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Real Earnings Management and Quality of Corporate Governance: A Meta-Regression Analysis*

Realne zarządzanie zyskami a jakość nadzoru korporacyjnego: metaregresja

Abstract

The goal of this study is to meta-analyse the results of 146 primary research studies examining how three categories of corporate governance – ownership structure (OS), gatekeepers (G), and management characteristics (MC) – affect real earnings management (REM). The application of meta-regression (MRA), which is a method for combining and analysing data from multiple studies, makes it possible to link effect sizes from primary studies into a single summary effect and to explain the variability among these effect sizes. The mean values of the partial correlation coefficients between corporate governance categories and REM are not statistically significant. However, the results of heterogeneity analysis show that family ownership and insider shareholding can be positively associated with REM. The analyst coverage seems to have a mitigating effect on REM, while external auditor quality does not. The study identifies several moderator variables that explain some of the structural and methodological heterogeneity in empirical results. The results on REM utilisation support the opportunistic view rooted in agency theory. The findings obtained confirm the need for further operationalisation of variables and an expanded analysis of various components of corporate governance.

Streszczenie

Celem tego badania jest przeprowadzenie metaanalizy wyników 146 pierwotnych badań, w których sprawdzono, w jaki sposób trzy kategorie nadzoru korporacyjnego – struktura własności (OS), gatekeepers (G) oraz charakterystyki osób zarządzających (MC) – wpływają na realne manipulowanie zyskami (REM). Zastosowanie metaregresji (MRA), która jest metodą łączenia i analizowania danych z wielu badań, pozwala na uwzględnienie efektów z badań pierwotnych, ich podsumowanie oraz wyjaśnienie zmienności tych efektów. Średnie wartości współczynników korelacji cząstkowej między kategoriami nadzoru korporacyjnego a REM nie są statystycznie istotne. Wyniki analizy heterogeniczności pokazują jednak, że własność rodzinna i insidersi mogą być pozytywnie powiązani z REM. Zainteresowanie analityków wydaje się mieć łagodzący wpływ na REM, podczas gdy jakość

zewnętrznego audytora nie wykazuje istotnego wpływu. W badaniu zidentyfiko-
wano kilka zmiennych moderujących, które wyjaśniają część heterogeniczności
strukturalnej i metodologicznej w wynikach empirycznych. Wnioski dotyczące
wykorzystania REM wspierają teorię agencji. Uzyskane wyniki wskazują potrzebę
dalszej operacjonalizacji zmiennych oraz rozszerzenia analizy różnych składowych
nadzoru korporacyjnego.

Introduction

Earnings management (EM) is a global practice of significant concern to corporate stakeholders due to its impact on a firm's performance [**Boachi, Mensah, 2022**]. It is also a key subject in management research, as evidenced by the rapidly growing number of publications in this area [**Krastev, Durana, Valaskova, 2020**]. While accrual-based earnings management (AEM) focuses on discretionary accruals[1], this paper addresses real earnings management (REM), which refers to practices that directly affect cash flows. **Roychowdhury** [**2006**] defines REM 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"[2]. The focus on REM is driven by a clear shift in managerial and research interest towards this type of EM [**Habib et al., 2022**], partly due to the significant legal liabilities and stiffer penalties imposed on AEM practices by the Sarbanes Oxley Act (SOX) in 2002[3]. According to Roychowdhury, REM is also more appealing to managers because it is less likely to attract the scrutiny of auditors or regulators than AEM, as it involves real operational decisions, such as pricing and production.

In identifying the research gap connected with REM practices, a key question arises: what impact does the corporate governance system have on these practices? A crucial stream in the management literature explores how elements of corporate governance system influence EM activities (e.g., **Chouaibi, Harres, Brahim** [**2018**], **García-Meca, Sánchez-Ballesta** [**2009**], **Ronen, Yaari** [**2008**]). According to **Leonidou, Katsikeas and Samiee** [**2002**] and **García-Meca and Sánchez-Ballesta** [**2009**], a meta-assessment of REM literature might be useful for several reasons. First, many researchers focus on only a few selected factors of the corporate governance system in relation to REM. In contrast, a meta-analytical approach makes it possible to consider a wider range of corporate governance aspects. Second, the results of meta-analyses are based on data from different time periods and regions, encompassing companies operating under diverse legal systems, which allows for a more comprehensive approach to earnings management. Finally, meta-analysis is particularly useful when explanatory variables reflecting corporate governance factors are measured differently across studies, which can lead to ambiguity in results. Meta-analysis, and especially meta-regression analysis (MRA), provides a tool to explain the drivers of this ambiguity. Given the need to synthesise findings, generalise conclusions and address conflicting results, meta-analysis was chosen as the research method for this study.

In this study, 1,564 empirical results were aggregated, hand-collected from 146 research publications on corporate governance and REM. The goal was to assess the potential impact of various corporate governance factors on real earning management. Following **Ronen and Yaari** [**2008**], corporate governance factors were divided into three categories: ownership structure (OS), gatekeepers (G), and management characteristics (MC). A meta-analysis was conducted to estimate the overall impact of these categories on REM, based on results from a wide array of studies. Moreover, meta-regression analysis was used to explore the impact of a wide set of moderator variables that drive the differences in findings across primary studies. Similar appli-

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[1]   Discretionary accruals – the part of total accruals which is not directly observable and easy to manipulate by the company.
[2]   More detailed information is provided in Appendix A.
[3]   SOX imposes considerably greater potential penalties on CEO/CFOs who engage in financial wrongdoing; therefore, risk-averse managers are likely to report lower earnings by reducing discretionary accruals following SOX [**Zhou, Lobo, 2010**].

cations of MRA in corporate finance research can be found in studies by **Ahamed et al.** [**2023**], **Bhaskar et al.** [**2023**], and **Dakhli** [**2022**].

Using univariate meta-averaging for each of the three corporate governance factor groups (OS, G, MC), the analysis found that the average effect for all three categories is small (close to zero) and statistically insignificant. However, MRA, considering a wide set of moderators, identified the key drivers behind the differences in partial correlations across studies. For ownership structure, insider and family participation was found to reduce the constraining effect of institutional investors on REM. Regional differences were also observed, with stronger effects in East Asia and the Pacific compared to North America, and in common law countries compared to civil law countries. The mitigating effect of gatekeepers on real earnings management was additionally empowered by the analyst's coverage. REM measurement was found to be significant in terms of the impact of ownership structure and management characteristics. Finally, control variables (especially profitability when considering ownership structure, leverage in the gatekeepers and management characteristics models, AEM in the management characteristics model) and the publication status of the article affect the research results.

The key contributions of this study are as follows. To the best of our knowledge, this is the first meta-regression analysis (MRA) examining the broad associations between REM and corporate governance. The study employed a comprehensive approach, considering a wide range of variables measuring the corporate governance system, including ownership structure, gatekeepers, and governance features. By synthesising the results of many studies, this research clarifies some of the ambiguities in the relationship between REM and corporate governance factors. For example, the study confirms the role of insiders in weakening the influence of institutional investors in curbing REM practices. Agency theory provides a useful lens for interpreting these results, particularly in confirming the positive role of analysts in reducing REM practices when external audit quality is robust.

The remainder of the paper is organised as follows. Section 2 describes EM theory, highlighting the shift in research from AEM to REM and emphasizing the importance of the corporate governance system in controlling EM. A literature review is provided focusing on EM studies conducted using meta-analysis. Section 3 offers a description of moderator variables relevant from the point of view of corporate governance. Section 4 outlines the data collection process, while Section 5 describes the meta-analysis method. Section 6 presents detailed research findings, and Section 7 discusses the results and concludes the paper.

Real earnings management and corporate governance

The debate on the impact of REM on companies' performance and value remains unresolved. Managers often prefer engaging in REM over AEM, particularly in the post-SOX period, because AEM practices are more likely to be detected by auditors and regulatory authorities [**Cohen, Dey, Lys, 2008**]. When viewing a company as a set of contracts [**Coase, 1937**], two dominant theoretical frameworks emerge to explain the tendency to use REM: the opportunistic view and the efficiency view [**Habib et al., 2022**].

