reaction for restating firms that adopt clawbacks. Chen et al. (2014) also find that the market reacts positively to the announcement of voluntary adoption of clawback provisions. Faced with the clawback deterrent, managers appear to be more diligent, cautious, and conservative when compiling and reporting accounting statements. (Babenko et al., 2015). In summary, the literature has presented overwhelming evidence that clawback adoptions are associated with improvements in financial reporting quality and/or the information environment.

However, a few studies have found that the adoption of clawback provisions is merely for window dressing purpose. These studies document evidence that the improving financial reporting quality is actually at the expense of having higher real earnings management (Chan, Chen, & Chen, 2013; Yu, 2013; Chan, Chen, & Yu, 2015). Chan et al. (2015) even find that the total amount of earnings management does not decrease subsequent to clawback adoption. The mere threat of clawback might deter senior managers from managing accounting earnings; it doesn't deter the senior managers' gaming behavior anyway.

Pyzoha (2015) offers a more provoking explanation for the decline in restatements following the adoption of clawback provisions. He finds that executives (i.e., CFOs, controllers, and treasurers) facing a lower quality auditor are less likely to agree with amending prior financial statements when a higher proportion of their pay is incentive-based. Therefore, the seemingly drop in financial restatements, after adoption of clawback provisions, could be a misconception.

There is also the issue about how often the clawback is enforced? Do clawback provisions really have claws? It might be easy to put the provisions in place. But are firms committed to use them if it is necessary? Babenko et al.'s study puts the enforcement of the provisions into question. It shows that none

of the 232 firms in the S&P 500 that have a clawback in place and experienced an accounting restatement, has used the clawback provision to recoup pay from executives. Thus, not only do most voluntary clawback provisions offer significant discretion to the board, but in practice the board makes use of this discretion to avoid enforcing the clawback policy.

With the seemingly opposing views and evidence on the efficacy of clawback adoption, we try to examine this issue from a different perspective, the perspective of financial analysts. Financial analysts are sophisticated users of financial information including all kinds of corporate disclosures. In particular, financial analysts do have an information discovery and interpretation role (Chen, Cheng, & Lo, 2010) and are able to examine the quality of voluntary disclosures (Langberg & Sivaramakrishnan, 2008). Researchers have long been interested in learning about analysts' use of accounting information (Schipper, 1991). Analysts' forecasts are widely used in the accounting and finance literature to study market participants' expectations. In this paper we examine the association between the analyst forecast accuracy and the adoption of clawback provisions.

Prior literature examines the relation between the properties of firms' financial disclosures and the behavior of security analysts and finds that analysts are attracted to firms with less information uncertainty. For example, Lang, Lins, and Miller (2004) find that analysts are less likely to follow firms with governance issues, even though they appear to add greater value when they do. Similarly, Bushman, Piotroski and Smith (2005) find that analyst following is lower in situations where there is likely to be more information issues due to weak insider trading laws.

In addition, analysts are likely to prefer firms that are more forthcoming because it reduces the cost of following the firm and the risk of large negative surprises. Consistent with that notion, Lang and Lundholm (1996) find that analyst following is positively correlated with disclosure quality using the AIMR disclosure rankings. Healy, Hutton, and Palepu (1999) provide confirming evidence using the AIMR data that analyst following increases following enhancements to firms' disclosure policies. The US evidence on analyst following is also supported by international evidence. Bushman et al. (2005) provide evidence that analyst following increases in disclosure quality internationally. These studies generally document that firms with better disclosure quality tend to attract greater analyst following.[3]

Consequently, considering the abovementioned, we, therefore, contend that clawback adopters will attract higher analyst following due to their documented better financial reporting quality and corporate governance. Consequently, we state our first hypothesis as follows:

H1: All else being equal, voluntary clawback adoption would more likely be associated with increased financial analyst following.

The extant literature on the relation between clawback and accruals quality implies that clawback adoption could be related to analysts' forecast accuracy. For example, the evidence documented by Chan et al. (2012), Dehaan et al. (2013) and Iskandar-Datta and Jia (2013) provide strong supports to the hypotheses that clawback adoption diminishes financial reporting risks, improved financial reporting quality from the market's perspectives, curtails managers' incentives for earnings manipulation. In summary, these studies present evidence that clawback adoptions are associated with improvements in financial reporting quality and/or the information environment. Furthermore, the adoption of clawback is an effective corporate governance tool in making CEO more accountable for firm's financial reporting.

Byard, Li, and Weintrop (2006) show that better quality corporate governance is associated with a key benefit to the end users of firm-provided financial disclosures: an increase in the overall quality of information possessed by financial analysts, one of the key users of firm-provided financial disclosures. We, therefore, expect that analysts following firms with clawback provisions will make forecasts with greater accuracy and formalize our second hypothesis as the following:

H2: All else being equal, voluntary clawback adoption is associated with more accurate analyst forecasts.

Prior research documents that financial analysts improve their forecast accuracy by accessing more management information (Kanagaretnam, Lobo, & Mathieu, 2006). Furthermore, according to

Kanagaretnam et al. analysts may issue optimistically biased forecasts to maintain this access especially when the firm's earnings are less predictable, and forecasts are more complicated. Better information environment can, however, reduce the complexity of the forecasts and improve their predictability. Conditional on clawback firms having a better information environment, we contend that adoption of clawback provisions would be associated with less optimistic forecast bias. We therefore state our third hypothesis as follows:

H3: All else being equal, voluntary clawback adoption would be less likely to be associated with optimistic analyst forecast bias.

