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REVIEW

Determinants and consequences of clawback provisions in management compensation contracts: a structured literature review on empirical evidence

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Abstract The goal of this systematic literature review is to provide a detailed understanding of the determinants and consequences of clawback provisions in management compensation contracts, motivated by the increasing global regulatory, practical, and academic importance of implementing this new corporate governance tool. We identify 44 empirical (archival and experimental) studies on this topic and review them based on an agency-theoretical framework. Our review of empirical clawback research offers insights into this growing field and supports future researchers in developing new research questions. Our main results are as follows. First, we still know very little about the drivers of clawback adoption, as prior research concentrated on the consequences of clawback provisions. Second, many studies indicate that clawbacks lead to better earnings quality (reduced re-/misstatements), better pay-for-performance sensitivity, increased firm performance, greater value relevance, and lower overinvestment. While there are indications that clawbacks may serve an incentive-alignment function for managers, their contribution may be dependent on other corporate governance mechanisms, e.g. board composition, as significant moderators. We develop a research agenda with detailed recommendations for future research from methodological and content perspectives. We expect that the research activity in this field regarding the European capital market will increase in light of the EU shareholder rights Directive of 2017.

Keywords Board composition · Management compensation · Financial restatements · Earnings management · Clawbacks · Principal agent theory

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1 Introduction

Compensation recovery provisions (i.e., clawbacks) are an innovative corporate governance mechanism for public interest entities (PIEs) that has emerged in the last decade (Huang et al. 2019; Chan et al. 2013). Clawbacks, a major component of management compensation contracts, provide reimbursement for remuneration if a triggering event occurs (e.g., fraud, restatements; Prescott and Vann 2018). Normally, the reimbursement includes the difference between the variable compensation received by management based on incorrect financial results and what management would have received based on the correct results. As clawbacks should contribute to better incentive alignment between executives and shareholders, the key goal of clawback adoption is to decrease conflicts of interest between these parties and to create a management culture of ethical behavior (Mahdy 2019). Specifically, clawbacks should increase earnings quality and corporate governance quality and influence corporate finance decisions in line with shareholders' interests.

Our topic is important for practitioners, regulators, and researchers. From a *practical* perspective, modern management compensation systems should promote sustainable development by recognizing long-term value aspects and including non-financial issues (Winschel and Stawinoga 2019). Incentive-based management compensation and clawbacks have a strong impact on financial accounting (e.g., earnings management), other corporate governance factors (e.g., board composition) and corporate finance decisions (e.g., investment policy) (Jensen and Murphy 1990). After the 2008/09 financial crisis, shareholders' trust in the quality of accounting and corporate governance decreased. As a result, many shareholders, especially institutional investors and proxy advisors, demand the recognition of clawback provisions in management compensation contracts (Hirsch et al. 2017). Thus, many PIEs have voluntarily included clawback provisions in their compensation package to ensure good investor relations (Prescott and Vann 2018; Mahdy 2019; see also the 2016 Wells Fargo case). Many shareholders and other stakeholders criticized the lack of sustainability in top management compensation contracts, leading to short-term management strategies with a focus on financial performance to increase the bonus of the executives. Clawbacks should lead to a more sustainable development of the firm, as management motives are more long-term after the recognition of clawback clauses. As clawbacks may lead to a reduction of executives' payments in the future because of events that are in conflict with stakeholder interests (e.g. extensive earnings management, accounting failures, or fraud), executives are expected to be more ethical, long-term oriented and to include non-financial firm goals (e.g. employee satisfaction).

From a *regulatory* perspective, the US-American setting is of great importance for international clawback development. The Sarbanes Oxley Act (SOX 2002) represents a starting point for clawback regulation. While the SOX did not explicitly mandate companies to adopt clawback provisions, it includes a requirement for CEOs/CFOs of PIEs to reimburse remunerations by financial restatements because

of an intentional material deviation from financial reporting *fraud* (i.e., misstatements). This requirement is enforced by the Securities and Exchange Commission (SEC). However, prior literature has found that clawbacks in accordance with the SOX have rarely been enforced (Prescott and Vann 2018; Erkens et al. 2018). Due to the low number of clawback cases in light of the 2008/09 financial crisis, the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 (Dodd-Frank Act 2010) included stricter clawback rules. According to these results, PIEs must adopt clawback provisions to recapture executive officers' excess incentive compensation in cases of financial restatements due to material noncompliance of the issuer with any financial reporting requirements. However, the requirements of the Dodd-Frank Act have never been formally implemented because the SEC has not yet published its final rules on clawbacks (Firk et al. 2019). Today, clawbacks are still voluntary in *restatement* cases, according to the Dodd-Frank Act, but mandatory in *fraud* cases, according to the SOX.

Clawback adoption is relevant not only in US regulation but also in the modernized EU directive on shareholders' rights (EC 2017). In line with the implementation of mandatory say-on-pay votes and mandatory compensation reporting within the EU member states, clawbacks are explicitly mentioned in the EU directive as a voluntary monitoring instrument for executives. If companies decide to adopt clawbacks in their management compensation contracts, they must explain this in the management report.

Due to the increased practical and regulatory relevance of clawback adoption, a great amount of empirical *research* on this topic has been conducted in the US after enactment of the Dodd-Frank Act. This research has been published in high-ranked journals in the finance, accounting, and corporate governance fields (e.g., *The Accounting Review* or the *Journal of Accounting & Economics*). Some researchers have analyzed selected drivers of voluntary clawback adoption before and after the Dodd-Frank Act (e.g., Addy et al. 2014; Brown et al. 2015), but the majority of studies address the economic consequences of clawbacks and question whether clawbacks are an effective corporate governance tool (e.g., Chan et al. 2012, 2015; Chen and Vann 2017). Recent research included a variety of accounting, corporate governance, and corporate finance variables, achieving heterogeneous results, and also start to include moderator variables. Despite the increased interest in clawback research during the last decade, a structured literature review has not yet been performed; the only example is Prescott and Vann's (2018) paper, which presents five selected empirical quantitative articles. This is a major gap in clawback research.

The goal of our paper is a detailed and structured synthesis of empirical quantitative research on clawback adoption (empirical qualitative and conceptual research designs have not yet been implemented). In our final sample of 44 studies, the majority investigate the US-American capital market (42), adopt an archival design (38), and/or examine the consequences of clawbacks (35). A key result is that (voluntary) clawback adoption leads to better earnings quality, increased pay-for-performance-sensitivity, reduced over-investment, and higher firm value. More recently, researchers started to analyze whether positive consequences of clawbacks rely on other corporate governance tools as "package". In this context, board

composition variables significantly moderate the consequences of clawbacks, thus, a positive effect of clawbacks may depend on other corporate governance factors. Moreover, clawbacks may also represent a substitute with regard to other corporate governance variables, thus leaving room for useful research in the future. We stress the limitations of prior research and provide useful recommendations for future research.

This review is structured as follows. First, the theoretical and normative framework is presented. Second, the research framework is explained along with the method, variables, and data selection process, Third, in the literature review section, we distinguish between determinants and consequences on the one hand and moderator variables on the other hand. Moreover, we stress the limitations of existing empirical research and make useful recommendations for future research.

2 Theoretical and normative foundation

2.1 Principal agent theory

Neoclassical principal agent theory (Ross 1973; Jensen and Meckling 1976; Tirole 1986; Eisenhardt 1989) is the most popular theoretical foundation in clawback research (e.g., Lin 2017; Erkens et al. 2018; Liu et al. 2020; Natarajan and Zheng 2019). Agency theory focuses on maximizing firm value (Jensen and Meckling 1976) based on the residual claim of principals' stocks and the assumption of homogeneous shareholder preferences (Fama and Jensen 1983). As ownership is dispersed in PIEs, the shareholders (i.e., principals) delegate management functions to executives (i.e., agents; Berle and Means 1932). Risk-averse managers (i.e., agents) apply a specific level of discretion when handling tasks, which provides them with an information advantage. However, information asymmetry can result in moral hazards and self-serving actions (e.g., earnings manipulation, over-investment) due to conflicts of interest between shareholders and executive directors (Harris and Bromiley 2007). One major problem in agency theory is empire building by executives (Liu et al. 2018). Managers have incentives to portray the company as having positive earnings development and to overinvest so that firms grow beyond their optimal size (Liu et al. 2018). Thus, strict monitoring by corporate governance institutions (e.g., audit committees, external auditors, and institutional investors) and incentive-alignment mechanisms must be applied by the principals to reduce the losses caused by self-serving agents (i.e., agency costs). Executive compensation is a key incentive-alignment mechanism as it can fill the gap between firm performance and managerial effort (Jensen and Murphy 1990; Obermann and Velte 2018). Alignment can be achieved through either performance-based or equity-based management compensation, e.g. granting stock option plans (Liu et al. 2019). Managers with incentive-based compensation, which leads to higher pay-for-performance sensitivity (PPS), are expected to be more willing to increase firm performance because this simultaneously increases their own gains (Larcker 1983; Faulkender et al. 2010). Cash compensation (e.g., salary, bonuses, and non-equity incentives) typically reward short-term financial performance, while

equity-based compensation (e.g., stock options, restricted stocks, and other long-term incentives) are associated with long-term financial performance (Liu et al. 2019). After the financial crisis, stock option plans have been criticized as drivers of material misstatements (Jones and Wu 2010). Moreover, cash compensation can be influenced by earnings manipulation and investment politics. Compensation systems are connected to contracting procedure, and executives' paybacks to the firm are quite difficult for boards of directors unless managers conduct financial fraud or other illegal activities. Clawbacks as ex post settings are very costly, and the board of directors will include them in management contracts only if it is absolutely necessary (Liu et al. 2020). Based on the above information, asymmetrical gains and losses are a main characteristic of manager contracts, as executives benefit from increased firm values but do not lose rewards due to poor financial performance or financial restatements (Kroos et al. 2018; Mburu and Tang 2018a).