The opportunistic view is linked to information asymmetry and agency theory. This perspective suggests that managers intentionally misinform financial statement users [**Habib et al., 2022**], leading to market failures by creating adverse selection and moral hazard problems. REM-induced adverse selection makes it difficult for capital providers to allocate resources efficiently, while moral hazard arises from stakeholders' inability to effectively monitor the actions of managers, potentially leading to decisions that prioritise managers' personal interests over those of other stakeholders. Proponents of the opportunistic view argue that REM negatively affects a company's long-term performance [**Cohen, Zarowin, 2010**; **Kothari, Mizik, Roychowdhury, 2016**; **Roychowdhury, 2006**]. The rationale behind this perspective is that managers, driven by short-term goals, exploit information asymmetry to manipulate profits, aiming to meet benchmarks and gain private benefits. This behaviour causes adverse selection and moral hazard problems and can limit a company's future performance. by undermining sustainable growth and long-term value [**Habib et al., 2022**].

On the other hand, the efficiency view, also known as the information view, is rooted in signaling theory. According to this perspective, REM can be used as a method of reducing information asymmetry in the capital market. Researchers in favour of the efficiency view argue that firms with the potential for stronger future performance may use REM as a signal to the market, indicating their ability to deliver favourable outcomes in the long term [**Al-Shattarat, Hussainey, Al-Shattarat, 2018**; **Gunny, 2010**].

The opportunistic view and the efficiency view can be considered dominant paradigms when explaining managers' behaviour regarding REM practices. However, other theories, such as socioemotional wealth (SEW) theory, provide additional perspectives. SEW theory suggests that family-controlled firms may limit REM practices to pass the business to future generations in a good shape [**Achleitner, Kaserer, Siciliano, 2014**].

Gillian and Starks [**1998**] define corporate governance as a system of laws, rules and mechanisms designed to regulate a company's operations. This system includes a variety of factors that help to overcome the consequences of information asymmetry and can also be used to limit REM practices. According to **Ronen and Yaari** [**2008**], corporate governance factors that influence EM can be grouped into three main categories: ownership structure (OS), gatekeepers (G), and management characteristics (MC).

Ownership structure matters in corporate governance because it determines who has the ultimate decision-making power in the company [**Kumar, Zattoni, 2015**]. Different groups of shareholders, such as institutional investors, insiders, and founding family members, may pursue different objectives, which can impact REM practices. For example, **Goh, Lee and Lee** [**2013**] found a significantly negative association between majority shareholdings and income-increasing REM after the Asian financial crisis, which is consistent with the incentive alignment hypothesis. This hypothesis suggests that concentrated ownership helps align the interests of controlling and non-controlling shareholders, thereby reducing earnings management [**Habib et al., 2022**].

Gatekeepers are a crucial component of the corporate governance system. **Coffee** [**2001**] defines gatekeepers as "reputational intermediaries who provide verification services to investors". They play a key role because they help reduce the agency problems and information asymmetry between well-informed insiders (e.g., managers or shareholders who control the company) and less informed outsiders (e.g., minority shareholders or external investors). Under signalling theory, gatekeepers can convey valuable signals about future economic growth to capital markets coming from firms with solid financial performance applying REM. Gatekeepers include both external and internal control factors (e.g., external audit quality and the strength of corporate governance) and the institutional environment (e.g., variables indicating the impact of legal regulations on REM).

The link between corporate governance and REM should also be viewed in terms of the characteristics of decision-makers and the way they are remunerated. An EM perspective requires a focus on management characteristics such as bonus compensation received by top-level managers, the CEO's professionalism, the independence of the board of directors, and the proportion of women on boards of directors. CEO compensation can affect REM. **Bergstresser and Philippon** [**2006**] claim that EM is higher if the CEO's compensation is heavily weighted toward the company's performance. REM may be associated with the CEO's professionalism, which is related to their financial expertise, age, and tenure. Prior empirical studies provide evidence that a CEO's financial expertise may constrain EM [**Kouaib, Jarboui, 2016**; **Matsunaga, Yeung, 2008**; **Sani, Abdul Latif, Al-Dhamari, 2020**]. Meanwhile, **Demers and Wang** [**2010**] conclude that younger managers tend to engage in less AEM and REM than older CEOs. The independence of the board of directors often leads to lower EM (e.g., **Klein** [**2002**], **Osma** [**2008**]). Prior empirical research shows an ambiguous relationship between gender and REM. Some previous studies found that women are less prone to engaging in opportunistic behaviour [**Krishnan, Parsons, 2008**], while being more likely to improve the quality of earnings [**Srinidhi, Gul, Tsui, 2011**]. Some other studies confirmed a negative relationship between gender and REM [**Arun, Almahrog, Aribi, 2015**; **Gavious, Segev, Yosef, 2012**; **Luo, Xiang, Huang, 2017**]. Meanwhile, **Gull, Nekhili, Nagati and Chtioui** [**2017**], **Sun, Liu, Lan** [**2011**], and **Peni and Vahamaa** [**2010**] report no significant link between the presence of a female director, audit committee or board member and a reduction in EM.

Moderator variables for meta-regression

The corporate governance determinants of REM were categorised into three key dimensions: ownership structure, gatekeepers, and management characteristics. Since the corporate governance measures in the three groups are fundamentally different, the meta-analysis was conducted separately for each group. Different sets of moderators were collected for each group based on their relevance, frequency of occurrence in the literature and ambiguity of results. Table 1B in Appendix B summarises the moderators for corporate governance measurement differences. These are all dummy variables with values equal to one if a characteristic is present in a primary study, and zero otherwise. In the case of ownership structure, the most prominent types of shareholders were examined: institutional, insider, and family ownership with institutional ownership taken as a base category[4]. In the gatekeepers category, external and internal audits, board characteristics, board independence, and analyst coverage were considered. In the case of management characteristics, managers' compensation – commonly explored in previous studies – was set as the base category in this paper. Additionally, moderators describing multiple CEO and director traits were analysed, including professionalism and gender.

Due to the significant differences in corporate governance systems across countries [**García-Meca, Sánchez-Ballesta, 2009**], moderators that capture structural heterogeneity are included [**Rusnak, Havranek, Horvath, 2013**]. These come in the form of dummy variables to reflect regional differences between North America; Europe and Central Asia; East Asia and Pacific countries and the rest of the world. This group of moderators is presented in Table 2B in Appendix B. The last group measures "methodological heterogeneity" and addresses differences among primary studies in terms of their empirical approach [**Havranek, Irsova, 2011**]. The moderators presented in Table 3B in Appendix B are designed to capture:
- differences in REM measurement,
- differences in effect size estimation characteristics,
- differences in data characteristics,
- differences in publication characteristics.

Data collection

The full process of preparing the research sample is outlined in Figure 1. The literature search began with the selection of a large sample of English-language publications focusing on EM. The initial search targeted titles and abstracts of primary studies accessible through the Google Scholar browser and databases such as Science Direct, JSTOR, and SSRN. Keywords such as "earnings management", "earnings manipulation", "managing earnings", and "manipulating earnings" were used. After preliminary screening, a database of 336 primary studies was built.

To be included in the final sample, a paper should meet specific criteria required for conducting a meta-analysis:
1) The study's focus is on REM or both REM and AEM;
2) The study investigates the relationship between REM consistent with the definitions provided by **Roychowdhury** [**2006**] as the dependent variable and factors influencing REM as independent variables;
3) The study reports empirical results required for a meta-analysis, along with information on the regression model and its coefficients, details about the sample size and its construct, and precision measures of the regression estimates, such as t-statistics, standard errors, and *p*-values.

A total of 184 papers met all three criteria, providing 2,007 unique regressions. These regressions were analysed to identify explanatory variables related to the corporate governance factors listed in Table 1B of Appendix B. Altogether, these factors could be found in 146 primary studies containing 1,584 unique regressions[5].

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[4] In meta-regression, the base, or reference, category serves as the benchmark variable against which other categories are compared in the analysis.

[5] In many cases, effect sizes associated with different categories (ownership structure, gatekeepers and management characteristics) could be found in the same regression. This explains why the aggregate number of primary studies and regressions shown separately for these

These primary studies were published between 2008 and 2021. They contained 4,999 effect sizes obtained from empirical research covering the timespan from 1983 to 2019. The full list of primary studies included in our research sample can be found in Appendix C.