RESEARCH DESIGN AND METHODOLOGY

Data Sources

We obtain fundamentals data from COMPUSTAT, analyst forecast data from Institutional Brokers Earnings Services (I/B/E/S), auditor and internal control material weaknesses data from Audit Analytics, market data from CRSP, lines of business from LexisNexis® Academic, and the initial list of clawback firms from CapitalIQ. We hand-collect data on board characteristics, stock holding, and executive tenure from the SEC filings.[4]

Sample Construction

We use data for the period 2007 to 2013. Because the SEC amended regulation S-K requiring clawback provision adoption to be disclosed on form DEF 14A in 2006, we choose to make the year 2007 our starting point. We first screen company DEF 14A filings from Capital IQ using the term "clawback." We summarize our selection procedure in Table 1.

TABLE 1
SAMPLE SELECTION PROCEDURE

Description	2007	2008	2009	2010	2011	2012	2013	Total
Original Capital IQ screened list	116	215	493	708	1127	1353	1539	5,551
Drop private firms	(28)	(53)	(95)	(115)	(133)	(124)	(54)	(602)
Public firms	88	162	398	593	994	1229	1485	4,949
Drop duplicates in prior year lists	(0)	(23)	(52)	(80)	(165)	(286)	(381)	(987)
Drop utility and financial firms	(32)	(58)	(194)	(254)	(344)	(399)	(472)	(1,753)
Drops firms with missing data	(18)	(30)	(61)	(106)	(211)	(275)	(346)	(1,047)
Firms with data in databases	38	51	91	153	274	269	286	1,162
Drop non-clawback firms	(8)	(19)	(34)	(46)	(115)	(110)	(117)	(449)
Firms with clawback provisions	30	32	57	107	159	159	169	713
Firms with non-restatement clawback provisions	(11)	(12)	(19)	(28)	(45)	(69)	(72)	(256)
Firms with restatement clawback provisions	19	20	38	79	114	90	97	457
Firms with no propensity score matches	-	-	-	(31)	(58)	(41)	(41)	(248)
Matched study firms [a]	-	-	-	48	56	49	56	209
Matched control firms	-	-	-	48	56	49	56	209
Final study sample								418

[a] We use observations for the period 2007-2009 to compute propensity scores. Consistent with prior research (Dehaan et al., 2013); these observations should be excluded from model estimations for the study.

After confirming that firms that have used the term clawback have adopted clawback provisions, we select an initial sample. We require the firm to meet the following preliminary criteria: has clawback provisions, is a non-financial and non-utility industry firm, has all pertinent data available in COMPUSTAT, CRSP, I/B/E/S, and ExecuComp and that the firm has restatement triggered clawback provisions. We then partition the firms with restatement triggered clawback provisions sample into two:

1) period 2007-2009 and 2) period 2010-2013. We use the first partition to compute the probability of clawback adoption (propensity scores). We use the following binary logistic regression model which is based on Dehaan et al. (2013)[4]:

$$p_i(CLAWBACK) = \alpha + \beta_1 AVGLEV_i + \beta_2 AVGMKV_i + \beta_3 AVGMTB_i + \beta_4 AVGROA_i + \beta_5 AVGREV_i + \beta_6 RESTATE\_PRE_i + \beta_7 AVGBEAT_i + \beta_8 HBEAT_i + \beta_9 AVGDISP_i + \beta_{10} HVDISP_i + \beta_{11} AVGSPREAD_i + \beta_{12} AVGSDRET_i + \beta_{13} AVGERC_i + \beta_{14} HVERC_i + \beta_{15} LTOTALCOMP_i + \beta_{16} TURNOVER_i + \beta_{17} HVTURNOVER_i + \beta_{18} LOWNPERC_i + \beta_{19} HVOWN_i + \beta_{20} LNTENURE_i + \beta_{21} HVTENURE_i + FF48 + \varepsilon_i \quad (1)$$

We then score the data in the partition for period (2010-2013) which we use as our sample firms. Finally, we construct our final sample by matching each clawback firm to a non-clawback firm based on the propensity scores.

Final Sample Distribution

Our final sample has 418 firms, comprising 209 clawback firms and 209 non-clawback firms for the period 2010 to 2013 and a total of 1,530 firm-year observations. The number of firms adopting restatement clawback provisions in each of the years is relatively the same: 23 percent in 2010, 27 percent in 2011, 23 percent in 2012, and 27 percent in 2013.[6]

Research Design

We conduct univariate analysis (t-test for differences in means, Wilcoxon test for differences in medians), and the Pearson's correlation analysis) including the *difference-in-difference* univariate analysis. We then estimate the multivariate OLS regression models for test of hypotheses H1, H2, and H3. We measure the variance inflation factor (VIF) in all the multivariate models, in addition to assessing the size and significance of Pearson's correlation coefficients between independent variables, to check for any multicollinearity concerns.

Analyst Following and Clawback Adoption

We first test H1 which hypothesizes that*:* All else being equal, voluntary clawback adoption would more likely be associated with increased financial analyst following g. We estimate the following OLS regression model which is based on Irani and Karamanou (2003) to test H1. Positive and significant β_1 and β_3 would support the prediction of hypothesis H1.

$$ANFOL_{i,t} = \alpha + \beta_1 CLAWBACK_i + \beta_2 AFTER_i + \beta_3 AFTER*CLAW_i + \beta_4 LOB_{i,t-1} + \beta_5 TA_{i,t-1} + \beta_6 EPSVOL_{i,t-1} + \beta_7 EPSFX_{i,t-1} + \beta_8 EPSCH_{i,t-1} + \beta_9 SALCH_{i,t-1} + \beta_{10} AR_{i,t-1} + \beta_{11} RETVAR_{i,t-1} + \beta_{12} RDV_{i,t-1} + \mu_i \sum_{2}^{n} IND + \delta t \sum_{2}^{3} YR + \varepsilon_i \quad (2)$$

The dependent variable, ANFOL, is the analyst following and is measured by the natural log of one plus the number of analysts who provide forecast earnings in I/B/E/S annual estimates file for the fiscal year. The two independent variables of interest are: CLAWBACK (which equals one if the firm has adopted restatement triggered clawback provisions and zero otherwise) and AFTER*CLAW (which is an interaction term between AFTER and CLAWBACK). AFTER is a dummy variable that takes the value of one for all the years after clawback adoption and zero for the year of adoption and before.