The corporate governance literature has begun to examine clawback provisions in management contracts as a way to increase incentive alignment between managers and shareholders (Prescott and Vann 2018; Liu et al. 2020). In cases with clawbacks, boards of directors have the right to reclaim part of executives' compensation upon the occurrence of pre-defined triggering events, such as restatements or fraudulent reporting (Erkens et al. 2018). Thus, the implementation of clawbacks provides adequate ex-ante incentives for management to prevent misstatements as well as ex post sanctions for an executive's misbehavior (Kroos et al. 2018). Due to their discipline function and ability to strengthen firms' reputation, the implementation of firm-initiated clawbacks has increased since the 2008/09 financial crisis (Babenko et al. 2019). Moreover, regulation of the US-American capital market has increased the international relevance of clawback provisions, as explained in the next section.

3 US-American regulations on clawbacks

In response to the famous Enron scandal, the SOX (2002) was implemented, introducing important regulations for US listed firms (DeFond and Francis 2005; Cohen et al. 2010). While the SOX did not explicitly mandate companies to adopt clawback provisions, Section 304 mandates that the SEC reimburse any bonus or other incentive- or equity-based compensation given to CEOs/CFOs as a result of listed firms' financial restatements after an intentional material deviation from financial reporting *fraud* (i.e., misstatement; SOX 2002; see also Addy et al. 2014; Pyzoha 2015). Research shows that clawbacks in accordance with the SOX were rarely enforced by the SEC (Brink et al. 2019). For this reason, and due to the low amount of clawback cases, further regulation was needed (Gallogly 2012; Fried 2016).

In 2010, in response to the 2008/09 financial market crisis, the Dodd-Frank Act was finalized. According to Section 954 of the act, issuers with securities on a national exchange are required to create and enforce an excess-pay clawback that meets special requirements (Dodd-Frank Act 2010). The clawback provision in the Dodd-Frank Act is related to financial *restatements*, corporate executives, and

incentive-based compensation (Fried 2016). Clawbacks are relevant if the firm is required to prepare an accounting restatement as a result of material noncompliance with the financial reporting requirements in securities law. The clawback provision covers incentive-based compensation provided during the three-year period prior to the date on which an accounting restatement was required. The SEC proposed Rule 10D-1 on July 1, 2015, to cover clawbacks, but to date, a final rule has not been adopted (SEC 2015; Brink et al. 2019). The key differences between the two US clawback rules are as follows: (1) restriction of the CEO/CFO (SOX) versus executives (Dodd-Frank Act); (2) fraud (SOX) versus all restatement triggering events (Dodd-Frank Act); and (3) repayment of compensation received in the year following issuance of a misstated financial statement (SOX) versus coverage of compensation received in the three years preceding the date on which the company was required to file a restatement (Dodd-Frank Act).

In June 2017, the US House of Representatives pass the Financial Choice Act to change the Dodd-Frank Act. The clawback provision rules were modified to allow only executives who have *control over the financial reporting* that resulted in a restatement to be linked to clawbacks. Although Section 954 of the Dodd-Frank Act complements Section 304 of the SOX, the clawback provisions in the SOX are mandatory, while those in the Dodd-Frank Act have been voluntary to date (Gallogly, 2012). However, Babenko et al. (2019) indicate that voluntary clawback implementations increased from 1% in 2004 to about 80% in 2013 among firms listed on the S&P 500 index. Also, more than half of the firms listed on the Russell 3000 index adopted clawbacks in 2015 (Mahdy 2019). Thus, the US-American capital market is an interesting and relevant empirical research setting in which to analyze possible determinants and consequences of (voluntary) clawback adoption.

4 Research framework

4.1 Methods and variables

Our research framework is shown in Fig. 1. We focus on the determinants and consequences of (voluntary) clawback adoption. Moreover, we are interested in moderator analyses performed in prior empirical clawback research.

Empirical research on clawback adoption features heterogeneous methods, variables, data, theoretical approaches, and models, leading to a variety of research strengths. Thus, it is rather difficult to analyze the results and explain the state of the art in this research field. During the last decade, literature reviews have become a major research method for business scholars, practitioners, and regulators seeking to cope with the increased complexity of accounting, finance and corporate governance research (Brown et al. 2011a; Carcello et al. 2011). From a research perspective, literature reviews are useful for gaining new knowledge about a specific topic; reflection on the state-of-the-art research can highlight the limitations of prior studies and produce useful recommendations for future research (Massaro et al. 2016). Literature reviews are also useful for practitioners and regulatory bodies because they provide insights into the drivers and economic consequences of

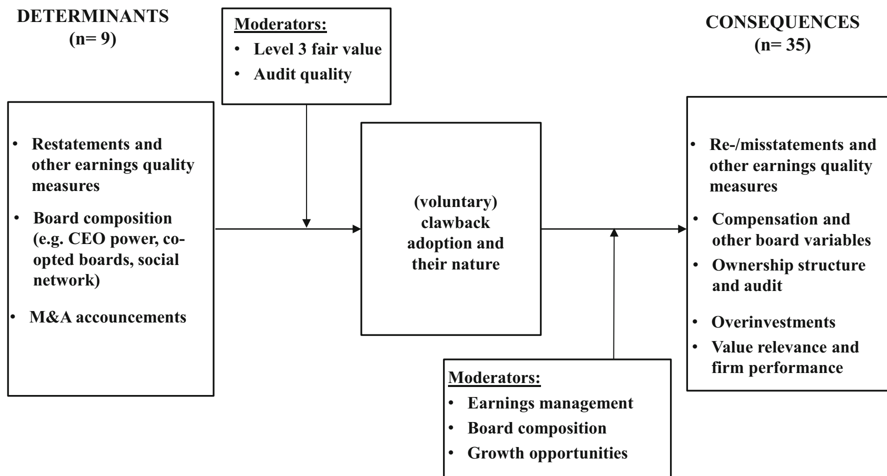

Fig. 1 Research framework on clawback adoption

corporate governance instruments like clawbacks, which could inform future regulations and standardization (Bodolica and Spraggon 2018).

To conduct our systematic literature review, we apply established procedures (Denyer and Tranfield 2009; Denyer et al. 2008). First, as our research objective, we focus on the determinants and consequences of (voluntary) clawback adoption. Our key research questions are as follows:

1) Which *factors* contribute to (voluntary) clawback adoption?
2) What are the *consequences* of (voluntary) clawback adoption?
3) Which *moderators* influence these determinants and consequences?

Major limitations and gaps in prior clawback research will be explained in detail.

Second, the major theories and concepts within the cited studies will be analyzed. We highlight the constructs that are relevant to our literature review and develop a research framework.

Third, several international databases were searched: Web of Science, Google Scholar, the Social Science Network (SSRN), EBSCO, and Science Direct. To identify research, we used "clawback" in connection with relevant keywords: "compensation," "accounting," financial accounting," "financial reporting," "audit," "auditing," "corporate governance," "governance," "board composition," "corporate finance," "financial performance," "firm value," "investments," and related terms.

Fourth, our exclusion criteria are discussed. Due to the international relevance of the topic, we did not restrict the period or country of origin of the included studies. To analyze the possible economic relationships of clawback adoption, we focused on empirical studies. As empirical clawback research does not have a long tradition, we included not only articles published in English-language scientific journals but

also current working papers (e.g., those published on SSRN). All of our studies used either primary (experiments) or secondary (archival) data to gather independent, dependent, moderator, and/or control variables for the statistical models.

Fifth, a precursory analysis of the studies was carried out. After scanning the titles and abstracts of the articles, we excluded the articles that did not meet our evaluation criteria. A final sample of 44 studies was included in the literature review.

Sixth, we used a vote-counting methodology (Light and Smith 1971) to code the clawback studies with regard to the selected (sub-)constructs and our research framework. We concentrated on significant results and their indicators. The coefficients (+ , −, ±) are listed in Table 3.

4.2 Data

We performed a bibliometric analysis and developed coarse content descriptions of the included studies (see Table 1). The first empirical clawback research was performed in 2011, and the field has grown considerably during the last years (Panel A). With two exceptions, all studies focused on the US-American capital market (Panel B). As clawback provisions have been regulated by the Dodd-Frank Act (2010) and the SEC's rules have not yet been finalized, research on voluntary clawback provisions is an attractive topic for US research that has the potential for innovation. Most studies have been published in finance and accounting journals (Panel C), especially *The Accounting Review* (5), the *Journal of Business Finance and Accounting* (4) and the *Journal of Accounting and Economics* (3). However, we also included 11 recent working papers.