Figure 1. Strategy for Literature Search

Preliminary dataset ⟹	336 unique primary studies
Selection criteria ⟹	Subject	General problem	Empirical content
Usefulness in the meta-analysis of different factors influencing REM ⟹	184 unique primary studies / 2,007 unique regressions
Usefulness in the meta-analysis of corporate governance factors (ownership structure, gatekeepers and management characteristics) influencing REM ⟹	146 unique primary studies / 1,584 unique regressions / 4,999 effect sizes

Separation of three dimensions of corporate governance: ownership structure, gatekeepers and management characteristics ⟹	**Ownership structure**	**Gatekeepers**	**Management characteristics**
	74 primary studies (69 peer-reviewed; 5 working papers / conference proceedings / dissertations) 871 regressions 1,641 effect sizes	121 primary studies (116 peer-reviewed; 5 working papers / conference proceedings / dissertations) 1,231 regressions 2,489 effect sizes	50 primary studies (49 peer-reviewed; 1 working paper) 463 regressions 869 effect sizes

Notes: This figure depicts the database search process and the number of studies added to the sample or rejected in each step.
Source: Authors' own elaboration.

Methodology

MRA is an extension of traditional meta-analysis. It is defined as "the regression analysis of regression analyses" [**Stanley, Jarrell, 1989**]. In empirical research fields where studies routinely report regression parameters as their main results, MRA provides a method for (1) synthesising effect sizes from a set of primary studies within a single summary effect, and (2) explaining the heterogeneity among these effect sizes by identifying study characteristics associated with this variation.

The effect size is the central unit of analysis to be aggregated in a meta-analysis. To account for differences in measurement across studies, the reported effects were transformed into partial correlation coefficients, following a well-established approach used in meta-analysis studies [**Abdullah, Doucouliagos, Manning 2015; Stanley, Doucouliagos, 2015**; **Havranek, Irsova, Zeynalova, 2018**; **Geyer-Klingeberg et al., 2019**; **Hang, Geyer-Klingeberg, Rathgeber, 2018**, among others]. In the meta-regression model, the effect sizes, the partial correlation coefficients r_{ij} (where i and j are the study and estimate subscripts) are regressed on a set of explanatory variables which quantify heterogeneity and common sources of bias. The meta-regression model can be defined as follows:

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categories is higher than the total number of unique primary studies and unique regressions that can be used to analyse corporate governance factors influencing REM.

$$r_{ij} = \beta_0 + \beta_1 SE(r_{ij}) + \sum_{l=1}^{L} \gamma_l Z_{ijl} + \varepsilon_{ij}, \text{ where } \varepsilon_{ij} \sim N\left(0; SE(r_{ij})\right), \tag{1}$$

where $SE(r_{ij})$ is the standard error of the partial correlations; ε is the error term. According to **Egger, Smith and Minder** [**1997**], the rejection of the null hypothesis, ($H_0 : \beta_1 = 0$), tests the presence of publication selection bias. The corresponding MRA parameter $\hat{\beta}_1$ measures the direction and magnitude of the bias. The estimate for the intercept, $\hat{\beta}_0$, is the mean partial correlation beyond publication selection. Moreover, Z denotes a set of variables capturing heterogeneity in the partial correlations. The estimates of the MRA coefficients $\hat{\gamma}_l$ measure the effect of the particular study characteristic on the effect sizes. Accordingly, the MRA variable Z can be interpreted as a moderator for the relationship between the respective corporate governance variables and REM. When estimating the meta-regression model, two important aspects, heteroscedasticity and within-study dependencies, are considered.

To address the first challenge of heteroscedasticity, all effect size estimations are carried out using weighted least squares (WLS), with the inverse of the squared standard errors as weights [**Stanley, 2005**; **2008**]. The second challenge comes from within-study dependencies. To account for this, models are estimated with robust standard errors clustered at the study level. This technique, commonly recognised as a best practice in MRA, mitigates the issue of correlated effect sizes [**Stanley, Doucouliagos, 2012**].

Results

Descriptive meta-statistics

Table 1 shows both unweighted and weighted meta-averages (means)[6] for the measurement differences across corporate governance categories, along with their respective 95% confidence intervals. Weights, in the form of inverse variance, were applied to the partial correlation coefficients to increase the influence of more precise studies in the sample.

Studies with higher precision report higher partial correlation values between internal audit with REM. Those measuring gatekeepers by analyst coverage (*Analyst Coverage* =–0.031 in the weighted meta-analysis) show statistically significant and the lowest correlation after weighting, suggesting that analyst attention is on average a stronger constraint on REM practices than other factors[7].

In the case of management characteristics (Panel C), the weighting alters the sign and value of the mean correlation for CEO duality and gender variables. This shift means that more precise studies tend to obtain higher correlation values for these variables.

Table 1. Meta-averages of corporate governance measurement differences

Panel A. Ownership structure								
			Unweighted			Weighted		
Table items	No. of obs.	No. of studies	Mean	95% conf. int.		Mean	95% conf. int.	
Institutional	473	31	–0.034	–0.034	0.012	–0.012	–0.021	0.003
Insider	230	26	–0.007	–0.017	0.004	–0.005	–0.012	0.002
Family	258	15	–0.002	–0.017	0.054	0.005	–0.011	0.021
Other	436	39	0.005	–0.008	0.018	0.006	–0.004	0.016
Overall	1,641	74	–0.010	–0.019	0.001	–0.010	–0.019	0.001

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[6]   The unrestricted WLS approach has been shown to be superior to the conventional fixed effects and random effects meta-analysis if a publication selection bias and heterogeneity are present [**Stanley, Doucouliagos, 2015**].

[7]   There is a correspondence between the p-value and the confidence interval, such that the p-value is greater than 0.05 only when the 95% confidence interval contains a zero value [**Borenstein et al., 2021**: 5].

Panel B. Gatekeepers								
			Unweighted			Weighted		
Table items	No. of obs.	No. of studies	Mean	95% conf. int.		Mean	95% conf. int.	
External audit	1,352	99	−0.006	−0.006	0.009	−0.004	−0.007	−0.001
Board	365	32	0.001	−0.014	0.014	0.001	−0.010	0.012
Institutional framework	224	27	0.009	−0.009	0.027	0.008	0.002	0.015
Board independence	198	22	0.002	−0.016	0.019	0.003	−0.008	0.013
Analyst coverage	134	15	−0.027	−0.052	−0.002	−0.031	−0.050	−0.011
Internal audit	128	12	−0.033	−0.050	−0.016	0.002	−0.043	0.047
Other	88	5	−0.014	−0.014	−0.002	−0.017	−0.038	0.005
Overall	2,489	121	−0.002	−0.008	0.004	−0.002	−0.008	0.004
Panel C. Management characteristics								
			Unweighted			Weighted		
Table items	No. of obs.	No. of studies	Mean	95% conf. int.		Mean	95% conf. int.	
Compensation	337	19	−0.004	−0.011	0.037	−0.004	−0.011	0.025
CEO turnover	38	2	−0.001	−0.008	0.007	−0.001	−0.006	0.005
CEO professionalism	283	18	−0.010	−0.025	0.006	−0.007	−0.022	0.008
CEO duality	116	14	−0.009	−0.035	0.017	0.003	−0.008	0.014
Gender	73	6	−0.007	−0.051	0.037	0.010	−0.021	0.040
Other	22	3	−0.044	−0.083	−0.004	−0.012	−0.033	0.010
Overall	869	50	−0.008	−0.016	0.010	−0.008	−0.016	0.001

Notes: This table shows the mean partial correlation coefficients for different subgroups. Variables are defined in Table 1B. Weighted = Each estimate is weighted by the inverse of the estimate's variance. Confidence intervals with robust standard errors are clustered at the study level.
Source: Authors' own elaboration.

The meta-averages for structural differences, including associations between REM and geographical regions, as well as between REM and legal systems, are shown in Table 4B (Appendix B). In all cases, the partial correlation coefficients are low and, in most instances, statistically insignificant, indicating that geographic location has little impact on REM. A statistically significant result is observed only for ownership structure estimates based on companies in the *Rest of the World* category. Similarly, the meta-averages do not show a significant impact of the legal system on REM.

The results in Table 5B, concerning methodological differences (Appendix B), show that for all three categories, variations in the way REM is measured do not significantly affect the meta-averages. However, for management characteristics, when REM is defined as the sum of *Ab CFO* and *Ab Prod*, this method of measurement is significantly distinct from other methods. In general, these findings contrast with **García-Meca and Sánchez-Ballesta [2009]**, who found that the operationalisation of AEM substantially affects its relationship with ownership structure. However, they explain that different ways of calculating AEM allow for a high degree of subjectivity. In the case of REM, all of the measures are based on **Roychowdhury [2006]** and calculated from unambiguous accounting categories, except for *Ab Exp*, which appears in the gatekeepers and management characteristics panels. Accounting for endogeneity, robust errors, and fixed or random effects generally does not result in statistically or economically significant meta-averages. Notable exceptions include studies in which endogeneity was not tested and where a significantly statistical weighted mean value was found for gatekeepers. Additionally, non-peer-reviewed studies report statistically significant weighted means for ownership structure, whereas peer-reviewed research articles do not.