All the control variables used in equation 1 are suggested by the literature regarding analyst following and firm characteristics. Specifically, we control for the firm complexity by the number of lines of business (LOB), total assets (TA), the volatility of earnings (EPSVOL), the annual EPS before discontinued operations and extraordinary items scaled by beginning stock price (EPSFX), changes in

firm performance (EPSCH), changes in firm growth (SALCH), a firm's compounded annual return less the compounded annual return for the value weighted market index (AR), a firm's stock returns variability (RETVAR), advertising expenses as a percentage of total expenses (RDV), and the industry (IND) and year (YR) fixed effects.

Analyst Forecast Accuracy and Clawback Adoption

In our second hypothesis, we hypothesize that there is a positive association between the adoption of clawback provisions and analyst forecast accuracy. We estimate the following model (Equation 3) to test hypothesis H2.

$$ACCURACY_{i,j} = \alpha + \beta_1 CLAWBACK_i + \beta_2 AFTER_i + \beta_3 AFTER*CLAW_i + \beta_4 CEODUALITY_i + \beta_5 LOSS_i + \beta_6 MKV_i + \beta_7 LEV_i + \beta_8 LNANFOL_i + \beta_9 RD_i + \beta_{10} BDIND_i + \beta_{11} LBDSIZE_i + \beta_{12} DISP_i + \beta_{13} EPSVOL_i + \beta_{14} BIG6_i + \beta_{15} ICMW_i + \mu_i \sum_{2}^{n} IND + \delta t \sum_{2}^{3} YR + \varepsilon_i \quad (3)$$

Based on Lang and Lundholm (1996), Byard et al. (2006), and Xu and Tang (2012), we define forecast accuracy as follows:

Forecast accuracy (ACCURACY) = $-\frac{|\text{EPS Forecasted} - \text{EPS Actual}|}{\text{Stock Price}}$, both forecasted and actual earnings per share are from IBES Summary Files. Forecast accuracy is computed as the absolute difference between the last median forecasted earnings and the actual earnings for the year in which the clawback is adopted. We deflate forecast accuracy by stock price to facilitate comparisons across firms. By taking the negative of the absolute forecast error, this measure increases with forecast accuracy.

The two independent variables of interest, CLAWBACK and AFTER*CLAW are defined as in equation 1. Based on the literature, we further control for CEO also being the chair of the board (CEODUALITY), whether the firm has reported losses for the year (LOSS), firm size (MKV), leverage (LEV), competition among analysts (LNANFOL), defined as the log of analyst coverage; the R&D expenditure (RD), the proportion of independent directors on the board (BDIND), the board size (LBDSIZE), the dispersion of earning forecasts (DISP), the volatility of earnings (EPSVOL), auditor size (BIG6), the internal control material weaknesses (ICMW), and the year (YR) and industry (IND) fixed effects. These variables are defined in Appendix B.

Analyst Forecast Bias and Clawback Adoption

Gu and Wu (2003) define analyst forecast bias as the deviation between the mean forecast and the median forecast. We use a modified model based on Gu and Wu (2003) to examine the association between analysts' optimistic bias and the adoption of voluntary clawback provisions (H3). We predict a negative and significant association between our measure of bias (BIAS) and our variables of interest, CLAWBACK and AFTER*CLAW. Our prediction relies on the improved information environment in clawback firms compared to non-clawback firms. Hence, to estimate hypothesis H3, we use the following model;

$$BIAS_{i,t} = \alpha + \beta_1 CLAWBACK_{i,t} + \beta_2 AFTER_{i,t} + \beta_3 AFTER*CLAW_{i,t} + \beta_9 UE_{i,t} + \beta_{10} UE_{i,t-1} + \beta_{11} UE_{i,t-2} + \beta_4 LOSS_{i,t} + \beta_5 MKV_{i,t} + \beta_6 LNANFOL_{i,t} + \beta_8 DISP_{i,t} + \beta_7 EPSVOL_{i,t} + + ADA_{i,t} + \mu_i \sum_{2}^{n} IND + \delta t \sum_{2}^{4} YR + \varepsilon_i \quad (4)$$

We define our dependent variable (BIAS) as the difference between the mean analyst forecast for the year and the median analyst forecast for the year scaled by the beginning stock price. Consistent with Gu and Wu (2003), we include the following control variables: LOSS which takes the value of one if the firm had negative earnings for the year and zero otherwise; MKV, a measure of firm size, defined as the log of market value of equity; LNANFOL, a measure of the competition among analysts, defined as the log of

analyst coverage; EPSVOL, a measure of earnings volatility, measured as the standard deviation of actual EPS reported in I/B/E/S for the past five years scaled by the beginning stock price; DISP, a measure of the earnings variability measured as the standard deviation of the year analyst forecasts divided by beginning stock price.

We also include UE, a measure of analysts' under-reaction to current and recent earnings information. UE is the deviation between the mean forecast and the actual earnings for the year deflated by beginning stock price (UE_{t-1}, and UE_{t-2} are the first and second lag variables of the unexpected earnings respectively). IND and YR represent the industry and year dummies respectively.

RESULTS

Univariate Results

We show the results from the test of differences in means and medians, the difference-in-difference (DiD), and correlations in Table 2.