Table 1 shows that prior research mainly focused on the consequences of clawback adoption (35), rather than determinants (9) (Panel D). In addition, prior research has mainly been archival in nature (38), and few studies have adopted experimental designs (6). No empirical-qualitative research has been conducted so far. With regard to empirical-quantitative (archival) research designs, a variety of different regression models are used. Most of our included archival studies used propensity score matching (PSM) (21) and the difference-in-difference approach (diff-in-diff) (16). We also see a combination of these two methods in clawback research. Moreover, a logistic (logit) regression is often used (15), whereas a probit regression (5), classical ordinary least squares (OLS), panel regressions, event studies and dynamic approaches (GMM) are rarely included. Logit and probit models are appropriate when attempting to model a dichotomous dependent variable, e.g. clawback adoption (yes or no). As linear OLS regressions are not useful in this context, logit and probit models assume a nonlinear function and both models will yield similar (though not identical) inferences. As firm-initiated clawback adoption is still voluntary in the US-American capital market, a simple logit or probit regression is connected with self-selection/sample bias and thus lowers the validity of archival research. The diff-in-diff approach is useful in this context to analyze changes in accounting, corporate governance and corporate finance decisions before and after the clawback adoption (deHaan et al. 2013). This approach lowers the methodological concerns that unobserved time-invariant

Table 1 Count of cited published papers

Panel A: by publication year	
Total: 44	2011: 1
	2012: 3
	2013: 3
	2014: 2
	2015: 6
	2017: 6
	2018: 12
	2019: 12
	2020: 1
Panel B: by region	
Total: 44	Germany: 1
	Indonesia: 1
	USA: 42
Panel C: by journal/working paper	
Total: 44	Accounting and corporate finance journals:
	Accounting and Finance: 1
	Advances in Accounting: 2
	Contemporary Accounting Research: 2
	European Accounting Review: 1
	Investment Management and Financial Innovations: 1
	Journal of Accounting and Economics: 3
	Journal of Accounting and Finance: 1
	Journal of Accounting and Public Policy: 1
	Journal of Accounting, Auditing and Finance: 1
	Journal of Business Finance and Accounting: 4
	Journal of Financial Economics: 1
	Journal of Financial Regulation and Compliance: 2
	Journal of Law, Finance, and Accounting: 1
	Management Accounting Research: 1
	Review of Corporate Finance Studies: 1
	Review of Quantitative Finance and Accounting: 1
	The Accounting Review: 5
	Management/corporate governance journals:
	Corporate Governance: 1
	International Journal of Corporate Governance: 1
	Journal of Business Ethics: 1
	Journal of Management, Spirituality and Religion: 1
	Working paper: 11
Panel D: by content	
Total: 44	Consequences: 35
	Determinants: 9
Panel E: by method	
Total: 44	Archival: 38
	Experimental: 6

variables or market-wide forces drive the observed changes in the dependent variables. The selection of control firms for the diff-in-diff analysis should be related to the PSM (Shipman et al. 2017; Rosenbaum and Rubin 1983) to control for a range of observable firm condition, performance, compensation, and governance variables that might have an impact on clawback implementation. The PSM also mitigates concerns over violations of the "parallel" trends" assumption that is critical to the diff-in-diff design (deHaan et al., 2013). The method addresses potential nonlinearities in the control variables and composes a control group that was similar to the treatment companies (i.e., clawback adopters) but did not implement clawbacks during the sample period. The combination of diff-in-diff and PSM is relevant in our included studies, especially in high ranked top accounting journals, and should be a "best practice" for future researchers.

During the last decade, an increasing number of US researchers have studied clawback-adopting firms to analyze determinants and consequences related to accounting, corporate governance and corporate finance. The US-standard setter assumes that clawbacks are useful monitoring instruments. Thus, clawbacks should influence executives' behavior such that accounting and corporate governance quality are increased after the implementation of clawbacks in management compensation contracts, and corporate finance strategies are more efficient and aligned with shareholders' interests. In most international settings (e.g., the EU), clawbacks are still voluntary. We already noted that the strict clawback rules described in the US Dodd-Frank Act (2010) have not yet been finalized by the SEC. Thus, not only the economic consequences of voluntary clawback adoption but also possible drivers are of key interest. In light of the variety of included variables in our sample and the heterogeneous results, we did not find a prior structured literature review of empirical clawback research. Only a short description of five selected studies was provided by Prescott and Vann (2018). There are huge interdependencies between the accounting, corporate governance, and corporate finance disciplines, as has been stressed in prior literature reviews, and thus they should be analyzed together (Brown et al. 2011a, b).

Table 2 summarizes the main proxies that have been used as determinants and consequences. Clawback adoption is mainly approximated by a dummy variable (1 = clawback adoption, 0 = otherwise). Most researchers rely on voluntary clawback adoption (with one exception, which utilized mandatory SOX clawbacks: Natarajan and Zheng 2019). Other clawback variables are very rare; in an archival study, Erkens et al. (2018) included a clawback strength score with five criteria (compensation coverage, employee coverage, enforcement, time period and trigger), and in an experimental study, Brink et al. (2019) differentiated between no clawbacks, lower clawbacks, and higher clawbacks with regard to the amount of the CEO's repayment. In the next chapter, we differentiate between (1) determinants, (2) consequences, and (3) moderators of the determinants and consequences of clawback adoption.

Table 2 List of proxies as clawback determinants and consequences

Determinants	Consequences	Moderators
Accounting:	**Accounting:**	***Moderators of determinants:***
Goodwill impairments	Restatements/Misstatements	**Accounting:**
Litigation risk	Other earnings quality measures: Risk of fraudulent financial reporting,	Level 3 fair values M&A announcement returns
M&A announcement returns	Earnings response coefficient (ERC),	**Corporate governance:**
Management compensation (bonus, incentive-based)	Accruals based/Real Earnings Management	Audit quality
Restatements	Meeting/beating earnings forecasts/ optimistic bias	Co-opted member on the compensation committee (at least one)
Target acquisition with poor accounting quality	Analyst forecast dispersion/accuracy	Financial expertise (audit committee)
Corporate governance:	Non-GAAP earnings disclosure frequency/exclusion quality	***Moderators of consequences:***
Board composition (Co-opted boards, compensation committee quality, social networks by at least one director in the compensation committee with other adopters)	Tax avoidance	**Accounting:**
CEO power	**Corporate governance:**	Accruals-based/real earnings management
Corporate governance index (management entrenchment/monitoring, strong/ weak)	Management compensation (total CEO gains/compensation, incentive- or non-incentive-based, changes, CEO in-the-money option value)	Readability of 10-k reports
	PPS/sensitivity of unvested compensation/CFO bonus PPS	**Corporate governance:**
	Managerial ability	Audit quality (industry specialist; big four)
	Strategic repertoire	Board composition (independence/ outside directors with expertise, Board/audit committee size, financial expertise/prestige of the audit committee, executive overconfidence, interlocked directorships)
	Litigation risk/lawsuits filed against executives dismissed or settled with lower costs	Board monitoring
	CEO variables (duality, tenure)	CEO variables (accounting expertise, power)
	Board composition (independence, size)	Internal control weaknesses
	Institutional ownership	Management compensation (option-based; CEO bonus, CEO equity incentives, incentive pay)
	Audit quality (report lag, audit fees, auditor judgment, reports of material internal control weaknesses)	Managerial ability
	Corporate finance:	PPS
	Overinvestments (capital/R&D expenditures)	Transient/dedicated institutional investors
	Investment risk/behavior/capital investment mix	**Corporate finance:**
	CAR	Cash flow volatility
	bid-ask-spreads	Ex ante fraud risk
	Stock price crash risk/volatility of stock returns	Growth opportunities
	Cash holdings	Insider sales
	M&A announcement returns/likelihood of M&A deal completion	R&D expenditures
	Patents	
	Analyst following	
	Financial covenants	
	Performance price provisions	
	Debt assurance/leverage	
	Interest rate	
	Loan maturity/collateral	
	Financial performance (ROA, ROE)/ ESG performance/wealth performance	

5 Review of the literature

5.1 Overview of related proxies

First, we explain the main proxies related to accounting, corporate governance and corporate finance before showing the significant results of the included clawback studies.

Accounting: earnings manipulation can be conducted within financial reporting standards (i.e., earnings management) or illegally (i.e., accounting failure and fraud; Sari and Sholihin 2019). As the SOX and Dodd-Frank Act rely on earnings misstatements as proxies of failures and fraud, it is obvious that clawback research on accounting-related determinants and consequences focus on these earnings quality variables. Earnings misstatements are identified through earnings restatements or enforcement releases (e.g., by the SEC) associated with adverse publicity (i.e., negative signaling). Earnings restatements can be fraudulent if executives intentionally do not follow legislation and create their earnings. In other cases, managers are negligent, leading to accounting failures. Strict external monitoring by, for example, external auditors or by the SEC will uncover accounting failures and fraud and lead to restatements and sanctions.

In addition to financial misstatements, *other earnings quality variables* are used in clawback research. Earnings management research concentrates on *accruals-based earnings management* (Dechow et al. 2010) *after* the date on the balance sheet. Abnormal/discretionary accruals (i.e., the difference between annual profit and operational cash flow) are associated with increased earnings management and thus reduced earnings quality (Dechow et al. 2010). The basic accruals model proposed by Jones (1991) has been modified by many researchers during the last years (e.g., Dechow and Dichev 2002; Kothari et al. 2005). Today, no one accruals model is clearly superior. In some models, researchers have included accounting policy *before* the balance sheet date as *"real" earnings management*. In his basic model, Roychowdhury (2006, 337) defines real earnings management as "departures from normal operational practices, motivated by managers' desire to mislead at least some stakeholders into believing certain financial reporting goals have been met in the normal course of operations." Important proxies include abnormal cash flow from operations, abnormal production costs, and abnormal expenses (Roychowdhury 2006).

