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Ownership structure and real earnings management: A meta-analysis

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ABSTRACT

This article examines the relationship between ownership structure and real earnings management (REM) by applying a meta-analysis of 808 effect size estimates from 49 primary studies. We explore how institutional investors, family owners, and insiders relate to REM across the literature, assess publication selection bias, and identify factors contributing to the heterogeneity of reported results. The findings reveal publication selection bias in studies on institutional investors; after correcting for this bias, their relationship with REM appears to be insignificant. Family ownership similarly shows no significant mean effect, while insider ownership exhibits a consistent, though small, negative association with REM. Heterogeneity analysis indicates that the mitigating role of family and insider ownership is context-dependent, appearing stronger in Western country settings, consistent with cultural differences across institutional environments, while legal and macroeconomic factors explain little of the variation in reported estimates. Results are also sensitive to methodological choices, particularly the measurement of REM and controls for endogeneity. The findings of this meta-analysis provide insights for policymakers and researchers aiming to better understand the conditional relationship between ownership and earnings quality.

1. Introduction

The Wall Street Journal's November 2019 headline, "Ironing Out an Investing Mystery", highlighted the persistent tendency of listed companies to avoid disclosure of financial losses. This observation is consistent with empirical evidence presented by [Zweig \(2019\)](#), who finds that companies with a return on equity between 0% and 1% face a higher risk of reporting losses, suggesting that some firms have incentives to conceal poor performance.

Earnings management (EM) is a global phenomenon that raises significant concerns among corporate stakeholders, particularly given the mixed evidence regarding its implications for firm performance. For example, [Chakroun and Amar \(2022\)](#) report a negative relationship between EM and firm performance, measured by return on assets, whereas [Lee et al. \(2016\)](#) find that firms with **stronger underlying performance and greater growth opportunities tend to engage in higher levels of EM**. Earnings manipulation generally takes two forms: accrual-based earnings management (AEM) and real earnings management (REM). This paper focuses on REM because of its growing

importance in the modern corporate landscape. The Sarbanes-Oxley Act (SOX) of 2002 imposed stringent controls and severe penalties on accounting misstatements, making the manipulation of discretionary accruals (AEM) significantly riskier for managers. Consistent with this argument, [Ewert and Wagenhofer \(2005\)](#) show that tighter accounting standards improve earnings quality while simultaneously increasing the marginal benefits of REM, leading managers to substitute toward costlier real activities manipulation. Furthermore, they argue that an endogenous substitution exists between accounting and REM, resulting solely from market reactions. Empirical research confirms this substitution. [Cohen et al. \(2008\)](#) document a significant decline in AEM and a rise in REM following the introduction of SOX. Likewise, [Zang \(2012\)](#) shows that managers choose between REM and AEM according to their relative costs and the sequential timing of these strategies. Because real activities must be manipulated before the fiscal year ends, accrual manipulation becomes a substitute after year-end. The shift from AEM to REM carries profound, real-world implications. Unlike AEM, which is confined to accounting entries, REM involves altering a firm's core operational activities, such as overproducing to lower the cost of goods

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sold or reducing R&D expenses to meet short-term earnings targets. Such actions, which executives admit to undertaking (Graham et al., 2005), can have tangible, long-term adverse consequences for a firm's competitive position and future performance, making REM arguably more destructive to fundamental firm value (Gunny, 2010; Kothari et al., 2016). Moreover, understanding the drivers of REM is essential for policymakers seeking to assess the unintended consequences of regulation and to design mechanisms extending beyond accounting compliance. For investors and company boards, focusing on REM is crucial because REM can mask weaknesses in operational and investment decision-making.

The corporate governance system is associated with EM (Chouaibi et al., 2018; García-Meca & Sánchez-Ballesta, 2009; Ronen & Yaari, 2008). Corporate governance is a broad concept, typically divided into external and internal mechanisms. In this paper, we focus on one internal mechanism: ownership structure as a critical aspect of corporate governance that determines who holds ultimate decision-making power within the firm (Kumar & Zattoni, 2015). We address three key objectives: (1) to synthesize the relationship between ownership structure and REM through the lens of theoretical frameworks; (2) to assess the presence of publication selection bias; and (3) to explain the heterogeneity in reported results arising from methodological and contextual factors. We define corporate ownership by the identity of owners, focusing on three major shareholder types: institutional investors, families, and insiders. The relationship between each ownership type and REM is examined through the lens of theoretical frameworks such as agency theory and signaling theory.

In this study, we account for heterogeneity, which stems from the fact that primary studies' results often depend on study design and data-related factors, such as the country or region from which the data originate, the legal system, the sample period, the macroeconomic situation, and the measurement of the dependent variable. To synthesize the numerous results obtained and address the challenge of publication selection bias, we use meta-analysis in the form of meta-regression analysis (MRA), an established quantitative research method for systematic reviews in management and economic sciences (Carney et al., 2011; Geyskens et al., 2009, or Kysucky & Norden, 2016, among many others).