Analysis of publication bias

Publication bias occurs when research results are selected for publication based on their statistical significance [**Stanley, Doucouliagos, 2012**]. According to **Sterne and Egger** [**2001**], asymmetry in funnel plots may indicate publication bias in meta-analysis. Funnel plots are constructed by placing the inverse of the standard errors of partial correlations (1/SE) on the vertical axis and the partial correlation coefficients on the horizontal axis. Both the funnel plots and histograms presented in Figure 2 (Appendix D) show relatively symmetrical results for each category, which may indicate that authors do not selectively report preferred results. This intuitive conclusion is confirmed by the statistical test of funnel plot asymmetry reported in Table 2.

Table 2. Publication bias analysis

Table items	(1) Ownership structure	(2) Gatekeepers	(3) Management characteristics
Mean effect ($\widehat{\beta}_0$)	−0.002 (−0.60)	−0.002 (−0.60)	−0.004 (−0.54)
Bias ($\widehat{\beta}_1$)	−0.425 (−1.50)	−0.020 (−0.08)	0.001 (0.01)
No. of observations	1,641	2,489	869
No. of studies	74	121	50

Notes: This table shows the results of the publication bias test by estimating Eq. (1) without the moderator variables Z. $\hat{\beta}_1$ measures the presence and magnitude of publication bias. $\hat{\beta}_0$ denotes the mean partial correlation corrected for publication bias The model is estimated by weighted least squares estimation using the inverse of the estimates' squared standard errors as weights. The *t*-statistics of the regression parameters reported in parentheses are based on standard errors clustered at the level of the individual studies.
Source: Authors' own elaboration.

The publication bias test is performed by estimating Eq. (1) without the moderator variables Z. The model is estimated by weighted least squares, using the inverse of the estimates' squared standard errors as weights. The t-statistics of the regression parameters reported in parentheses are based on standard errors clustered at the level of individual studies. β_1 measures the asymmetry in the funnel plot, and the results do not indicate publication bias. β_0 measures the true effect beyond publication bias. The corrected mean effects are very close to 0 for all three categories of corporate governance, indicating near-zero mean partial correlations after correcting for potential publication bias.

Analysis of heterogeneity

To explore the differences between studies and identify key factors of heterogeneity within the same regression, the extended MRA model shown in equation (1) was run, including the moderating variables Z. Table 3 shows the results of the heterogeneity analysis. As with the publication bias analysis, weighted least squares estimation was used, with inverse standard errors as weights, and t-statistics based on standard errors clustered at the survey level. For corporate governance measurement characteristics, REM measurement, world regions, and legal systems – measured by interdependent moderators – the primary category was assigned in each group of moderators. These categories were marked with asterisks in Tables 1B-3B (see Appendix B). This means that various aspects of structural and methodological differences should be interpreted relative to the base category. For example, in the case of regional differences, North America was assigned as the base category, meaning that regression parameters for other world regions indicate whether the relationship between corporate governance and REM in a particular part of the world is significantly different from that in North America.

Table 3. Heterogeneity analysis

	(1) Ownership structure	(2) Gatekeepers	(3) Management characteristics
Mean effect $(\widehat{\beta}_0)$	−0.017 (−0.02)	−0.429 (−0.47)	−0.139 (−0.06)
Bias $(\widehat{\beta}_1)$	1.561 (1.05)	0.042 (0.09)	−3.226*** (−3.75)
Corporate governance measurement differences			
Insider	0.015** (2.05)		
Family	0.025* (1.93)		
Other	0.032*** (5.18)		
Board characteristics		0.006 (1.06)	
Institutional framework		0.008 (1.57)	
Board independence		0.006 (1.13)	
Analyst coverage		−0.027*** (−3.11)	
Internal audit		0.008 (0.37)	
Other		− 0.025*** (−3.11)	
CEO turnover			0.002 (0.43)
CEO professionalism			0.003 (0.70)
CEO duality			0.023* (1.74)
Gender			0.012 (0.68)
Other			−0.013 (−1.57)
Structural heterogeneity moderators			
Europe and Central Asia	−0.003 (−0.35)	0.008 (1.22)	−0.009 (−0.32)
East Asia and Pacific	0.020*** (2.66)	−0.005 (−1.18)	−0.029 (−1.29)
Rest of the world	0.010 (1.53)	0.010 (1.54)	0.038* (1.71)
Common law	0.013** (2.07)	−0.001 (−0.21)	0.003 (0.17)
Differences in real earnings management measurement			
Ab CFO	0.011 (1.30)	−0.005 (−0.77)	0.004 (1.17)
Ab Exp	0.009 (1.33)	0.008 (0.94)	0.008* (1.79)
Ab Prod	−0.013* (−1.78)	0.001 (0.34)	−0.002 (−0.67)
Ab CFO & Exp	0.001 (0.05)	−0.001 (−0.10)	−0.014*** (−2.82)
Ab Exp & Prod	0.010* (1.81)	−0.001 (−0.07)	−0.006 (−1.34)
Other	0.025 (1.34)	0.012 (1.24)	0.004 (0.50)

	(1) Ownership structure	(2) Gatekeepers	(3) Management characteristics
Differences in effect size estimation characteristics			
Size	−0.005 (−0.36)	−0.009 (−1.32)	0.022 (0.81)
Profitability	0.017*** (2.94)	0.005 (1.26)	−0.004 (−0.52)
Loss	−0.015*** (−2.99)	0.001 (0.17)	−0.016 (−1.12)
Leverage	0.005 (1.36)	−0.009** (−2.51)	0.015*** (3.07)
MTB	0.003 (0.68)	0.008* (1.68)	−0.001 (−0.11)
AEM	−0.005 (−0.98)	0.001 (0.06)	0.009** (2.05)
Fixed effects	0.008 (1.59)	−0.006 (−1.49)	0.013 (1.63)
Endogeneity	−0.001 (−0.37)	0.004 (1.57)	−0.001 (−0.02)
Robust errors	−0.003 (−0.62)	0.003 (0.79)	−0.018** (−2.51)
Differences in data characteristics			
No. of observations	0.013 (1.51)	−0.001 (−0.38)	−0.027*** (−4.58)
Average year	−0.001 (−0.17)	0.001 (0.51)	0.001 (0.18)
Differences in publication characteristics			
Peer-reviewed	−0.027** (−2.24)	−0.017 (−1.48)	−0.003 (−0.37)
No. of. observations	1,641	2,489	869
No. of. studies	74	121	50

Notes: This table shows the results of the heterogeneity analysis using meta-regression as in Eq. (1). Variables are defined in Tables 1B-3B. All models are estimated by weighted least squares estimation using the inverse of the estimates' squared standard errors as weights. The t-statistics of the regression parameters reported in parentheses are based on standard errors clustered at the level of individual studies. ***, ** and * indicate significance on the 1%, 5% and 10% levels respectively.

Source: Authors' own elaboration.

Ownership structure and REM

All variables related to the measurement of ownership structure are statistically significant, meaning that certain types of ownership can differ in terms of REM mitigation. *Insider* ownership and *family* ownership seem to weaken this mitigating effect compared with *institutional* ownership, which was set as the base category. This result aligns more with agency theory and is in line with the findings of **Tang and Chen** [**2020**] and **Eng, et al.** [**2019**]. *Other* variables associated with ownership structure, such as individual investor ownership, ownership concentration, and the existence of a dual-class share system, strongly limit this mitigating effect compared with *institutional* ownership.

Gatekeepers and REM

In the case of gatekeepers, moderators measuring *external audit* quality are described by variables such as the size of an audit firm, auditor tenure, and auditor quality indices, which are set as the base category. As seen in Table 3, moderators such as *board characteristics*, *institutional framework*, *board independence*, and *internal audit* quality do not show substantially different effect sizes compared with the base category. Meanwhile, *analyst coverage* seems to have a stronger mitigating effect on REM, reducing the mean partial correlation for

gatekeepers by 0.027, which is in line with the results obtained by **Sohn** [**2016**] and **Ipino and Parbonetti** [**2017**]. Analysts can therefore be treated as "external monitors", a finding that challenges signaling theory, according to which firms with solid financial performance use REM to reduce information asymmetry in the capital market. Similarly, the negative value of 0.025 for the moderator *other*, which includes variables such as dummies for corporate governance reforms and composite corporate governance scores, can be interpreted along the same lines.