TABLE 2
RESULTS FOR UNIVARIATE ANALYSIS

PANEL A: Test of differences in the dependent variables

Variable	Clawback (1)		Non-clawback (0)		Differences (1 – 0)		DiD[a]	
	Mean	Median	Mean	Median	t-value	z	t-value	z
ANFOL	16.31	14.00	9.55	8.00	13.56***	12.99***	8.34***	8.83***
ACCURACY	-0.07	-0.01	-0.15	-0.22	5.78***	12.80***	2.38**	8.85***
BIAS	-0.07	-0.01	0.04	0.00	-1.44	-0.44	0.62	0.52

PANEL B: Correlations among main variables

VARIABLE	AFTER*CLAW	ACCURACY	ANFOL	BIAS
CLAWBACK	0.52***	0.36***	0.42***	-0.05
AFTER*CLAW	1	0.24***	0.29***	0.02
ACCURACY		1	0.28***	0.03
ANFOL				0.03
BIAS				1

[a]DiD refers to the difference-in-difference test statistics being means and medians after clawback adoption minus means and medians before clawback adoption.

CLAWBACK = 1 if the firm has adopted clawback and zero otherwise; ANFOL is the number of analyst covering the firm; ACCURACY is the negative absolute deviation between actual and consensus forecast EPS scaled by the closing stock price; BIAS is the deviation between mean and median forecast scaled by beginning stock price; *, **, *** indicate significance at 10%, 5%, and 1% respectively.

The tests of differences results (Table 2 Panel A) show significant differences between clawback firms and non-clawback firms in both means and medians of analyst following, and analyst forecast accuracy. The t- and z-value for the test of difference between clawback and non-clawback firms are 13.56 and 12.99 in ANFOL. In ACCURACY, the t- and z-value are 5.78 and 12.80 respectively. All the statistics are significant at the 0.01 significance level. We find preliminary evidence that the adoption of clawback provisions is associated with more analyst following and higher analyst forecast accuracy. Though we find lower optimistic bias in clawback firms compared to non-clawback firms, the t-test and Wilcoxon tests for this variable do not show significant differences.

In addition, we find significant differences in both means and medians of analyst following, and analyst forecast accuracy measures before and after clawback adoption between clawback and non-

clawback firms (DID). Again, the statistics are significant at least at the 0.05 significance level. These DiD results provide preliminary support to the difference only results; i.e., the differences in analyst following and analyst forecast accuracy may in part be attributed to the adoption of clawback provisions.

We present the correlations among our main dependent and independent variables in Panel B of Table 2. Consistent with the results from the tests of differences in means and medians presented in Panel A, the correlations show significant correlations at the 0,01 level, between the two variables of interest, CLAWBACK and AFTER*CLAW and the two dependent variables: analyst following and accuracy. Results show a positive and significant correlation between CLAWBACK and analyst following and between CLAWBACK and the analyst forecast accuracy variable. In addition, AFTER*CLAW is also positively and significantly associated with analyst following and forecast accuracy. These findings add additional preliminary support to our predictions in hypotheses H1 and H2 that clawback firms have higher analyst following and more accurate analyst forecasts compared to non-clawback firms.

The optimistic bias variable (BIAS) is not significantly associated with CLAWBACK and AFTER*CLAW. The positive and significant correlation between ACCURACY and AFTER*CLAW interaction term provides preliminary evidence of a causal relationship between analyst forecast accuracy and clawback adoption. We also find a positive and significant correlation between analyst following and the variable AFTER*CLAW, suggesting a causal relationship between clawback adoption and analyst following.

Multivariate Analyses

Clawback Adoption and Analyst Following

We estimate equation 1 to test hypothesis H1. We make three estimations for the model: 1) with CLAWBACK only; 2) with AFTER*CLAW only; and 3) with both CLAWBACK and AFTER*CLAW plus the variable AFTER[7]. The results are presented in Table 3.

In Estimate 1, the coefficient for CLAWBACK is significantly positive at the 0.01 significance level (0.873, t = 14.96). This suggests that the adoption of clawback is associated with increased analyst following. The coefficients for the control variables show that analyst following is positively associated with LOB, EPSVOL, EPSFX, AR and RDV. It is negatively associated with RETVAR. In general, they are consistent with the evidence presented in the literature.

In Estimate 2, the coefficient for AFTER*CLAWBACK is significantly positive at the 0.01 significance level (0.475, t = 6.65), suggesting that clawback adoption leads to an increase in analyst following. There is a causal relation between clawback adoption and analyst following. However, when we include both CLAWBACK, AFTER*CLAW and AFTER in Estimate 3, only CLAWBACK variable is significant (0.859, t = 12.67). In both Estimates 2 and 3, the significant control variables remain the same as in Estimate 1.

These results, taken together, provide mild support for hypothesis H1. Voluntary clawback adoption is associated with increased analyst following. The issue about clawback adoption causing an increase in analyst following cannot completely be ruled out.

TABLE 3
CLAWBACK ADOPTION AND ANALYST FOLLOWING

VARIABLE	Estimate 1 β_i (t-value)	Estimate 2 β_i (t-value)	Estimate 3 β_i (t-value)
INTERCEPT	1.036*** (10.89)	-1.302*** (13.11)	1.028*** (10.66)
CLAWBACK	**0.834*** (14.96)**		**0.859*** (12.67)**
AFTER			0.099(1.26)
AFTER*CLAW		**0.475*** (6.65)**	-0.062(-0.62)
LOB	0.044** (2.46)	0.072*** (3.84)	0.044** (2.43)
TA	-0.001(-0.15)	-0.009(-0.90)	-0.001(-0.13)
EPSVOL	0.123*** (2.70)	0.175*** (3.64)	0.125*** (2.74)
EPSFX	0.081** (2.47)	0.141*** (4.08)	0.079** (2.41)
EPSCH	10.001(-1.15)	-0.002(-1.25)	-0.001(-1.14)
SALCH	0.265(1.51)	0.064(0.35)	0.269(1.53)
AR	0.114** (2.39)	0.113** (2.23)	0.115** (2.40)
RETVAR	-0.248*** (-9.62)	-0.317*** (-11.74)	-0.248*** (-9.51)
RDV	0.943*** (3.86)	0.710*** (2.76)	0.934*** (3.83)
FIXED EFFECTS	Yes	Yes	Yes
N	1530	1530	1530
F (p-value)	31.23 (<.0001)	20.89 (<.0001)	28.69 (<.0001)
Adjusted R^2	0.3031	0.2225	0.3030