Corporate governance: clawback clauses in executive compensation contracts represent a modern method of monitoring and aligning incentives. Various *corporate governance variables* may be determinants, consequences or moderators of clawbacks. In fact, it is expected that high-quality corporate governance factors related to the monitoring environment are significant drivers of clawback adoption or positively changed after clawback adoption (Mahdy 2019; Addy et al. 2014). This literature review adopts the classical separation between *board composition* (as internal corporate governance), *ownership structure* and *external audit* (as external corporate governance). In general, empirical research concentrated on board composition variables, which is not surprising because firm-initiated clawbacks

must be implemented and supervised by the board of directors. In addition, clawbacks, as a part of management compensation contracts, have been analyzed together with *other* management compensation items. The studies in the reviewed sample examined the total level of compensation, structure of remuneration, and pay-for-performance-sensitivity (PPS). Executive compensation usually takes the form of a fixed-cash salary (i.e., non-incentive-based compensation), incentive-based (i.e., variable) payments (e.g., earnings-related bonus, stock options), and other types of compensation (e.g., severance agreements; Kovermann and Velte 2019). In light of the increased influence and power of the CEO, it is quite common for empirical research to examine *CEO* compensation while neglecting other executives (Winschel and Stawinoga 2019). Several other board variables were identified in our literature review, including expertise on the board and specific committees and board independence, which indicate high corporate governance quality, as well as CEO power and co-opted boards, which indicate low corporate governance quality. With regard to external corporate governance, research on ownership structure relates to institutional ownership due to the increased influence of institutional investors on management compensation (e.g., say-on-pay votes; Obermann and Velte 2018) and on the quality of external audits.

Corporate finance: prior research provides evidence that financial reporting quality is connected with investment behavior (Chen and Vann 2017). Higher earnings quality helps a company raise capital, increases investors' ability to supervise managerial investment strategy, and improves investment efficiency. Thus, in line with accounting and corporate governance quality, clawback adoption can influence corporate finance decisions. With one exception (Brown et al. 2015), prior research has focused exclusively on the consequences of clawbacks on corporate finances. Most of the included studies examine *abnormal investments or overinvestment behavior* and related measures (e.g., investment mix or investment efficiency). It is assumed that clawback adoption will lead to lower abnormal investments/overinvestments due to better incentive alignment between management and shareholders (Chen and Vann 2017; Lin 2017). Usually, abnormal investments are approximated by the degree of capital expenditures and R&D expenditures (Liu et al. 2018). Studies of *value relevance* performed after clawback adoption are another subcategory of corporate finance research. This stream of literature assumes that stock valuation, bid–ask spreads, and cumulative abnormal returns (CAR) increase after the implementation of clawbacks (Iskandar-Datta and Jia 2013; Bakke et al. 2018). Finally, some studies include *financial performance* (accounting- and market-based measures) to analyze the possible positive impact of clawbacks.

5.2 Determinants of clawback adoption

Accounting: prior researchers neglected accounting variables as determinants of clawback adoption, except for Brown et al. (2011b, 2015). Financial restatements resulting from irregularities are positively related to fraud-based clawbacks (Brown et al. 2011b). Goodwill impairments can be connected to both M&A failures and earnings management behavior; for example, Brown et al. (2011b) found that

goodwill impairments had a positive impact on clawback adoption. In addition, target acquisition with poor accounting quality leads to more clawbacks (Brown et al. 2015).

Corporate governance: some researchers include a corporate governance index with different items to measure overall corporate governance quality. According to Chen and Vann (2017), strong (weak) corporate governance increases (decreases) clawback adoption. Addy et al. (2014) differentiated between management entrenchment status (low corporate governance quality) and monitoring status (high corporate governance quality) and found a negative link between management entrenchment and clawback adoption. Moreover, according to Arena and Nguyen (2019), litigation risk and clawback adoption are positively linked.

Instead of focusing on corporate governance indices, some researchers focused on specific *board composition variables*. According to Brown et al. (2011b), bonus payments to executives are positively related to clawback adoption. Moreover, social networks involving at least one director on the compensation committee and other adopters increase the probability of clawback clauses (Addy et al. 2014). Hsu et al. (2018) examined compensation committee quality and found that it has a positive impact on clawback implementation. Accounting expertise on the audit committee promotes clawback adoption when clawbacks are not associated with previous restatements (Zhang and Zhou 2018). However, financial expertise on the audit committee decreases the implementation of clawbacks when they are activated by prior restatements (Zhang and Zhou 2018). Furthermore, CEO power (Brown et al. 2011b) and co-opted boards (Huang et al. 2019) are negatively related to clawback adoption.

Corporate finance Brown et al.'s (2015) study is the only one to examine the corporate finance-related determinants of clawback adoption. It found that M&A announcement returns was positively significant.

5.3 Consequences

*Accounting: m*ost researchers have focused on accounting-based consequences of clawback provisions, especially *financial re-/misstatements*, and often found a negative relationship (Chan et al. 2012; Chen et al. 2015; DeHaan et al. 2013; Remesal 2018; Natarajan and Zheng 2019). Fung et al. (2015) identified the risk of fraudulent financial reporting according to Richardson et al.'s (2005) model and described the negative influence of clawbacks. In addition to restatements, other earnings quality measures, mainly *earnings management proxies*, were included in prior research. In this context, implementation of clawbacks led to decreased accruals-based earnings management (Chen et al. 2015; Mburu and Tang 2018a). Chan et al. (2015) distinguished between accruals-based and real earnings management and found a shift from accruals to real earnings management after clawback adoption. Kyung et al. (2019) is the only study in our literature review with a focus on non-GAAP ("pro forma") earnings disclosure. Non-GAAP earnings are alternative performance proxies, which are value relevant to investors, but can be used opportunistically by executives. The authors found a positive (negative) impact of clawback provisions on non-GAAP reporting frequency (exclusion

quality). Moreover, studies have found that clawbacks lead to higher earnings response coefficients (DeHaan et al. 2013), better analyst forecast accuracy (DeHaan et al. 2013; Mburu and Tang, 2018b), and lower rates of meeting/beating analyst earnings forecasts (Remesal 2018). Kubick et al.'s (2020) study is the only one in our sample to focus on tax avoidance and find that clawbacks had a positive influence. Thus, better earnings quality can be substituted by increased tax avoidance behavior.

Experimental designs complement archival studies in analyses of the behavioral and individual aspects of managers and shareholders. Prior experiments supported the results of archival studies, according to which clawbacks significantly influence earnings management behavior. Hodge and Winn (2012) found that restatement-related clawbacks reduce the riskiness of financial reporting choices if executives did not make conservative reporting choices before the clawback. Hales et al. (2018) supported the archival results presented by Chan et al. (2015), stating that clawback adopters shift from accruals to real earnings management (if monitoring scores are weak). According to Sari and Sholihin (2019), in very innovative research designs, clawbacks are included as moderator variable. The authors find that clawbacks strengthen the negative influence of religiosity on accruals and the positive influence of religiosity on real earnings management.

Corporate governance: it is obvious, that one of the major consequences identified in empirical clawback research relates to *management compensation*. Ang et al. (2012) stressed that the majority of CEO stock (option) gains were not subject to recovery under the new Dodd-Frank Act; only 1% of the total monetary gains are subject to the new clawback rules, meaning that the discipline function is very weak. According to DeHaan et al. (2013) and Chen et al. (2015), both CEO compensation and PPS were increased by clawback adoption. In contrast, Natarajan and Zheng (2019) found that mandatory SOX clawbacks lead to decreased CEO in-the-money option value. Moreover, clawbacks are linked with decreased asymmetric sensitivity between CEO/CFO cash compensation and firm performance (Liu et al. 2019), better sensitivity of unvested (long-term) compensation (Remesal 2018), and higher CFO bonus incentives tied to financial measures (Kroos et al. 2018). With regard to different compensation items, according to Mburu and Tang (2018a), decreased vega and bonus payments can be found after clawback adoption. Erkens et al. (2018) did not include clawback adoption in their study but developed a clawback strength index, concluding that CEO pay is negatively linked to clawback strength.

In addition to compensation, *other corporate governance variables* are included in our sample. Chen and Vann (2015) distinguished between board composition variables (e.g., board independence) and ownership structure variables (e.g., institutional ownership) and stressed that clawbacks are complements to internal corporate governance measures and substitutes for external measures. According to Arena and Nguyen (2019), litigation risk decreases while the number of lawsuits filed against executives that are dismissed or settled with lower costs increase. Erkens et al. (2018) found that clawback strength had a negative impact on CEO turnover. Referring to the famous managerial ability model developed by Demerjian et al. (2012), Mahdy (2019) stressed the positive influence of clawbacks on managerial ability reflects managers' efficiency in generating revenues. Finally, clawback

adoption seems to increase audit efficiency as audit report lag and fees and auditors' reports of material internal control weaknesses are decreased (Chan et al. 2012).

Corporate finance: most included studies found that clawback adoption has a negative impact on *overinvestments or abnormal investments* (Babenko et al. 2019; Lin 2017; Chen and Vann 2017; Liu et al. 2020; 2018). Biddle et al. (2018), however, found a positive effect. The results of *value relevance* studies are more heterogeneous. According to Iskandar-Datta and Jia (2013), higher CAR and bid–ask spreads are observed after clawback adoption, especially in firms with previous restatements. In contrast, Bakke et al. (2018) found that firms *without* clawbacks gain higher CAR. Brown et al. (2015) found higher M&A announcement returns and a higher likelihood of M&A deal completion after clawback implementation. However, stock price crash risk also increased after clawback adoption, according to Bao et al. (2018). Chan et al. (2013) focused on creditor relationships and stated that financial covenants, performance price provisions, and loan maturity increase and interest rates and loan collateral decrease after clawback implementation. Thus, clawback adoption strengthened debtholder relations.