Management characteristics and REM

In analysing the relationship between management characteristics and REM, the *compensation* moderator serves as the base category. *CEO duality* is the only management characteristic that significantly differs in terms of effect size. When the CEO doubles as the chair of the board, a significantly weaker mitigating effect on REM is observed compared with top executive compensation mechanisms. This observation is in line with entrenchment theory, according to which a CEO who also chairs the board can exploit the position for personal gain, using REM to achieve those objectives [**Al-Haddad, Whittington, 2019**; **Nuanpradit, 2019**].

Structural differences

The coefficient for *East Asian and Pacific* countries is significant and positive in the case of the relationship between REM and ownership structure. These results indicate that ownership structure as a corporate governance mechanism is less effective at reducing REM in these countries. A similar result is observed for management characteristics in the *Rest of the World* category, which includes countries such as Bangladesh, Nigeria, South Korea, and Thailand. In these countries, the mitigating effect of management characteristics on REM seems to be weaker than in the United States.

A moderating effect of *common law* is also found in the ownership structure category. Countries with a common law system show a weaker relationship between ownership structure and REM reduction. While this might initially seem counterintuitive, it is important to note that the sample includes Asian and African countries that follow common law, which may contribute to the weaker mitigating effect.

Differences in real earnings management measures

REM has been measured in various ways by different researchers. One common approach is to calculate REM as an aggregate measure by combining abnormal cash flows from operations, abnormal discretionary expenses, and abnormal production costs [**Badertscher, 2011**]. This approach was used as the base category. Nevertheless, there are some significant deviations from this model. The strongest deviation is found in studies using the sum of abnormal cash flows and abnormal production costs in the management characteristic category. These studies tend to report partial correlations lower by 0.014 than in the base category. Similar deviations are found in studies analysing the relationship between ownership structure and REM when the latter is measured with abnormal production costs. In contrast, studies using alternative measures report weaker mitigating effects of corporate governance. In the case of ownership structure, primary studies using the sum of abnormal discretionary expenses and abnormal production costs report size effects higher by 0.01 compared with studies using *aggregate REM*. A similar pattern is in evidence in the management characteristics category when REM is measured using abnormal discretionary expenses.

Differences in estimation characteristics

The most significant variables in this section of moderators are connected with different control variables, though no clear trends are apparent. For instance, primary studies that use *leverage* as a control variable report partial correlations lower by 0.009 in the gatekeepers category, but higher by 0.015 in the management

characteristics category, compared to studies that do not control for leverage. Additionally, certain control variables are statistically significant only in one category. Higher effect sizes are observed in studies on ownership structure and REM when *profitability* is controlled for, and in studies examining the mitigating effect of management characteristics when *AEM* is used as a control variable. The first observation is confirmed by lower size effects in studies on ownership structure and REM when *loss* is included as a control variable.

Using a specific methodological approach in primary research seems to have no impact on reported results. No significant moderators were found to capture fixed effects or control for *endogeneity*, a surprising finding given the extensive discussion of endogeneity in the literature [**Abdallah, Goergen, O'Sullivan, 2015**; **Roberts, Whited, 2013**; **Schultz, Tan, Walsh, 2010**]. This may in part be because some studies do not correctly account for endogeneity (e.g., by not using natural experiments). One exception is the use of robust standard errors in primary studies management characteristics and REM, which seems to strengthen the negative relationship between these variables.

Data and publication characteristics differences

The number of observations per study appears to impact the relationship between corporate governance and REM in the management characteristics category. This indicates that primary studies with a higher number of observations report a stronger relationship between management characteristics and REM. Similarly, in the ownership structure category, primary studies published in *peer-reviewed* journals tend to report partial correlation coefficients lower by 0.027 compared to non-peer-reviewed journals. This suggests that more rigorous review processes may result in a tendency to publish findings that highlight a stronger mitigating role of ownership structure on REM.

Summary, discussion and further research

This paper presents a meta-analysis approach to determining the relationship between corporate governance mechanisms and REM. A broad sample of 146 primary studies is analysed, including both peer-reviewed and non-peer-reviewed articles, working papers and dissertations published between 2008 and 2021. The sample includes a total of 1,564 effect size estimates. To provide a comprehensive perspective on corporate governance, the concept of **Ronen and Yaari** [**2008**] was used, dividing corporate governance features into three separate categories: ownership structure, gatekeepers, and management characteristics. Separate basic and augmented meta-regression models were estimated for each category. The ambiguity of empirical results in the literature may suggest that publishers and editors do not show a preference for a particular type of result. The investigation confirmed this, showing no significant publication bias in the base model. Similarly, no statistically significant mean partial correlation was observed between corporate governance categories and REM. Most mean effects are small and close to zero. Accordingly, on average, the meta-analysis does not indicate a statistically significant mean effect across the literature.

Ownership structure appears to have a differential effect on limiting REM. Compared to institutional investors' ownership, insider and family ownership weakens this limiting effect on REM. These results are consistent with agency theory and argue against socioemotional wealth theory. The findings on family ownership and REM are in line with the results of **Mutschmann et al.** [**2018**], which show that family representation on the board is associated with an increase in REM. The results on the association between earnings management and ownership structure indicate a different role for AEM and REM than suggested by **García-Meca and Sánchez-Ballesta** [**2009**]. Indeed, García-Meca and Sánchez-Ballesta did not find significant correlations between AEM and ownership structure, except for board ownership.

Most factors in the gatekeepers category do not show significant differences compared to external audit quality, which was the base category. The only exception is *analyst coverage*, which suggests that companies reduce REM practices to avoid negative market evaluations, thereby reducing information asymmetry. This

finding is not in line with signalling theory, which predicts that firms use REM to shape market perceptions of their future growth. The results for gatekeepers differ from those of other meta-analyses, which, for example, highlight significant negative relationships between earnings management and board independence and expertise [**García-Meca, Sánchez-Ballesta, 2009**; **Lin, Hwang, 2010**]. This difference may be due to the larger research sample, different methodology, or the use of different moderators.

In the management characteristics category, the only variable that showed a significant deviation from the base category was *CEO duality*. When the CEO also chairs the board, REM usage is higher compared to the base category, suggesting managerial entrenchment consistent with agency theory. This finding contrasts with **García-Meca and Sánchez-Ballesta** [**2009**], who did not confirm a positive correlation between AEM and CEO duality.

The multidimensional MRA includes a set of variables measuring differences between various regions of the world and the methodological characteristics of primary studies. The study identifies significant regional differences in the effect of corporate governance mechanisms on REM, particularly in ownership structure and management characteristics. The effect of ownership structure on REM is weaker in common law countries, which is in line with **Francis, Hasan and Li** [**2016**]. This could mean that companies in stronger legal systems prefer REM over AEM because REM is more difficult to prosecute in court. Methological aspects, such as how REM is measured, the inclusion of specific control variables, the number of observations in primary studies, and the quality of publications, contribute significantly to explaining the heterogeneity of results.

Several limitations of the study should be noted. First, some categories are underrepresented in the available primary studies, especially in the heterogeneity analysis, where moderators such as *CEO turnover* are based on relatively few studies. Additional effect size estimations would help confirm observed patterns or identify new relationships. Another limitation is the method of REM measurement used in primary studies. Despite being widely adopted, the method proposed by **Roychowdhury** [**2006**] —based on abnormal production costs, abnormal operational cash flows and abnormal discretionary expenses calculation – has been criticised for potential inaccuracies [**Cohen, Pandit, Zach, 2020**; **Siriviriyakul, 2020**]. **Srivastava** [**2019**] finds that commonly used measures can misidentify competitive strategies as REM, leading to potential spurious relationships between firm characteristics and REM. The geographical distribution of the sample is another limitation, as it is dominated by East Asian and Pacific countries (43% of the overall sample and more than 45% of the ownership structure category), compared with *Europe and Central Asia* and *North America* (17% and 14% respectively). The high concentration of ownership and weak corporate governance systems in these regions could influence the results. Further limitations arise from the nature of meta-analysis. Our research sample includes effect sizes from primary studies across different periods and regions. While this allows for comprehensive conclusions, the obtained relationships may overlook cultural or regulatory factors that regional dummies do not capture. Incorporating moderators that address these aspects could lead to more accurate results.