Dependent variable is the log of analysts. CLAWBACK = 1 if the firm has adopted clawback and zero otherwise, AFTER*CLAW is an interaction between AFTER (AFTER = 1 for all years after clawback adoption and zero otherwise) and CLAWBACK; LOB is the number of business lines measured by the number of 4-digit SIC codes of the firm as reported in LexisNexis® Academic AR is the lagged deviation of the firm's compounded annual return and the compounded annual return for the value weighted market index; EPSVOL is the lagged standard deviation of actual EPS for the past five years lagged by beginning stock price; EPSFX is the lagged annual EPS before discontinued operations and extraordinary items scaled by beginning stock price; TA is the lagged total assets; SALCH is the lagged change in annual sales revenue scaled by net sales; RETVAR is the natural log of standard deviation of daily firms returns for one year period; RDV is the lagged (R&D + advertising expenses) scaled by total operating expenses; FIXED EFFECTS refer to industry and year dummy variables; *, **, *** indicate significance at 10%, 5%, and 1% respectively.

Clawback Adoption and Analyst Forecast Accuracy

Our 2nd hypothesis is about the association between clawback adoption and analyst forecast accuracy. We estimate equation 2 to test hypothesis H2 and the results are presented in Table 4.

We first estimate equation 2 with variable CLAWBACK and control variables in Estimate 1. Then, we estimate equation 2 with AFTER*CLAW and control variables in Estimate 2. Finally, we include both CLAWBACK and AFTER*CLAW plus the AFTER and control variables in Estimate 3. The dependent variable in all three estimates is ACCURACY.

The coefficient of variable CLAWBACK is significantly positive at the 0.01 significance level (0.021 *t*=3.44) for the dependent variable ACCURACY in Estimate 1. The coefficients of control variables MKV, LNANFOL, BDIND, and EPSVOL are significantly positive; while the coefficients of LOSS, LEV and RD are significantly negative. They are broadly consistent with the existing evidence. This suggests that clawback adoption is associated with greater forecast accuracy.

TABLE 4
CLAWBACK ADOPTION AND ANALYST FORECAST ACCURACY

VARIABLE	Estimate 1		Estimate 2		Estimate 3	
	β_i	(t-value)	β_i	(t-value)	β_i	(t-value)
INTERCEPT	-0.262***	-9.15	-0.271	-9.85	-0.255***	-8.93
CLAWBACK	**0.021*****	**3.44**			0.010	1.35
AFTER					-0.009	-1.24
AFTER*CLAW			**0.026*****	**3.99**	**0.028*****	**2.96**
CEODUALITY	0.006	1.34	0.007	1.47	0.006	1.37
LOSS	-0.036***	-5.96	-0.038***	-6.29	-0.037***	-6.09
MKV	0.043***	3.65	0.042***	3.56	0.041***	3.53
LEV	-0.031***	-3.09	-0.031***	-3.13	-0.030***	-3.03
LNANFOL	0.011***	3.45	0.012***	3.60	0.011***	3.43
RD	-0.043*	-1.94	-0.047**	-2.12	-0.042*	-1.90
BDIND	0.066***	3.38	0.075***	3.89	0.067***	3.40
LBDSIZE	0.002	0.20	0.007	0.63	0.002	0.19
DISP	0.009	1.07	0.008	0.97	0.008	0.95
EPSVOL	0.029**	2.27	0.030**	2.33	0.029**	2.29
BIG6	0.001	0.10	0.004	0.48	0.002	0.30
ICMW	-0.003	-0.24	-0.004	-0.36	-0.003	-0.23
FIXED EFFECTS	Yes		Yes		Yes	
N	1526		1526		1526	
F (p-value)	21.37(<.0001)		21.37(<.0001)		21.15(<.0001)	
Adjusted R^2	0.2503		0.2503		0.2483	

Dependent variable, Accuracy, is defined as the negative absolute deviation between actual and consensus forecast EPS scaled by the closing stock price; CLAWBACK = 1 if the firm has adopted clawback and zero otherwise, AFTER = 1 for all years after clawback adoption and zero otherwise; MKV is log of market value of equity; LOSS = 1 if net income is negative and zero otherwise; LNANFOL is natural log of analyst following; RD is R&D expenditure and is set to zero if missing; CEODUALITY = 1 if the CEO is also chair of the board; DBIND is the proportion of independent directors; LBDSIZE is the natural log of number of directors on the board; DISP is the standard deviation of analyst forecasts scaled by beginning stock price; EPSVOL is the standard deviation of actual EPS for the past five years scaled by beginning stock price; BIG6 = 1 if the firm is audited by KPMG, Ernst & Young, PWC, Deloitte & Touche, Grant Thornton, or BOD USA and 0 otherwise; ICMW = 1 if the firm had ineffective internal controls under the SOX Section 404; FIXED EFFECTS refer to industry and year dummies; *, **, *** indicate significance at 10%, 5%, and 1% respectively.

In Estimate 2, the coefficient of variable After*Claw is significantly positive at the 0.01 significance level (0.026, $t = 3.99$). The significant control variables remain the same as in Estimate 1. There is strong evidence that the adoption of clawback leads to increasing forecast accuracy. In Estimate 3, we include both the CLAWBACK and AFTER*CLAW plus AFTER and the control variables, only AFTER*CLAW is significantly positive (0.028, $t = 2.96$).

The overall results presented in Table 4 provide strong support to hypothesis H2 that firm-initiated restatement triggered clawback adoption is positively associated with more accurate analyst forecasts. The results not only show that clawback firms have more accurate forecasts, they also suggest a causal association between clawback adoption and analyst forecast accuracy.