Researchers also found that clawbacks have a positive impact on *financial performance* (Chen and Vann 2014) and wealth performance (Remesal 2018). According to Babenko et al. (2019), a battery of financial consequences are tested after clawback adoption: decreased volatility of stock returns, R&D spending, patents, and debt issuance on the one hand, and increased cash holdings, environmental, social and governance (ESG) performance, short-term market reactions, and long-term performance on the other hand.

5.4 Moderator variables of determinants

Accounting: Hsu et al. (2018) performed the only moderator analysis involving accounting-related determinants of clawback adoption to date. Using level-3 fair values as a proxy for accruals-based earnings management strengthened the positive impact of the monitoring quality of the compensation committee on voluntary clawback adoption.

Corporate governance: There is also a research gap concerning corporate-governance-specific moderator analysis of the drivers of clawbacks with two exceptions. Huang et al. (2019) found that the negative relationship between co-opted boards and clawbacks is strengthened by the presence of at least one co-opted member on the compensation committee. Pyzoha (2015), based on an experimental setting, analyzed the relationship between incentive-based compensation, acceptance of a restatement recommendation that will lead to a clawback, and audit quality (applied as a moderator). A negative moderator impact was found, leading clawbacks to be classified as a substitute for external auditing.

No study to date has performed a corporate finance-related moderator analysis.

5.5 Moderator variables of consequences

As we already noted that mainly older studies found a positive impact of clawback adoption on financial reporting quality, corporate governance and firm value, recent

studies have a “less optimistic” view. These researchers claim that clawbacks will be adopted as part of a broader corporate governance reform package at the firm level (Denis 2012; Erkens et al. 2018). Thus, it is important to take other corporate governance, accounting and financial circumstances of the firm into account to analyze the real consequences of clawbacks. It is not clear whether the implementation of clawbacks solely or in combination with other accounting, corporate governance and finance factors will matter (Denis 2012). Thus, the recognition of moderator variables, especially with regard to other corporate governance factors (e.g., other parts of management compensation contracts or board composition), is extremely important in empirical-quantitative clawback research during the last years. Other corporate governance factors can either represent complements or substitutes of clawbacks, leading to the assumption of an endogenous nature of clawbacks with heterogeneous results.

Accounting: prior empirical research has neglected moderator analysis of accounting-based consequences. We only identified Bao et al.’s (2018) study, which found that real earnings management, decreased readability of 10-k reports, and ex-ante fraud risks moderate the positive link between clawbacks and stock price crash risk. Thus, low *earnings quality* has a huge impact on the link between clawbacks and stock price risk.

Corporate governance: other *management compensation variables* have been included as main significant moderators in prior research. Lin (2017) stressed that the negative impact of clawbacks on overinvestment is strengthened by option-based compensation. According to Biddle et al. (2018), investments shift away from research and development (R&D) to capital expenditures due to higher performance-linked annual pay in the context of clawbacks. Moreover, capital expenditures increase without significant R&D reductions due to higher levels of equity incentives in executive compensation contracts (Biddle et al. 2018). With regard to the positive impact of clawbacks on the risk of a stock price crash, Bao et al. (2018) concluded that high CEO equity incentives have a positive moderating impact. Firk et al. (2019) found that the negative influence of clawbacks on the strategic repertoire (based on the Shannon index) was strengthened by the ratio of incentive pay.

A variety of other corporate governance measures has also been used as moderators in studies focusing on *board composition*. Liu et al. (2018) confirmed that weak board composition quality (e.g., a low degree of board independence) mitigates the negative effect of clawbacks on overinvestments. Kroos et al. (2018) found that the positive link between clawbacks and CFO bonus PPS was mitigated by firms’ susceptibility to misreporting (e.g., CEO power and lower financial expertise and prestige in the audit committee). According to Natarajan and Zheng (2019), powerful CEOs receive higher salaries, which are not subject to the SOX’s mandatory clawback provisions. Lin (2017) stressed that the negative impact of clawbacks on overinvestments is strengthened by executive overconfidence. Moreover, according to Remesal (2018), the positive link between clawback adoption and sensitivity of unvested (long-term) compensation was mitigated by pre-adoption board independence. Firk et al. (2019) found that the negative influence of clawbacks on the strategic repertoire was strengthened by a lack of

major accounting expertise among CEOs and board independence. Furthermore, low managerial ability and low dedicated institutional ownership positively moderate the positive impact of clawbacks on stock price crash risk (Bao et al. 2018). Similarly, Chan et al. (2015) found that transient institutional investors positively moderate the link between clawbacks and the shift from accruals to real earnings management. Finally, Liu et al. (2020) stressed that the presence of big four auditors strengthened the negative impact of clawbacks on corporate risk-taking.

Two *experimental* designs included corporate governance consequences and moderators of clawbacks. According to Hales et al. (2018), a shift from accruals to real earnings management was moderated by weak board monitoring. Strong board monitoring, however, can strengthen the negative impact of clawbacks on both accruals and real earnings management. In line with Erkens et al. (2018), Brink et al. (2019) focused on clawback strength, differentiating between no, lower, and higher clawbacks. Higher (lower) clawbacks are associated with $1.5 million ($750,000) CEO repayments of previously awarded compensation if prior-year financial statements are restated. Brink et al.'s (2019) analysis is the only study included in our review with no significant results at all; they did not find any consequences on auditors' propensity to propose restatements and auditors' assessments of the risk of material misstatement (key audit matters), which were their main output variables.

Corporate finance: Fung et al. (2015) indicated that the negative relationship between clawbacks and risk of fraudulent financial reporting is strengthened by insider sales. Moreover, growth opportunities moderate the shift from accruals to real earnings management by clawback adopters (Chan et al. 2015). Hirsch et al. (2017) conducted the only experiment to date on corporate finance consequences, focusing on information processing and behavior. The authors found that when the firm is in a loss position, managers issue a more positive assessment of the success factors of a risky investment involving a clawback, and they will underestimate the riskiness of their investment. When the outcome of an investment decision affects only the size of the loss, managers make riskier investment decisions with clawbacks.

Table 3 gives a detailed overview of our included studies.

5.6 Recommendations for future research

In this chapter, we present selected recommendations for future research from a content view. We differentiate between accounting, corporate governance and corporate finance issues in future clawback research.

Accounting: we already noted that current clawback research on accounting-based proxies is not satisfactory. First, we recommend including more earnings quality variables that are common in other research strands. The first useful variable is *earnings persistence*. Companies with a more sustainable earnings stream will provide more useful inputs into discounted cash flow-based equity valuations. *Earnings smoothness*, defined as the smoothing of transitory cash flows, will also increase earnings persistence and informativeness. However, executives' strategies

Table 3 Summary of empirical quantitative clawback research

Year of publication	Author(s)	Journal	• State • Sample • Year(s) • Theory • Method	Independent variable (s) (X = voluntary clawback adoption; dummy)	Dependent variable (s) (X = voluntary clawback adoption; dummy)	Significant results
Determinants of clawbacks						
2011b	Brown et al.	Working Paper	• USA • 252 adopters • 2005-2009 • Managerial power theory • Logit model	Accounting: • Prior restatements • Goodwill impairments Corporate Governance: • Bonus payments • CEO power	• X	+ (restatements resulting from irregularities are related to fraud-based clawbacks) + + -
2014	Addy et al.	Journal of Accounting and Public Policy	• USA • 341 firm-year observations • 2006-2008 • n.A. • Logit model	Corporate Governance: • management entrenchment index • social networks by at least one director in the compensation committee with other adopters (interlocks)	• X	- +
2015	Brown et al.	Journal of Business Finance & Accounting	• USA • 235 adopting firms • 2004-2010 • n.A. • logit model/Difference in difference approach (Diff-in-diff)	Corporate Finance: • M&A announcement returns (CAR) Accounting: • Target acquisition with poor accounting quality	• X	- +
2015	Pyzoha	The Accounting Review	• USA • 112 executives • N.A. • Principal agent theory • Experiment (2x2)	Corporate Governance: • Incentive-based compensation • Moderator: audit quality (industry specialization, training and experience)	• Acceptance of a restatement recommendation that will lead to a clawback	- (moderator: -)
2017	Chen and Vann	Journal of Business Finance & Accounting	• USA • 4,534 firm-year observations • 2005-2009 • n.A. • Diff-in-diff/propensity score matching (PSM)/inverse mills ratio	Corporate Governance: • Strong (board independence, meetings and size) versus weak corporate governance (CEO duality and tenure)	• X	+ (strong)
2018	Hsu et al.	Investment Management and Financial Innovations	• USA • 4,098 firm-year observations • 2008-2015 • Principal agent theory • Logit model	Corporate Governance: • Compensation committee quality (number, shareholdings, financial expertise, at least 10 years board experience, CEO appointed directors, at least three additional board seats, CEO from other firms) • Moderator: level 3 fair values	• X	+ Moderator: +
2018	Zhang and Zhou	Journal of Law, Finance, and Accounting	• USA • 186 adopting firms • 2007 • n.A. • Logit model	Accounting: • Restatements • Moderator: Financial expertise on the audit committee (accounting/non-accounting)	• X (fraud based)	Accounting experts (+, when clawbacks are not associated with previous restatements) Financial experts (-, when clawbacks can be implicated by prior restatements)
2019	Arena and Nguyen	Journal of Financial Regulation and Compliance	• USA • 1,172 firms • 2007-2014 • n.A. • OLS, logit model	Corporate Governance: • Litigation risk	• X	+