MRA makes it possible to synthesise findings, and this study attempted to capture geographical differences within a comprehensive approach to corporate governance categories – ownership structure, gatekeepers and management characteristics. Different characteristics may be more effective in reducing REM in certain regions, suggesting that future research could focus on regional studies. Expanding the analysis of specific components within these categories could be the subject of future research. For example, for the gatekeeper category, the impact of internal and external auditing on REM can be examined in separate MRAs. An interesting challenge in terms of directions for further research would be an attempt to find common links between ownership structure, gatekeepers and management characteristics and their impact on REM, which would be possible by using meta-analytical structural equation modeling (MASEM). Additionally, it would also be worth investigating whether the stability of the macro-environment has an impact on the mitigating effect of the corporate governance system in REM.

In terms of practical implications, the findings may be useful for investors as companies with greater analyst coverage may engage in less REM, potentially increasing investor confidence in the quality of reported

information. Surprisingly, both univariate and heterogeneity analyses reveal no significant mitigating effect of external and internal audits on REM. This implies that regulators may not be able to rely on big audit firms or audit committees to act as effective gatekeepers in protecting stakeholders from the effects of REM.

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Appendix A

Roychowdhury proposes three separate metrics to measure real earnings management, each scaled by company size (sales or assets – current or deferred). The first is based on opearting cash flow (OCF), the second on production costs (costs of goods sold (COGS) plus change in inventory), and the third on discretionary expenditures (advertising, sales, general and R&D). "Normal" levels of these three categories are calculated using a regression function. For example, "normal" cash flows from operations for each year (industry-year models are used) are calculated as a linear function of sales (S) and the change in sales (ΔS):

$$\frac{OCF_t}{A_{t-1}} = \beta_0 \frac{1}{A_{t-1}} + \beta_1 \frac{S_t}{A_{t-1}} + \beta_2 \frac{\Delta S_t}{A_{t-1}} + \epsilon_t$$

where: OCF_t is industry cash flow in period t, and A_{t-1} is the lagged total industry assets. Abnormal levels of OCF, which may indicate real earnings management practices, are calculated as differences between current levels and "normal" levels predicted by regression models.

Appendix B

Table 1B. Moderators for the Measurement of Corporate Governance

Moderator	Description
	Panel A: Ownership structure (OS)
Institutional*	= 1 if study measures OS as institutional ownership, O otherwise
Insider	= 1 if study measures OS as insiders ownership, O otherwise
Family	= 1 if study measures OS as family ownership, O otherwise
Other	= 1 of study measures OS in a different way than above, O otherwise
	Panel B: Gatekeepers (G)
External Audit*	= 1 if study measures G as external audit quality, O otherwise
Board Characteristics	= 1 if study measures G as boards' of directors characteristics, O otherwise
Institutional Framework	= 1 if study measures G as the scrutiny of accounting practices forced by IFRS, GAAP adoption or SOX passage, O otherwise
Board Independence	= 1 if study measures G as the independence of board members, O otherwise
Analyst Coverage	= 1 if study measures G as the level of analysts' attention devoted to given companies, O otherwise
Internal Audit	= 1 if study measures G as the quality of internal audit, O otherwise
Other	= 1 of study measures G in a different way than above, O otherwise
	Panel C: Management characteristics (MC)
Compensation*	= 1 if the study measures MC as the level and composition of top executives' compensation and bonus, O otherwise
CEO's Turnover	= 1 if the study measures MC as the turnover of the CEO, O otherwise
CEO's Professionalism	= 1 if the study measures MC as the CEOs professionalism, O otherwise
CEO's Duality	= 1 if the study measures MC as the CEOs duality, O otherwise
Gender	= 1 if the study measures MC as the female presence in board of directors, O otherwise
Other	= 1 if the study measures MC in a different way than above, O otherwise

Notes: This table shows moderators variables for measurement differences of corporate governance together with their definitions. Asterisks indicate omitted base categories.

Source: Authors' own elaboration.

Table 2B. Moderators for Structural Heterogeneity

Moderator	Description
Panel A: Regional moderators	
North America*	= 1 if the country/countries from the primary study research sample are classified into North America region, 0 otherwise
Europe and Central Asia	= 1 if the country/countries from the primary study research sample are classified into Europe and Central Asia region, 0 otherwise
East Asia and Pacific	= 1 if the country/countries from the primary study research sample are classified into East Asia and Pacific region, 0 otherwise
Rest of the world	= 1 if the country/countries from the primary study research sample are classified into different world region than above, 0 otherwise
Panel B: Other structural heterogeneity moderators	
Common Law	= 1 if the country/countries included in the primary study research sample have legal origin in common-law system, 0 otherwise

Notes: This table shows moderators variables for structural heterogeneity and their definitions. Asterisks indicate omitted base categories.
Source: Authors' own elaboration.

Table 3B. Moderators for Methodological Heterogeneity

Moderator	Description
Panel A: Differences in REM measurement	
Aggregate REM*	= 1 if the dependent variable in the primary study is an aggregate measure of abnormal cash flows from operations, abnormal discretionary expenses and abnormal production costs, 0 otherwise
Ab CFO	= 1 if the dependent variable in the primary study is a measure of abnormal cash flows from operations, 0 otherwise
Ab Exp	= 1 if the dependent variable in the primary study is a measure of abnormal discretionary expenses, 0 otherwise
Ab Prod	= 1 if the dependent variable in the primary study is a measure of abnormal production costs, 0 otherwise
Ab CFO & Ab Exp	= 1 if the dependent variable in the primary study is an aggregate measure of abnormal cash flows from operations and abnormal discretionary expenses, 0 otherwise
Ab Exp & Ab Prod	= 1 if the dependent variable in the primary study is an aggregate measure of abnormal discretionary expenses and abnormal production costs, 0 otherwise
Other	= 1 if authors have applied different methodology to real earnings measurement, 0 otherwise
Panel B: Differences in effect size estimation characteristics	
Size	= 1 if the primary study research included size as control variable, 0 otherwise
Profitability	= 1 if the primary study research included profitability as control variable, 0 otherwise
Loss	= 1 if the primary study research included loss as control variable, 0 otherwise
Leverage	= 1 if the primary study research included leverage as control variable, 0 otherwise
MTB	= 1 if the primary study research included market-to-book as control variable, 0 otherwise
AEM	= 1 if the primary study research included accrual-based earnings management based on Jones model (1991) as control variable, 0 otherwise
Fixed Effects	= 1 if the primary study research applied fixed effects model, 0 otherwise
Endogeneity	= 1 if the primary study research controlled for the endogeneity problem, 0 otherwise
Robust Errors	= 1 if the primary study research regression was estimated based on clustered robust standard errors, 0 otherwise
Panel C: Differences in data characteristics	
No. of Observations	= A number of observations analyzed in primary study
Average Year	= Average year of the data under examination
Panel D: Differences in publication characteristics	
Peer-reviewed	= 1 if the journal is peer-reviewed, 0 otherwise

Notes: This table shows moderators variables on methodological differences and their definitions. Asterisks indicate omitted base categories.
Source: Authors' own elaboration.

Table 4B. Meta-averages of Structural Differences

Panel A. Ownership structure								
			Unweighted			Weighted		
Region	No. of obs.	No. of studies	Mean	95% conf. int.		Mean	95% conf. int.	
North America	226	18	−0.002	−0.012	0.079	−0.003	−0.008	0.002
Europe and Central Asia	275	11	−0.016	−0.040	0.008	−0.006	−0.013	0.006
East Asia and Pacific	749	37	−0.002	−0.011	0.007	−0.002	−0.010	0.007
Rest of the world	485	13	−0.020	−0.030	−0.011	−0.022	−0.043	−0.002
Common law	272	25	−0.010	−0.026	0.005	−0.006	−0.010	−0.001
Civil law	788	37	−0.005	−0.017	0.008	−0.002	−0.013	0.010
Overall	1,641	74	−0.010	−0.019	−0.001	−0.006	−0.013	0.001
Panel B. Gatekeepers								
			Unweighted			Weighted		
Region	No. of obs.	No. of studies	Mean	95% conf. int.		Mean		95% conf. int.
North America	929	45	−0.003	−0.008	0.002	−0.001	−0.005	0.005
Europe and Central Asia	443	24	0.017	0.001	0.033	0.002	−0.006	0.011
East Asia and Pacific	1,064	53	−0.007	−0.015	0.002	−0.001	−0.011	0.078
Rest of the world	405	22	−0.006	−0.023	0.012	0.001	−0.010	0.012
Common law	1,340	56	−0.001	−0.008	0.005	−0.003	−0.006	−0.001
Civil law	951	54	−0.004	−0.017	0.009	−0.008	−0.019	0.004
Overall	2,489	121	−0.002	−0.008	0.004	−0.002	−0.007	0.002
Panel C. Management characteristics								
			Unweighted			Weighted		
Region	No. of obs.	No. of studies	Mean	95% conf. int.		Mean	95% conf. int.	
North America	429	17	0.001	−0.002	0.005	−0.003	−0.010	0.040
Europe and Central Asia	42	7	−0.029	−0.055	−0.004	−0.021	−0.049	0.080
East Asia and Pacific	335	18	−0.018	−0.032	−0.004	−0.010	−0.020	0.001
Rest of the world	63	8	0.002	−0.049	0.053	0.030	0.002	0.059
Common law	482	23	0.001	−0.007	0.009	−0.001	−0.006	0.005
Civil law	365	24	−0.016	−0.028	−0.004	−0.014	−0.023	−0.004
Overall	869	50	−0.008	−0.016	0.010	−0.004	−0.010	0.002