Clawback Adoption and Analyst Forecast Bias

Finally, we test our third hypothesis which hypothesizes that there is a negative relation between clawback adoption and forecast bias. We estimate model 3 to test hypothesis H3 and the results are presented in Table 5. Similar to what we did earlier, we first estimate Equation 3 with variable

CLAWBACK variable and control variables in Estimate 1. Then, we estimate equation 2 with AFTER*CLAW and control variables in Estimate 2. Finally, we include both CLAWBACK and AFTER*CLAW plus the AFTER and control variables in Estimate 3. The dependent variable in all three estimates is BIAS.

TABLE 5
CLAWBACK ADOPTION AND ANALYST FORECAST BIAS

VARIABLE	Estimate 1		Estimate 2		Estimate 3	
	β_i	(t-value)	β_i	(t-value)	β_i	(t-value)
INTERCEPT	0.177	0.85	0.297	1.45	0.163	0.69
CLAWBACK	**-0.222****	**-2.39**			-0.143	-1.29
AFTER					0.071	0.49
AFTER*CLAW			**-0.222****	**-2.26**	**-0.215***	**-1.69**
UE_t	-1.316	-1.15	-1.414	-1.23	-1.265	-1.09
UE_{t-1}	7.375***	9.36	7.332***	9.3	7.380***	9.36
UE_{t-2}	0.954**	2.15	0.965**	2.17	0.971**	2.19
LOSS	0.259**	2.21	0.259**	2.21	0.267**	2.27
MKV	-0.056	-1.59	-0.075**	-2.23	-0.056	-1.57
LNANFOL	0.188***	2.73	0.184***	2.67	0.186***	2.72
DISP	-0.158*	-1.75	-0.171*	-1.88	-0.163	-1.80
EPSVOL	-0.796***	-4.00	-0.781***	-3.92	-0.788***	-3.96
ADA	-0.042	-1.55	-0.040	-1.49	-0.040	-1.49
FIXED EFFECTS	Yes		Yes		Yes	
N	706		706		706	
F (p-value)	8.78(<.0001)		8.74(<.0001)		8.15(<.0001)	
Adjusted R^2	0.1953		0.1946		0.1957	

BIAS is the dependent variable defined as [(mean forecast - median forecast) x 100] scaled by beginning stock price; CLAWBACK = 1 if the firm has adopted clawback and zero otherwise, AFTER = 1 for all years after clawback adoption and zero otherwise; UE is the unexpected earnings defined as (mean forecast EPS – actual EPS) scaled by beginning stock price; MKV is log of market value of equity; LOSS = 1 if net income is negative and zero otherwise; LNANFOL is natural log of analyst following; DISP is the standard deviation of analyst forecasts scaled by beginning stock price; EPSVOL is the standard deviation of actual EPS for the past five years scaled by beginning stock price; ADA is the abnormal discretionary accruals computed using the modified Jones model; FIXED EFFECTS refer to industry and year dummies; *, **, *** indicate significance at 10%, 5%, and 1% respectively.

The coefficient of variable CLAWBACK is significantly negative at the 0.05 significance level (-0.222 t = -2.39) in Estimate 1. The coefficients of control variables UE_{t-1}, UE_{t-2}, LOSS, and LNANFOL are significantly positive; while the coefficients of MKV, DISP and EPSVOL are significantly negative at conventional significance level. The clawback adoption is associated with less forecast bias.
In Estimate 2, the coefficient of variable After*Claw is significantly negative at the 0.05 significance level (-0.222, t = -2.26). The significant control variables remain the same as in Estimate 1. The evidence presented show that the adoption of clawback leads to increasing forecast accuracy. In Estimate 3, we include both the CLAWBACK and AFTER*CLAW plus AFTER and the control variables, the variable AFTER*CLAW is marginally significant (-0.215, t = -1.69). The overall evidence presented in Table 5 suggests that voluntary clawback adoption is associated with less forecast bias.

CONCLUSIONS

Prior research finds many positive financial reporting benefits associated with clawback adoption; such as fewer restatements, larger earnings response coefficients, fewer internal control material weakness disclosures, lower audit fees, shorter audit lags, lower borrowing costs, reduced loan collateral, longer loan terms, positive stock price reactions, and better investment perception of M&A decisions. There are, on the other hand, a few studies which have found some unintended consequences associated with the voluntary clawback adoption such as higher real earnings management, higher total compensation and reduced incentive to make restatement. Denis (2012) argues that many benefits documented in the literature might come from the broader commitment from the top and the clawback is simply used by the board to signal its commitment for heightened reporting integrity, not necessarily clawback itself.

Because the sell side analysts are the most important users of financial information, we examine, in this paper, the impact of clawback adoption on sell side analysts. If clawback adoption leads to increase in the transparency and integrity of financial information suggested by the evidence, analysts will react positively to the adoption. Therefore, in this paper, we investigate whether clawback adopting firms have higher analyst following, more accurate analyst forecasts, and lower optimistic analyst forecast bias compared to the non-adopting firms.

We find that clawback firms have significantly higher financial analysts following, more accurate analyst forecasts, and lower optimistic bias. These results provide support to our contention that clawback firms have better information environment; more credible and transparent information. Taken together, our overall findings on analyst following, accuracy and bias suggest that clawback adoption is associated with reduced forecasting complexity. However, we still can't rule out the possibility that our findings might be associated with "boards of directors adopt clawback provisions as part of a broader plan to increase the integrity of firms' reporting. In this scenario, clawback adoption is likely to be accompanied by, and may serve as an external signal of, a board's decision to adopt more careful board monitoring overall." (Denis, 2012).

ENDNOTES

We explain the details of these studies' major findings in the following section.