Table 3 continued

Year of publication	Author(s)	Journal	• State • Sample • Year(s) • Theory • Method	Independent variable (s) (X = voluntary clawback adoption; dummy)	Dependent variable (s) (X = voluntary clawback adoption; dummy)	Significant results
Determinants of clawbacks						
2019	Huang et al.	European Accounting Review	• USA • 6,399 firm-year observations • 2007-2013 • Managerial power theory/Principal Agent theory • logit model	Corporate Governance: • Co-opted boards (directors appointed after the CEO assumed office) • Moderator: at least one co-opted member on the compensation committee; likelihood that a clawback provision will be triggered	• X	- Moderator: +
Consequences of clawbacks						
2012	Ang et al.	Working Paper	• USA • 576 firm-year observations • 2000-2010 • n.A. • probit regression	• X	Corporate Governance: • CEO excess incentive compensation plus profit from the sale of stock and stock exercise	The majority of the CEO gains (stock (option) gains) are not subject to recovery under Dodd-Frank act (only 1% of the total monetary gains is subject to the act)
2012	Chan et al.	Journal of Accounting and Economics	• USA • 343 adopter firms • 2000-2009 • n.A. • Diff-in-diff/PSM	• X	Accounting: • Financial restatements • Earnings response coefficient Corporate Governance: • Audit report lag • audit fees • Reports of material internal control weakness	- + - - -
2012	Hodge and Winn	Working Paper	• USA • 65 MBA students • n.A. • n.A. • Experiment (3x5)	• X	Accounting: • Riskiness of financial reporting choices	- (exception: executive who made conservative reporting choices already before clawback) + (in comparison to those covered by a holdback clause)
2013	Chan et al.	Journal of Financial Economics	• USA • 343 clawback adopters • 2005-2009 • Signaling theory • Diff-in-diff/PSM	• X	Corporate Finance: • Financial covenants • Performance price provisions • Interest rates • Loan maturity • Loan collateral	+ + - + -
2013	DeHaan et al.	Contemporary Accounting Research	• USA • 580 adopting firms • 2005-2010 • Principal agent theory • Diff-in-diff/PSM	• X	Accounting: • Restatements • Earnings response coefficient/analyst forecasts Corporate Governance: • PPS • CEO compensation	- + + +
2013	Iskandar-Datta and Jia	The Accounting Review	• USA • 246 adopter firms • 2005-2009 • Principal agent theory • logit model/PSM/event study	• X	• Corporate Finance: • CAR • Bid-ask-spread after adoption by restating firms • Corporate Governance: • CEO compensation	+ (greater for firms with previous financial restatement) + +/-
2014	Chen and Vann	International Journal of Corporate Governance	• USA • 1,787 firm-year observations • 2005-2009 • Principal agent theory/stewardship theory	• X	Corporate Governance: • Board independence • Board size • CEO duality • CEO tenure	Clawbacks are complements to internal and substitute to external corporate governance

Table 3 continued

Year of publication	Author(s)	Journal	• State • Sample • Year(s) • Theory • Method	Independent variable (s) (X = voluntary clawback adoption; dummy)	Dependent variable (s) (X = voluntary clawback adoption; dummy)	Significant results
Consequences of clawbacks						
			• Diff-in-diff/PSM		• Institutional ownership Corporate Finance: • Financial performance (ROA, ROE)	 +
2015	Brown et al.	Journal of Business Finance & Accounting	• USA • 235 adopting firms • 2004-2010 • n.A. • logit model/Diff-in-diff	• X	Corporate Finance: • M&A announcement-related CAR • Likelihood of M&A deal completion	+ +
2015	Chan et al.	The Accounting Review	• USA • 444 adopter firms • 2000-2009 • n.A. • probit regression/PSM /2 stage heckman model	• X • Moderator: growth opportunities; level of transient institutional investors	Accounting: • Shift from accrual to real earnings management	+ Moderator: +; total degree of earnings management does not change
2015	Chen et al.	Review of Corporate Finance Studies	• USA • 515 clawback observations • 2004-2011 • Principal agent theory • OLS/panel regression	• X	Accounting: • Financial restatements • Abnormal accruals Corporate Governance: • Total and incentive compensation • Non-incentive compensation • PPS	- - + - +
2015	Fung et al.	Journal of Accounting and Public Policy	• USA • 414 clawback adopters • 2003-2012 • n.A. • probit regression/PSM /diff-in-diff	• X • Moderator: insider sales	Accounting: • Risk of fraudulent financial reporting (Richardson et al., 2005)	- Moderator: -
2017	Chen and Vann	Journal of Business Finance & Accounting	• USA • 4,534 firm-year observations • 2005-2009 • n.A. • Diff-in-diff/PSM/inverse mills ratio	• X	Corporate Finance: • Abnormal investments (capital expenditures) • Investment risk (earnings volatility)	- -
2017	Hirsch et al.	Management Accounting Research	• Germany • 82 MBA students • n.A. • Principal agent theory/motivated reasoning • Experiment (2x2)	• X	Corporate Finance: • Information processing • Investment behavior	+ (changes) + (changes)
2017	Lin	Corporate Governance: An International Review	• USA • 1,093 clawback adopters • 2006-2012 • Principal agent theory • Diff-in-diff/PSM	• X • Moderator: executive overconfidence, option-based compensation	Corporate Finance: • Overinvestments (capital expenditure ratio; abnormal investment by Richardson (2006)	- Moderator: strengthen the negative link
2018	Bakke et al.	Working Paper	• USA • 1,123 adopters • 2015 • Principal agent theory/managerial power theory • Event study	• SEC proposal to mandate clawbacks • Moderator: CEO power (CEO duality; co-opted board); bonus payments to CEO; audit quality (industry specialist; big four); costs of clawback provisions (cash flow volatility; R&D expenditures)	Corporate Finance: • CAR	+ (without a clawback provision) + (higher in firms with CEO power and with higher costs)

Table 3 continued

Year of pub-lica-tion	Author(s)	Journal	• State • Sample • Year(s) • Theory • Method	Independent variable (s) (X = voluntary clawback adoption; dummy)	Dependent variable (s) (X = voluntary clawback adoption; dummy)	Significant results
Consequences of clawbacks						
2018	Bao et al.	Contemporary Accounting Research	• USA • 540 adopting firms • 2007-2013 • n.A. • Diff-in-diff/PSM	• X • Moderators: real earnings management, decreased readability of 10-k reports, ex ante fraud risk, low-ability managers, high CEO equity incentives, low dedicated institutional ownership	Corporate Finance: • Stock price crash risk (negative extreme return, difference between number of weeks with negative and positive extreme returns, negative skewness of returns, down-to-up volatility of crash risk)	+ Moderators: +
2018	Biddle et al.	Working Paper	• USA • 347 adopters • 2005-2012 • Principal agent theory • Probit regression/ PSM	• X • Moderator: performance-linked annual pay and equity incentives	Corporate Finance: • Capital investment mix (sum of capital expenditures, acquisitions, and R&D expenditures less sales of property, plant and equipment) • Overinvestments	Investments shift away from R&D to capital expenditures by higher performance-linked annual pay Increased capital expenditures without significant R&D reductions by higher levels of equity incentives + (Overinvestments)
2018	Erkens et al.	Journal of Accounting and Economics	• USA • 4,464 clawback observations • 2007-2013 • Principal agent theory • Diff-in-diff/PSM	• Clawback strength index (compensation coverage, employee coverage, enforcement, time period, trigger)	Accounting: • Mis-/restatements Corporate Governance: • CEO turnover • CEO pay (total, incentive, non-incentive)	- - -
2018	Hales et al.	Working Paper	• USA • 127 MBA students • n.A. • (Behavioral) agency theory • Experiment	• X • Moderator: board monitoring	Accounting: • Earnings management	Shift from accruals to real earnings management (by weak monitoring) Moderator: strong monitoring strengthens the negative impact of clawbacks on accruals and real earnings management
2018	Kroos et al.	The Accounting Review	• USA • 3,037 clawback observations • 2007-2013 • n.A. • Diff-in-diff/PSM	• X • Moderator: firms' susceptibility to misreporting (internal control weaknesses; accruals; CEO power; lower financial expertise and prestige of the audit committee)	Corporate Governance: • CFO bonus incentives tied to financial measures	+ Moderator: -
2018	Liu et al.	Advances in Accounting	• USA • 8,518 firm-year observation • 2005-2014 • Principal agent theory • Probit regression/PSM	• X • Moderator: board governance (independence, outside directors with financial/accounting expertise, interlocked directorship, audit committee size, board size)	Corporate Finance: • Overinvestments (sum of R&D, capital and acquisition expenditures less sales of PPE)	- Moderator: weak governance mitigates the negative effect
2018a	Mburu and Tang	Advances in Accounting	• USA • 457 firms • 2007-2013 • n.A. • OLS/PSM	• X	Corporate Governance: • Compensation changes (lower vega/bonus) Accounting: • Earnings management (accruals)	+ -
2018b	Mburu and Tang	Journal of Accounting and Finance	• USA • 418 firms • 2007-2013 • n.A. • logit model/PSM	• X	Accounting: • Analyst following • Forecast accuracy • Financial analyst forecast optimistic bias	+ + -
2018	Remesal	Working Paper	• USA • n.A. • 2002-2016 • Principal agent theory	• X • Moderator: Pre-adoption board independence	Corporate Finance: • Wealth performance Corporate Governance:	+