Notes: This table shows the mean partial correlation coefficients for different subgroups. Variables are defined in Table 2B. Weighted = Each estimate is weighted by the inverse of the estimate's variance. Confidence intervals with robust standard errors are clustered at the study level.

Source: Authors' own elaboration.

Table 5B. Meta-averages of Methodological differences

Panel A. Ownership structure								
			Unweighted			Weighted		
Dependent variables and other factors	No. of obs.	No. of studies	Mean	95% conf. int.		Mean	95% conf. int.	
Aggregate REM	603	50	−0.007	−0.019	0.006	−0.004	−0.012	0.003
Ab CFO	285	39	−0.007	−0.020	0.007	−0.002	−0.009	0.004
Ab Exp	215	42	−0.001	−0.011	0.009	−0.003	−0.008	0.001
Ab PROD	200	38	−0.032	−0.053	0.011	−0.025	−0.049	0.002
Ab CFO & Exp	64	11	−0.004	−0.020	0.012	−0.002	−0.009	0.005
Ab Exp & Prod	184	20	−0.008	−0.032	0.016	0.002	−0.009	0.012
Other	102	9	−0.021	−0.041	0.001	−0.007	−0.050	0.036
Fixed effects	1,123	58	−0.008	−0.017	0.001	−0.003	−0.008	0.002

Dependent variables and other factors	No. of obs.	No. of studies	Mean	95% conf. int.		Mean	95% conf. int.	
No fixed effects	518	21	−0.014	−0.030	0.001	−0.020	−0.037	0.002
Endogeneity	618	31	−0.009	−0.024	0.005	−0.005	−0.011	0.001
No endogeneity	1,023	50	−0.010	−0.020	0.001	−0.006	−0.015	0.003
Robust errors	660	39	−0.003	−0.011	0.005	−0.002	−0.007	0.003
No robust errors	981	36	−0.015	−0.026	0.004	−0.010	−0.022	0.002
Peer-reviewed	1530	69	−0.012	−0.020	−0.003	−0.007	−0.014	−0.001
Not peer-reviewed	111	5	0.015	0.006	0.025	0.017	0.001	0.033
Overall	1,641	74	−0.010	−0.019	0.001	−0.010	−0.019	0.001
Panel B. Gatekeepers								
			Unweighted			Weighted		
Dependent variables and other factors	No. of obs.	No. of studies	Mean	95% conf. int.		Mean	95% conf. int.	
Aggregate REM	795	76	−0.004	−0.017	0.010	−0.002	−0.011	0.007
Ab CFO	369	71	−0.001	−0.012	0.010	−0.004	−0.011	0.003
Ab Exp	393	76	0.009	−0.009	0.026	0.007	−0.011	0.025
Ab Prod	377	72	−0.002	−0.012	0.009	0.001	−0.007	0.007
Ab CFO & Exp	162	19	−0.001	−0.026	0.026	−0.011	−0.013	0.009
Ab Exp & Prod	328	34	−0.017	−0.028	0.006	−0.008	−0.010	0.005
Other	65	8	0.015	0.002	0.028	0.015	0.001	0.030
Fixed effects	2,113	96	−0.001	−0.007	0.006	−0.005	−0.008	−0.001
No fixed effects	376	30	−0.009	−0.021	0.003	0.007	−0.001	0.015
Endogeneity	862	45	0.004	−0.008	0.017	0.002	−0.006	0.010
No endogeneity	1,627	90	−0.005	−0.011	0.001	−0.005	−0.009	−0.001
Robust errors	1,281	64	−0.003	−0.010	0.003	−0.003	−0.006	0.001
No robust errors	1,208	58	−0.001	−0.011	0.010	−0.001	−0.013	0.012
Peer-reviewed	2,411	116	−0.003	−0.009	0.003	−0.003	−0.007	0.002
Not peer-reviewed	78	5	0.025	−0.001	0.051	0.012	−0.005	0.030
Overall	2,489	121	−0.002	−0.008	0.004	−0.002	−0.008	0.004
Panel C. Management characteristics								
			Unweighted			Weighted		
Dependent variables and other factors	No. of obs.	No. of studies	Mean	95% conf. int.		Mean	95% conf. int.	
Aggregate REM	300	30	−0.008	−0.020	0.005	−0.001	−0.006	0.005
Ab CFO	123	27	0.003	−0.007	0.014	0.001	−0.006	0.008
Ab Exp	148	27	0.001	−0.012	0.014	0.001	−0.007	0.008
Ab Prod	145	26	−0.014	−0.028	0.003	−0.009	−0.017	−0.001
Ab CFO & Exp	40	8	−0.017	−0.041	0.007	−0.018	−0.044	0.009
Ab Exp & Prod	105	14	−0.021	−0.030	−0.012	−0.017	−0.029	−0.005
Other	8	3	−0.001	−0.044	0.042	0.006	−0.002	0.014
Fixed effects	639	40	−0.006	−0.015	0.003	−0.003	−0.010	0.005
No fixed effects	230	13	−0.011	−0.029	0.073	−0.006	−0.015	0.003
Endogeneity	287	25	−0.003	−0.014	0.072	0.003	−0.003	0.090
No endogeneity	582	30	−0.010	−0.021	0.013	−0.007	−0.015	0.002
Robust errors	651	27	−0.006	−0.015	0.002	−0.005	−0.012	0.002
No robust errors	248	23	−0.011	−0.032	0.010	0.007	−0.004	0.018
Peer-reviewed	807	49	−0.008	−0.017	0.001	−0.004	−0.011	0.003
Not peer-reviewed	62	1	−0.003	-	-	−0.004	-	-
Overall	869	50	−0.008	−0.016	0.010	−0.008	−0.016	0.001

Notes: This table shows the mean partial correlation coefficients for different subgroups. Variables are defined in Table 3B. Each estimate is weighted by the inverse of the estimate's variance. Confidence intervals with robust standard errors are clustered at the study level.

Source: Authors' own elaboration.

Appendix C

List of Studies Included in the Meta-analysis
G- category Gatekeepers, OS- category Ownership structure, MC- category management characteristics

[G]   Abdul Rahman R., Hj Omar N., Rahman A., Muda R. [2018], Islamic ethical values of corporate top leadership and real earnings management, *International Journal of Law and Management*, 60 (3): 869–884, https://doi.org/10.1108/IJLMA-03-2017-0029.

[OS, MC]   Achleitner A.-K., Günther N., Kaserer C., Siciliano G. [2014], Real earnings management and accrual-based earnings management in family firms, *European Accounting Review*, 23 (3): 431–461.

[OS, G, MC]   Al-Absy M. S. M., Ku Ismail K. N. I., Chandren S. [2019], Corporate Governance Mechanisms, Whistle-Blowing Policy and Real Earnings Management, *International Journal of Financial Research*, 10 (6): 265, https://doi.org/10.5430/ijfr.v10n6p265.

[OS, G]   Al-Absy M. S. M., Ku Ismail K. N. I., Chandren S., Al-Dubai, S. A. A. [2020], Involvement of Board Chairmen in Audit Committees and Earnings Management: Evidence from Malaysia, *The Journal of Asian Finance, Economics and Business*, 7 (8): 233–246, https://doi.org/10.13106/jafeb.2020.vol7.no8.233.

[OS]   Alawag G. [2021], Business group opportunism: the difference in real earnings management between parent firms and nonparent firms, *Asian Journal of Accounting Research*, 6 (2): 246–261, https://doi.org/10.1108/AJAR-07-2020-0046.