Emphasizing this point, Robert Khuzami, director of the SEC's Division of Enforcement said, "The personal compensation received by CEOs . . . can be clawed back. The costs of such misconduct need not be borne by shareholders alone." In addition, a quote from filing DEF 14A of Mineral Technologies Inc. dated 04/03/2013, ". . . ensure that our executives do not retain undeserved windfalls . . ." illustrates this point too.

Some studies have, however, documented conflicting results. Frankel and Li (2004) find that firms with less value-relevant earnings numbers are associated with higher analyst following. They argue that if financial statements have low usefulness, that should increase the cost of information processing and hence lead to a low analyst information supply.

We confirm all clawback data from Capital IQ screening with the SEC DEF 14A filings. In addition, we also use the following SEC filings: DEFA14A, DEFM14A, DEF 14C, 10-K, and 20-F for some firms.

Results from this estimate (not tabulated) have N = 30,114, pseudo-R2 of 0.3670 and a maximum rescaled pseudo-R2 of 0.3798. We define all our variables in Appendix A.

We also examine the distribution of the sample firms by industry, state of incorporation, stock exchange, and S&P index.

We check for multicollinearity using variance inflation factors (VIF) in all our model estimations.

REFERENCES

Aboody, D., & Lev, B. (2000). Information asymmetry, R&D, and insider gains. *Journal of Finance*, 55, (6), 2747-2766.

Babenko, I., Bennett, B., Bizjak, J. M., & Coles, J. L. (2015). Clawback provisions. *Working Paper* (Arizona State University).

Barth, M. E., Kasznik, R., & McNichols, M. F. (2001). Analyst coverage and intangible assets. *Journal of Accounting Research*, 39, (1), 1-34.

Bushman, R. M., Piotroski, J. D., & Smith, A. J. (2005). Insider trading restrictions and analysts' incentives to follow firms. *The Journal of Finance*, 60, (1), 35-66.

Byard, D., Y. Li, & Weintrop, J. (2006). Corporate governance and the quality of financial analysts' information. *Journal of Accounting and Public Policy*, 25, (5), 609-625.

Chan, L. H., Chen, K. C., Chen, T.-Y., & Yu, Y. (2012). The effects of firm-initiated clawback provisions on earnings quality and auditor behavior. *Journal of Accounting and Economics*, 54, (2/3), 180-196.

Chan, L. H., Chen, K. C. W., & Chen, T.-Y. (2013). The effects of firm-initiated clawback provisions on bank loan contracting. *Journal of Financial Economics*, 110, (3), 659-679.

Chan, L. H., Chen, K. C., & Yu, Y. (2015). Substitution between real and accruals-based earnings management after voluntary adoption of compensation clawback provisions. *The Accounting Review*, 90, (1), 147-174.

Chen, X., Cheng, Q., & Lo, K. (2010). On the relationship between analyst reports and corporate disclosures: Exploring the roles of information discovery and interpretation. *Journal of Accounting and Economics*, 9, (3), 206-226.

Chen, M. A., Greene, D. T., & Owers, J. E. (2014). The costs and benefits of clawback provisions in CEO compensation. *The Review of Corporate Finance Studies*, 4, (1), 108-154.

Dehaan, E., Hodge, F., & Shelvin, T. (2013). Does voluntary adoption of a clawback provision improve financial reporting quality. *Contemporary Accounting Research*, 30, (3), 1027-1062.

Denis, D. K. (2012). Mandatory clawback provisions, information disclosure, and the regulation of securities markets. *Journal of Accounting and Economics*, 54, (2), 197-200.

Earlie, J. E., & Wilkerson, A. (2012). Dodd-Frank clawback: hot issue for 2012. *Journal of Investment Compliance,* 13, (1), 41-44.

Frankel, R., & Li, X. (2004). Characteristics of a firm s information environment and the information asymmetry between insiders and outsiders. *Journal of Accounting and Economics*, 37, (2), 229-259.

Gu, Z., & Wu, J. S. (2003). Earnings skewness and analyst forecast bias. *Journal of Accounting and Economics*, 35, (1), 5-29.

Healy, P. M., Hutton, A. P., & Palepu, K. G. (1999). Stock performance and intermediation changes surrounding sustained increases in disclosure. *Contemporary Accounting Research*, 16, (3), 485-520.

Irani, A. J., & Karamanou, I. (2003). Regulation fair disclosure, analyst following, and analyst forecast dispersion. *Accounting Horizons*, 17, (1), 15-29.

Iskandar-Datta, M., & Jia, Y. (2013). Valuation consequences of clawback provisions', *The Accounting Review*, 88, (1), 171-198.

Kanagaretnam, K., Lobo, G. J., & Mathieu, R. (2006). CEO compensation mix and analysts forecast accuracy and bias', *Working Paper* (University of Houston).

Lang, M. H., Lins, K. V., & Miller, D. P. (2003). ADRs, analysts, and accuracy: Does cross listing in the United States improve a firm s information environment and increase market value? *Journal of Accounting Research,* 41, (2), 317-345.

Lang, M. H., & Lundholm, R. J. (1996). Corporate disclosure policy and analyst behavior. *The Accounting Review*, 71, (4), 467-492.

Langberg, N., & Sivaramakrishnan, K. (2008). Voluntary disclosures and information production by analysts. *Journal of Accounting and Economics*, 46, (1), 78-100.

Pyzoha, J. S. (2015). Why do restatements decrease in a clawback environment? An investigation into financial reporting executives decision-making during the restatement process. *The Accounting Review*, 90, (6), 2515-2536.

Schipper, K. (1991). Analysts forecasts. *Accounting horizons*, 5, (4), 105.

Sheng, X., & Thevenot, M. (2012). A new measure of earnings forecast uncertainty. *Journal of Accounting and Economics*, 53, (1/2), 21-33.

Xu, L., & Tang, A. P. (2012). Internal control material weakness, analysts accuracy and bias and brokerage reputation. *Review of Quantitative Finance and Accounting*, 39, (1), 27-53.