Table 3 continued

Year of pub-lica-tion	Author(s)	Journal	• State • Sample • Year(s) • Theory • Method	Independent variable (s) (X = voluntary clawback adoption; dummy)	Dependent variable (s) (X = voluntary clawback adoption; dummy)	Significant results
Consequences of clawbacks						
			• Logit model		• Sensitivity of unvested (long-term) compensation Accounting: • Meeting/beating earnings forecasts • Restatements	- - Moderator: -
2019	Arena and Nguyen	Journal of Financial Regulation and Compliance	• USA • 1,172 firms • 2007-2014 • n.A. • OLS/logit model	• X	Corporate Governance: • Litigation risk • Lawsuits filed against them dismissed or settled with lower costs	- +
2019	Babenko et al.	Working Paper	• USA • 5,358 clawback observations • 1996-2017 • n.A. • Panel regression/GMM-instrumental variable	• X	Corporate Finance: • Volatility of stock returns • R&D spending • Patents • Investments • Cash holding • Debt issuance • ESG performance • Long-term performance • Short-term market reaction	- - - - + - + + +
2019	Brink et al.	Journal of Business Ethics	• USA • 150 auditors • N.A. • Motivating reasoning theory • Experiment (three)	• Strength of clawback • Moderator: client importance	Corporate Governance: • Auditor judgment (propensity to propose restatements and risk assessments)	+/-
2019	Firk et al.	Working Paper	• USA • 4,411 firm-year observations • 2004-2014 • n.A. • panel regression/dif-in-diff/PSM	• X • Moderator: CEO without major accounting expertise; ratio of incentive pay; board independence	Corporate Governance: • Strategic repertoire (Shannon index)	- Moderators increase the negative link
2019	Kyung et al.	Journal of Accounting and Economics	• USA • 262 clawback adopters • 2005-2009 • n.A. • logit model/PSM	• X	Accounting: • Non-GAAP earnings disclosure frequency • Non-GAAP earnings exclusion quality	+ -
2019	Liu et al.	Working Paper	• USA • 4,268 adopting firms • 2007-2014 • Principal agent theory • 2-stage heckman approach/logit model	• X	Corporate Governance: • Asymmetric sensitivity between CEO/CFO cash compensation and firm performance	-
2019	Mahdy	Accounting & Finance	• USA • 459 clawback observations • 2007-2013 • Resource based theory • Logit model/PSM	• X	Corporate Governance: • Managerial ability (Demerjian et al. 2012)	+
2019	Natarajan and Zheng	Journal of Accounting, Auditing & Finance	• USA • 494 restating firms 2000-2007 • Principal agent theory • logit model	• Mandatory SOX clawbacks • Moderator: CEO power	Accounting: • Misstatements Corporate Governance: • CEO compensation (CEO in-the-money option value)	- - Moderator: powerful CEOs receive higher salaries which are not subject to clawback provisions

Table 3 continued

Year of publication	Author(s)	Journal	• State • Sample • Year(s) • Theory • Method	Independent variable (s) (X = voluntary clawback adoption; dummy)	Dependent variable (s) (X = voluntary clawback adoption; dummy)	Significant results
Consequences of clawbacks						
2019	Sari and Sholihin	Journal of Management, Spirituality & Religion	• Indonesia • 266 participants from finance departments • n.A. • n.A. • Experiment	• Religiosity • Moderator: X	Accounting: • Earnings quality (fraud; accruals, real earnings management)	+/- Moderator: clawbacks strengthen the negative influence of religiosity on accruals; strengthen the positive impact on real earnings management
2020	Kubick et al.	The Accounting Review	• USA • 977 firms • 2004-2012 • n.A. • Diff-in-diff/PSM	• X	Accounting: • Tax avoidance (reduced effective tax rate in order to increase auditor-provided tax services, connections to other low-tax companies and use of tax havens	+
2020	Liu et al.	Review of Quantitative Finance and Accounting	• USA • 27,051 firm-year observations • 2005-2014 • Principal agent theory • Diff-in-diff	• X • Moderator: big four audit	Corporate Finance: • R&D expenditures, • capital expenditures • Leverage	- - - Moderator: +

to smooth permanent changes in cash flows is linked to delayed and less informative earnings. *Timely loss recognition* is another important earnings quality variable as it combats natural management optimism. This kind of asymmetric earnings behavior is an indicator of prudence or "earnings conservatism." Moreover, earnings variables such as *small profits* and *small loss avoidance* are also linked to lower earnings quality and should be included in future clawback studies. In general, earnings quality variables should be included in moderator analyses to explain the link between re-/misstatements and earnings management with regard to clawback adoption.

Only Kubick et al. (2020) recognized the impact of clawbacks on *tax avoidance*. However, a plethora of US-based research has found that, on average, incentive compensation is associated with increased levels of tax avoidance (Minnick and Noga 2010; Rego and Wilson 2012; Armstrong et al. 2012; Halioui et al. 2016). This relationship is present for CEOs and CFOs (Rego and Wilson 2012) as well as directly responsible tax directors (Armstrong et al. 2012). As clawbacks are part of management compensation contracts, and compensation represents one of the main topics in tax avoidance research (Kovermann and Velte 2019), the lack of analyses of the link between clawback adoption and tax avoidance (and vice versa) represents a major research gap.

Corporate governance: while prior clawback research included several board composition variables, we can make several recommendations for future research on *corporate governance*. First, the impact of board *committee* composition, especially the composition of the audit and compensation committees, on clawback adoptions could be analyzed in more detail. The main goal of audit committees is to supervise the executives, the internal and the external auditors. Thus, it is crucial for the audit

committee to monitor (non-) financial reporting, especially compensation reporting (Zhang and Zhou 2018). As the adoption of clawbacks must be connected with external compensation reporting, several audit committee variables (e.g., industry expertise, independence, interlocks, meeting frequency) can be included in future clawback research.

Second, the monitoring role of compensation committees must be further analyzed, as these committees are responsible for management compensation contracts and the development of clawback clauses (Addy et al. 2014; Huang et al. 2019; Hsu et al. 2018; Kang and Nanda 2018). The current discussion of clawback adoption from an international perspective is also related to *sustainable* aspects of corporate governance (Brink et al. 2019). Clawbacks should strengthen executive incentives to implement a sustainable management system and create a management culture of ethical behavior. This assumption can be justified by a more long-term orientation and an increased recognition of non-financial company goals by executives after the implementation of clawback clauses. As stakeholders criticized short-term orientation in management compensation contracts after the financial crisis of 2008–2009, clawbacks should promote top management incentives to rely on a more long-term and ethical behavior, as they may be punished for future events that conflict stakeholders' interests. Thus, future research designs should consider diversity variables (e.g., gender, nationality, age) or address the implementation of non-financial goals in management compensation contracts (Winschel and Stawinoga 2019; Obermann and Velte 2018).

Third, *external* corporate governance variables have been neglected in prior clawback research. The literature assumes that the discipline function of clawbacks is made more pronounced by shareholder activism (Chen and Vann 2014; Chan et al. 2015; Bao et al. 2018). In particular, shareholder activism related to management compensation has become a major topic during the annual general meetings of listed companies (Brandes et al. 2008). Although majority proxy voting exists in many regimes (Cziraki et al. 2010), much more attention has been paid to regulations regarding say on pay (i.e., a shareholder's right to vote on the appropriateness of executive compensation) in an international context. Future research designs should concentrate on the interdependencies between say-on-pay votes and clawbacks. In this context, heterogeneity among institutional investors must be acknowledged. In addition to differentiating between transient, dedicated and quasi-indexer institutions (Bushee 1998), researchers should distinguish between pressure-sensitive, pressure-resistant, and pressure-indeterminant institutional investors (Brickley et al. 1988). When analyzing heterogeneous investor preferences, measures of sustainability among institutional investors (e.g., whether they signed the UN Principles for Sustainable Investment) should be considered to increase the relevance of research (Dyck et al. 2019).

Fourth, *audit quality* and *efficiency* variables have been neglected in clawback research to date. As external auditors fulfil a major monitoring function in relation to the corporate governance of PIEs, we recommend that future research include audit quality variables. To determine financial reporting quality, empirical audit research has applied a variety of proxies (Knechel et al. 2013; DeFond and Zhang 2014). External auditors' expertise and independence are both crucial. Many

researchers assume that auditors' independence increases with higher audit fees and lower non-audit fees (Knechel et al. 2013). During the last decade, empirical audit research has discussed the internal and external rotation of external auditors to decrease conflicts of interest between auditors and management (Tepalagul and Lin 2015). These variables should be included as possible effects of clawback adoption. In addition, external audit quality is affected by auditor–client negotiation. The probability of going concern opinion issuance or the existence of an industry specialist, which have been used as proxies for auditor competence, can be easily adopted in future clawback research (Knechel et al. 2013; DeFond and Zhang 2014). Moreover, as regulations on extended auditor reporting (key audit matter disclosure) have been finalized in recent years in many countries (Velte and Issa 2019), following Brink et al.'s (2019) experimental design, archival studies should analyze the impact of clawback adoption on key audit matters.

Fifth, in addition to firm-specific governance variables, *country-related* governance variables should be included in future clawback research performed within a cross-country setting. There are three main groups of governance variables in the literature: (1) the presence of case (common) law, (2) the degree of legal enforcement, and (3) the range of shareholder rights (i.e., investor protection). It is assumed that case law regimes and regimes with increased legal enforcement and shareholder rights will feature stronger firm-related corporate governance variables and thus positively influence the adoption of clawbacks. LaPorta et al. (2008) used the differentiation between code (civil) law and case (common) law as a dummy variable. Civil law regimes are linked with rather low shareholder protection as an insider model of governance. A famous shareholder protection index developed by the WorldBank provides a simple average of the extent of conflict of interest regulations and the extent of shareholder governance indices ranging from 0 to 10. In addition, the World Justice Project developed a rule of law index (legal enforcement) that includes various factors related to a country's legal system's effectiveness, such as absence of corruption and regulatory environment, on a scale from 0 to 1. These governance variables should be included in future research designs to analyze differences in clawback effects with regard to different countries. Future cross-country studies should include cultural aspects, such as feminism, with reference to the famous Hofstede database.