[OS, G, MC]   Aleqab M. M., Ighnaim M. M. [2021], The impact of board characteristics on earnings management, *Journal of Governance and Regulation*, 10 (3): 8–17, https://doi.org/10.22495/jgrv10i3art1.

[G, MC]   Alhadab M. [2018], The impact of executive compensation and audit quality on accrual-based and real-based earnings management: Evidence from Jordan, *Corporate Ownership and Control*, 15 (2-1): 209–219, https://doi.org/10.22495/cocv15i2c1p7.

[G]   Alhadab M. M. [2017], Real and Accrual Earnings Management around Initial Public Offerings in Jordan, *International Business Research*, 11 (1): 204, https://doi.org/10.5539/ibr.v11n1p204.

[G, MC]   Alhadab M., Clacher I. [2018], The impact of audit quality on real and accrual earnings management around IPOs, *The British Accounting Review*, 50 (4): 442–461, https://doi.org/10.1016/j.bar.2017.12.003.

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[OS, G]   Alhadab M., Nguyen T. [2018], Corporate diversification and accrual and real earnings management, *Review of Accounting and Finance*, 17 (2): 198–214, https://doi.org/10.1108/RAF-06-2016-0098.

[OS, G, MC]   Al-Haddad L., Whittington M. [2019], The impact of corporate governance mechanisms on real and accrual earnings management practices: evidence from Jordan, *Corporate Governance: The International Journal of Business in Society*, 19 (6): 1167–1186, https://doi.org/10.1108/CG-05-2018-0183.

[G]   Alhebri A. A., Al-Duais S. D. [2020], Family businesses restrict accrual and real earnings management: Case study in Saudi Arabia, *Cogent Business & Management*, 7 (1), 1806669, https://doi.org/10.1080/23311975.2020.1806669.

[MC]   Alhmood M. A., Shaari H., Al-Dhamari R. [2020], CEO Characteristics and Real Earnings Management in Jordan, *International Journal of Financial Research*, 11 (4): 255, https://doi.org/10.5430/ijfr.v11n4p255.

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[OS, G]   Ashraf B. N., Qian N. [2021], The Impact of Board Internationalization on Real Earnings Management: Evidence From China, *SAGE Open*, 11 (3), 215824402110326, https://doi.org/10.1177/21582440211032640.

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[G]   Cai G., Li W., Tang Z. [2020], Religion and the Method of Earnings Management: Evidence from China, *Journal of Business Ethics*, 161 (1), 71–90, https://doi.org/10.1007/s10551-018-3971-6.

[OS, G, MC]   Chang L.-L., Guan Y.-D., Hsiao D. F. [2017], An exploratory study of female directors' constraint on real earnings management, *Corporate Management Review*, 37 (2): 31–85.

[G]   Chaur-Shiuh Young C.-S.,Tsai L.-C., Chen C.-H., Liao S.-T. [2012], *Board Characteristics and Real Earnings Management*, advance online publication, https://doi.org/10.6226/NTURM2012. OCT.R12027.

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[G]   Chouaibi J., Harres M., Ben Brahim N. [2018], The Effect of Board Director's Characteristics on Real Earnings Management: Tunisian-Listed Firms, *Journal of the Knowledge Economy*, 9 (3): 999–1013, https://doi.org/10.1007/s13132-016-0387-3.

[G]   Chowdhury S. N., Eliwa Y. [2021], The impact of audit quality on real earnings management in the UK context, *International Journal of Accounting & Information Management*, 29 (3): 368–391, https://doi.org/10.1108/IJAIM-10-2020-0156.

[OS, G, MC]   Cohen D. A., Dey A., Lys T. Z. [2008], Real and Accrual-Based Earnings Management in the Pre- and Post-Sarbanes-Oxley Periods, *The Accounting Review*, 83 (3): 757–787.

[G]   Cohen D. A., Zarowin P. [2010], Accrual-based and real earnings management activities around seasoned equity offerings, *Journal of Accounting and Economics*, 50 (1): 2–19.

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[OS, G, MC]   Demers E., Wang Ch. [2010], The impact of CEO career concerns on accruals based and real earnings management, *SSRN Electronic Journal*, 10.2139/ssrn.1562428.

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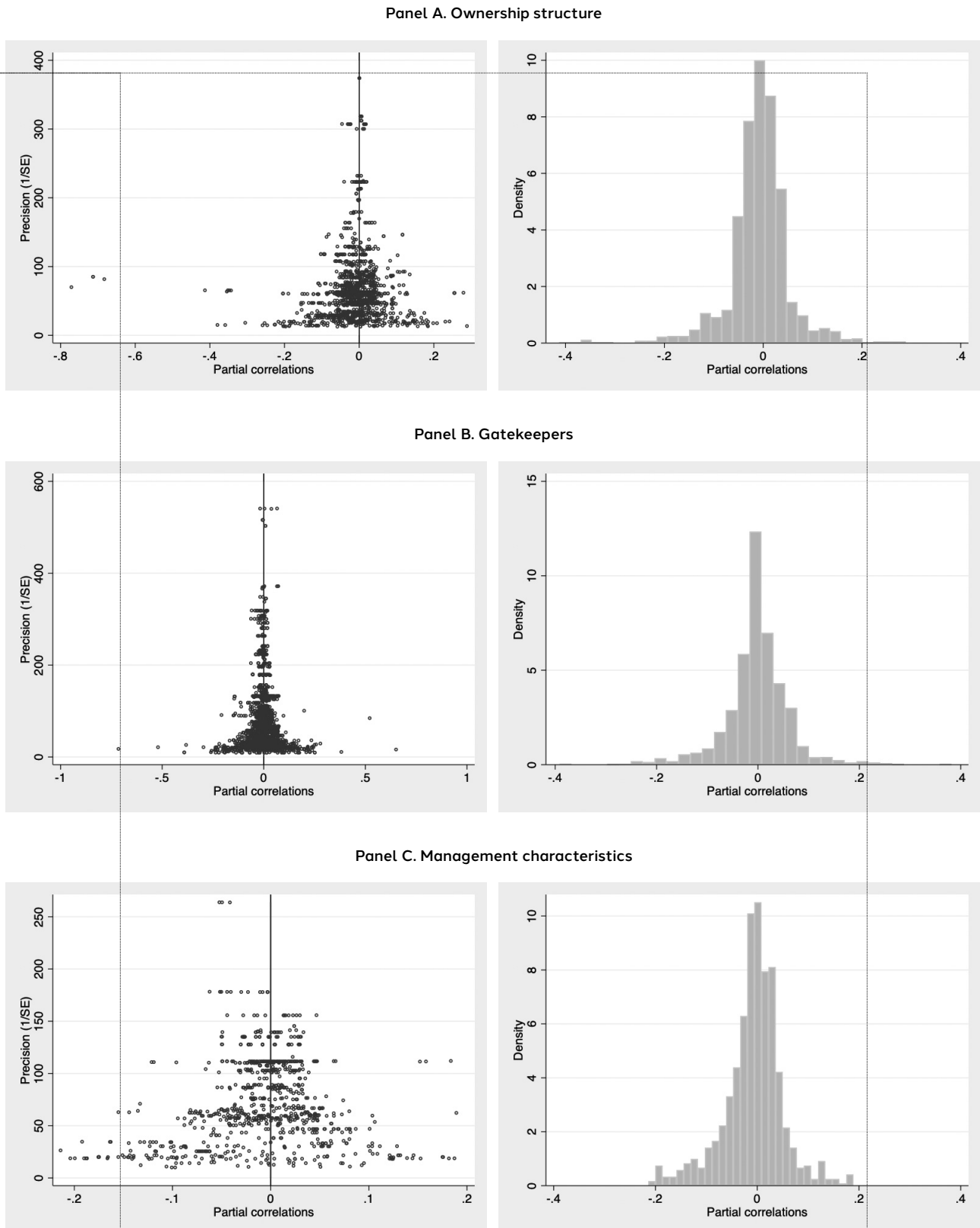
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Appendix D

Figure 2. Funnel Plots

Panel A. Ownership structure

Panel B. Gatekeepers

Panel C. Management characteristics

Notes: The funnel plots (left column) show the partial correlation coefficients calculated from the primary studies plotted against their precision, which is the inverse of the partial correlation coefficients' standard errors. The histograms of the partial correlation coefficients (right column) show the distribution of the effect estimates.

Source: Authors' own elaboration.