Yu, L.-H. (2013). *The effects of firm-initiated clawback provisions on earnings management* (Doctoral dissertation). Retrieved from UMI Dissertation publishing. (UMI Number: 3575351).

APPENDIX A
PROPENSITY SCORE MODEL VARIABLE DEFINITIONS

Variable	Definition
LAVGLEV	The natural log of three-year average of leverage, LEV. LEV is defined as sum of total long-term debt and debt in current liabilities divided by sum of market value of equity and long-term debt
AVGMKV	Three-year average of MKV. MKV is defined as natural log of market value of equity
LAVGMTB	The natural log of three-year average of MTB. MTB is defined as market value of equity divided by book value of equity
AVGROA	Three-year average of ROA. ROA is defined as net income divided by total assets
AVGREV	Three-year average of REV. REV is defined as natural log of total revenues
RESTATE_PRE	A dummy variable equal to 1 if the firm had a restatement in the last three years and zero otherwise. Only restatements due to fraud, accounting, or clerical errors with adverse effect on the earnings are considered
AVGBEAT	Three-year average of BEAT, a dummy variable equal to 1 if the raw deviation between actual and mean analyst forecast is between 0 and 0.01, and zero otherwise
HVBEAT	A dummy variable equal to 1 if the firm has a non-missing BEAT variable and 0 otherwise
AVGDISP	Three-year average of dispersion, DISP. DISP is defined as the annual standard deviation of analyst forecasts scaled by beginning stock price. Where there is only one analyst, DISP is set to 0
HVDISP	A dummy variable equal to 1 if the firm has a non-missing DISP variable and zero otherwise
AVGSPREAD	Three-year average of SPREAD. SPREAD is defined as the difference between bid and ask price at the end of the year
AVGSDRET	Three-year average of SDRET. SDRET is the standard deviation of monthly returns for the year
AVGERC	Three-year average of ERC using quarterly data. ERC is computed as the coefficient in the regression, $CAR = \alpha + \beta UE$, where CAR is the 3-day buy and hold cumulative abnormal returns, and UE is the deviation of actual EPS and mean analyst forecasts scaled by closing stock price
HVERC	A dummy variable equal to 1 if the firm has a non-missing ERC and 0 otherwise
LTOTALCOMP	The natural log of CEO total compensation, variable TDC1 in COMPUSTAT
TURNOVER	A dummy variable equal to 1 if the firm had a change in CEO in any of the last three years and zero otherwise
HVTURNOVER	A dummy variable equal to 1 if the firm has a non-missing TURNOVER and zero otherwise
LOWNPERC	The natural log of CEO's percentage of total shares owned as reported in ExecuComp
HVOWN	A dummy variable equal to 1 if the firm has a non-missing CEO percentage of total shares owned and 0 otherwise
LNTENURE	The natural log of CEO tenure as reported in ExecuComp.
HVTENURE	A dummy variable equal to 1 if the firm has non-missing CEO tenure and zero otherwise.
FF48	Dummy variables for the Fama & French 48 industry classifications

APPENDIX B

MODEL ESTIMATION VARIABLE DEFINITIONS

Variable	Definition
AFTER	A dummy variable equal to 1 for all fiscal years after clawback adoption and 0 otherwise.
CLAWBACK	Equal to 1 if firm has adopted clawback provisions at the end of fiscal year and 0 otherwise
AFTER*CLAW	An interaction term between variables AFTER and CLAWBACK
ADA	Abnormal discretionary accruals computed using the modified Jones model
ANFOL (LNAFOL)	Number of analysts following the firm, measured as the (log) number of analysts forecasting earnings in I/B/E/S annual estimates file
MKV	The natural logarithm of market value of equity
LEV	Measures leverage and is given by long term debt scaled by lagged total assets
LOB	Is the number of business lines measured by the number of 4-digit SIC codes of the firm as reported in LexisNexis®Academic
CEODUALITY	A dummy variable equal to 1 if the CEO is also the chairman of the board and 0 otherwise
ACCURACY	The negative absolute of the deviation between actual EPS and median EPS forecast scaled by the closing stock price
LOSS	A dummy variable equal to 1 if the firm reported a loss for the year and 0 otherwise
BDIND	The proportion of independent directors on the board
LBDSIZE	The natural logarithm of the number of directors on the board
RD	R&D expenditure; is set to 0 if missing consistent with Aboody and Lev (2000) and Barth et al. (2001)
EPSVOL	Measure of earnings volatility; measured by the standard deviation of actual EPS reported in I/B/E/S for the past five years scaled by the beginning stock price
DISP	The standard deviation of the year analyst forecasts divided by beginning stock price
BIG6	A dummy variable equal to 1 if the firm is audited by one of the Big 6 audit firms (i.e. KPMG, Ernst & Young, PricewaterhouseCoopers (PWC), Deloitte & Touché, Grant Thornton, and BDO USA) and 0 otherwise
ICMW	A dummy variable equal to 1 if the firm disclosed internal control material weaknesses with an adverse effect on earnings in the last three years and 0 otherwise
IND	Fama & French 48 industry classification dummy
YR	Year dummy
RDV	Controls for expenditure on innovative activities; measured as (R&D + advertising expenses)/Total operating expenses
$EPSCH_{i,t-1}$	Change in annual EPS before discontinued operations and extraordinary items scaled by beginning stock price
$AR_{i,t}$	Firm's compounded annual return less the compounded annual return for the value weighted market index
SALCH	Change in annual sales revenue scaled by prior year net sales.
RETVAR	Standard deviation of the firm's daily returns for one year
TA	Total assets
EPSFX	The annual EPS before discontinued operations and extraordinary items scaled by beginning stock price
BIAS	The difference between the mean analyst forecast for the year and the median analyst forecast for the year scaled by the beginning stock price
UE	The unexpected earnings, measured as the deviation between the mean forecast and the actual earnings for the year deflated by beginning stock price