Sixth, as we already noted, recent archival and experimental research designs address *moderator* effects by analyzing the consequences of clawbacks. The significant effects of clawback provisions on financial reporting quality, corporate governance and financial performance are more and more questioned as other corporate governance factors (e.g., other elements of the management compensation contracts, board composition or ownership) have to be simultaneously fulfilled to realize these clawback effects or other corporate governance variables may represent substitutes of clawbacks (Denis 2012; Erkens et al. 2018). Thus, the possible *endogenous* character of clawbacks has to be included in future research designs to evaluate under which circumstances do clawbacks matter. In this context, future researchers should not only include clawbacks as a simple dummy or binary variable, but should recognize the strength or nature of these provisions in line with Erkens et al. (2018) and Brink et al. (2019).

Corporate finance: future research should also address additional *corporate finance*-related determinants, effects and moderators of clawback adoption. In particular, the interaction between financial and ESG performance and its effect on the link between earnings quality and clawbacks is an important research topic. Clawbacks should not only lead to incentive alignment between managers and shareholders but also include other stakeholder interests. As clawbacks are linked with stronger say-on-pay regulations from an international perspective and increased institutional investor activism, clawback adopters may engage in more *sustainable finance* activities and thus increase their ESG performance (Babenko et al. 2019). Much prior earnings quality research found that CSR has a major influence on earnings management (Dhaliwal et al. 2012). This influence could be further analyzed in future clawback studies. Moreover, investment policy not only represents an output factor of clawbacks but also may lead to clawback implementation or moderate the impact of corporate governance on clawbacks. Future studies should examine this aspect.

Empirical research on firm value related to accounting and corporate governance drivers has addressed a variety of different proxies. In addition to financial performance, future clawback research designs should address the cost of equity and debt capital (e.g., the WACC model, Easton and Ohlson Juettner model, interest expenses, bond yield to maturity spreads), agency costs (e.g., the management expense ratio and total asset turnover). Moreover, major corporate finance strategies are linked with working capital management, dividend policy, capital structure decisions, and M&A activities, and a research design that examines the influence of clawback adoption on these issues would be important and innovative.

6 Summary, limitations, and conclusions

Clawback provisions are an important topic in the accounting, corporate governance, and corporate finance discipline with high relevance in research, regulatory and practical environments. The US-American regulations on clawback adoption serve as the motivation and starting point for empirical research on this topic. Section 304 of the SOX (2002) requires the CEOs/CFOs of PIEs to reimburse their remuneration via fraud-related financial restatements, enforced by the SEC. Eight years later, Sect. 954 of the Dodd-Frank Act (2010) greatly expanded clawback regulations, requiring PIEs to adopt clawback provisions for all financial restatements that do not meet current financial reporting standards. To date, the SEC has not finalized the rules on clawback adoption. Thus, compliance with the Dodd-Frank Act is still voluntary. However, voluntary adoption of clawback clauses has been recognized as a best practice of corporate governance in recent years from an international perspective.

Due to its regulatory and practical relevance, the US represents an important and innovative setting for empirical clawback research. However, we expect future research will cover other regimes. In particular, we expect increased research on the EU due to the finalization of the modernized EU shareholders rights directive in 2017, which made say-on-pay votes and compensation reporting mandatory within

EU member states. If companies decide to include clawback provisions in management compensation contracts, they must explain these issues in their new compensation reports to the public.

This is the first structured literature review of the determinants and consequences of clawback adoption (with archival and experimental research designs). This study makes several contributions to prior clawback and corporate governance research. First, we select the main proxies, which are used as dependent, independent, and moderator variables in prior studies. Second, we provide a comprehensive list of the variables and proxies used in prior empirical-quantitative clawback research and analyze their main statistical effects. Third, we develop a content-related agenda for future research designs and topics on determinants and consequences of clawbacks.

Our main results are as follows. In total, 44 studies focused on the US-American capital market (with two exceptions). These studies primarily addressed possible consequences of clawbacks (35), and most were archival studies (38). While we still know little about the determinants of clawback adoption, our literature review indicates that clawbacks lead to better earnings quality (i.e., reduced re-/misstatements), improved PPS, increased firm value, and lower overinvestment. Those positive consequences of clawbacks may rely on other corporate governance aspects, as board composition variables are often tested as significant moderator variables. Thus, a corporate governance reform "package" may only be useful with regard to the implementation of clawbacks. However, other corporate governance attributes, e.g. enforcement activities, can also represent a substitute of clawbacks, stressing their possible endogenous character.

Thus, our review has several important implications for practice. First, it shows which drivers will lead to (voluntary) clawback adoption and the extent to which clawbacks will increase accounting and corporate governance quality and change corporate finance decisions to align with shareholders' interests. Second, the composition of studies and their heterogeneous variables stress the need for cooperation across academic fields related to clawback adoption (e.g., finance and accounting, corporate governance and management, law, economics, sustainability, data science). As clawbacks are voluntary in most international settings (including the US), boards of directors still have much managerial discretion concerning the decision to implement clawbacks and the triggering events that are linked with clawbacks. Over the next few years, it is expected that digital transformation and sustainability will influence not only business economics as a whole but also clawback implementation and supervision. We justify this assumption based on recent research, which assumes that big data analytics and block chain technology have a positive impact on earnings, corporate governance, and audit quality (Yermack 2017).

We identified several overall limitations of empirical clawback research and thus wanted to make some recommendations for the field as a whole. First, empirical research to date has primarily focused on the US-American capital market, especially regulation after the Dodd-Frank Act (2010). Other regimes should be addressed in future research. In particular, it may be useful to explore the EU context due to the huge impact of the modernized shareholder rights directive (EC 2017). As clawback regimes and management compensation rules are

heterogeneous from an international perspective, we recommend conducting cross-national studies in different governance settings. Moreover, clawback measures should be more precise. Prior research mostly relied on a dummy variable to represent clawback adoption. However, a more detailed analysis on the firm-specific content of clawbacks and strength indices (Erkens et al. 2018; Brink et al. 2019) would be useful. This would involve a detailed content analysis of compensation reports with scoring methods. We recommend to use extended clawback variables to differentiate between the nature and range of clawbacks within companies. These analyses are important to explain under which circumstances clawbacks will lead to positive consequences with regard to accounting, corporate governance and corporate finance decisions.

Prior clawback research mainly focuses on consequences. We identified major research gaps with regard to the possible drivers of clawback adoption, mainly accounting and corporate finance determinants. We encourage future researchers to go one step further regarding the governance-related consequences of clawbacks and address ownership structure (e.g., different kinds of institutional investors), audit quality, sustainable corporate governance variables (e.g., ESG performance, board diversity), and country-related governance items (e.g., code law, shareholder rights, enforcement strength). To date, a rather low number of studies have applied moderator analyses, and no mediator analyses have been conducted. Moreover, accounting, corporate governance, and corporate finance variables may represent both determinants and consequences of clawbacks, and this potential bi-directional link should be tested in future studies.

From a methodological perspective, in line with recent empirical research on other corporate governance topics (e.g., board diversity, non-financial compensation), inverted and non-inverted U-shaped curves between clawback strength and specific measures related to accounting, corporate governance, and corporate finance (e.g., firm performance) should be tested. As self-selection bias is an important challenge in empirical clawback research, future studies should apply PSM (Shipman et al. 2017; Rosenbaum and Rubin 1983) in combination with diff-in-diff approaches. We found that a low number of studies used generalized method of moments (GMM) models and instrumental variables (IV), which are also useful for increasing the validity of archival studies with regard to endogeneity concerns (Wintoki et al. 2012). We also observed that archival studies are dominant and few experimental designs are applied.

Further research on the behavioral and individual attitudes of managers, shareholders, and other stakeholder groups is needed, as management compensation has been a controversial public topic since the 2008/09financial crisis. As no qualitative research designs have been applied so far, the collection of primary data via interviews, surveys, and case studies would represent a major contribution to the literature. Levine and Smith (2019) recently conducted an analytical model with a Monte Carlo simulation on the impact of clawbacks on earnings management as an alternative research method.

Finally, regarding the theoretical contributions of this study, we recognize that rather little attention has been paid to a sound theoretical foundation for clawback adoptions. While many studies have adopted principal agent theory, others did not

explicitly refer to a theoretical framework. Furthermore, other stakeholders (e.g., employees, customers, suppliers, the public) should be included in the theoretical foundation (e.g., stakeholder [agency] theory or legitimacy theory). We recommend explaining in detail the functions of clawback provisions with regard to diverse management theories, such as managerial power theory, recourse based theory, signaling theory, stewardship theory, and behavioral theories (e.g., motivating reasoning theory or prospect theory).

Last but not least, we mention the limitations of our study. Our vote counting method did not take into account the size of samples or the size of effects, and thus it represents a limited method for synthesizing evidence from multiple evaluations. This limitation can be overcome by performing a quantitative meta-analysis. However, the determinants and consequences of clawback adoption we included are too heterogeneous to conduct an overall meta-analysis. In addition, we included too few studies to conduct a specific meta-analysis of one topic, such as the impact of clawbacks on earnings quality. As it is expected that the research activity on clawbacks will increase over the next few years, future research should be able to conduct meta-analyses on empirical-quantitative clawback research.

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