The relationship between ownership structure or ownership concentration and corporate performance has been meta-analyzed in the previous literature (e.g., Heugens et al., 2009; Iwasaki & Mizobata, 2019; Sánchez-Ballesta & García-Meca, 2007; Wang & Shailer, 2013). Similarly, many meta-analyses on the relation between EM and various financial aspects such as audit quality or corporate governance have been published (García-Meca & Sánchez-Ballesta, 2009; Inaam & Khamoussi, 2016; Lin & Hwang, 2010). However, research synthesizing the relationship between EM and ownership structure is rare. Most studies focus on corporate governance systems rather than specific elements like ownership structure. García-Meca and Sánchez-Ballesta (2009), for example, analyze board and ownership associations with AEM in 35 primary studies and find no significant association between ownership concentration and lower levels of earnings manipulation. Kabaciński et al. (2022) uncover regional differences in the association between institutional ownership and REM, while Mutschmann and Hasso (2018) conclude that institutional ownership slightly mitigates REM. By contrast, the evidence on family ownership is mixed. Mutschmann et al. (2018) report a negative relationship, whereas Nowicki (2024) finds a positive one.

Our study contributes to the literature in four distinct ways. First, we provide the first large-scale synthesis focused exclusively on REM. Unlike prior meta-analyses that focus on accrual-based methods or examine single ownership categories in isolation (e.g., García-Meca & Sánchez-Ballesta, 2009; Kabaciński et al., 2022), we provide a simultaneous comparative analysis of institutional, family, and insider ownership. This provides a more integrated understanding of how different governance mechanisms are associated with real earnings manipulation.

Second, by applying meta-regression methods to detect and correct for publication selection bias, we show that the widely cited negative association between institutional ownership and REM is, at least in part, attributable to publication selection bias.¹ Third, we extend the theoretical framework by showing that the association between ownership structure and REM varies systematically across broad cultural settings. Finally, we systematically map how methodological choices—such as the measurement of REM and endogeneity controls moderate empirical outcomes, providing guidance for future research design.

The remainder of the paper is structured as follows: The next section presents the theoretical framework underpinning REM and ownership structure. Section 3 outlines the methodology, Section 4 presents the selection of moderator variables, Section 5 details the data collection process, Section 6 presents the results, Section 7 discusses the key findings, and Section 8 concludes with the implications of the findings and directions for future research.

2. Theoretical background

EM remains a critical area of research, primarily due to its significant association with company performance and its implications for firm value. The shift toward REM is often attributed to its lower detectability; unlike accrual manipulation, REM is harder for auditors and regulators to scrutinize, particularly in the post-SOX regulatory environment (Cohen et al., 2008). However, this opacity comes at a cost: because REM involves altering operational decisions (such as overproduction or cutting R&D) it has direct implications for operational cash flows and investment decisions and can adversely affect a firm's long-term fundamental value.

Because REM involves changes to firms' real operating activities rather than merely accounting adjustments, understanding why managers engage in these practices requires a theoretical framework that explains the incentives underlying such decisions. The literature generally distinguishes between two competing perspectives, the efficiency and opportunistic views, which offer contrasting explanations for managers' use of REM. These perspectives also provide the theoretical basis for examining how ownership structure may shape managers' incentives to engage in REM.

2.1. Theoretical perspectives on REM

The rationale behind REM practices is typically analyzed through two dominant theoretical lenses: the efficiency perspective and the opportunistic perspective (Habib et al., 2022). The efficiency view, rooted in signaling theory, posits that managers use REM to reduce information asymmetry by signaling confidence in future performance to the capital market (Al-Shattarat et al., 2018; Gunny, 2010). In contrast, the opportunistic view, aligned with agency theory, argues that managers manipulate earnings for personal benefit, thereby increasing information asymmetry and leading to adverse selection and moral hazard. These myopic actions can negatively affect a company's long-term performance (Cohen & Zarowin, 2010; Kothari et al., 2016; Roychowdhury, 2006).

The efficiency and opportunistic perspectives provide the overarching theoretical framework for this study. Specifically, the efficiency perspective is grounded in signaling theory, whereas the opportunistic perspective draws primarily on agency theory. More specific mechanisms, including the monitoring, alignment, entrenchment, and investor distraction hypotheses, are derived primarily from agency theory and explain how different ownership structures shape managers' incentives to engage in REM.

These competing perspectives provide the theoretical basis for understanding ownership structure as a governance mechanism, as different ownership arrangements can either constrain or facilitate REM depending on incentive alignment, monitoring effectiveness, and the potential for entrenchment. Although agency theory provides the

dominant framework for explaining governance mechanisms, it does not fully capture the distinctive objectives of family-controlled firms, where non-financial considerations often play a central role. To address this limitation, socioemotional wealth (SEW) theory provides an additional theoretical lens, particularly for family firms. Unlike agency theory, which emphasizes the relationship between a principal and an agent, with a particular focus on financial incentives and control mechanisms, SEW emphasizes non-financial objectives and emotional attachment to the business (Hernández-Perlines et al., 2023). SEW theory posits that family owners prioritize non-financial goals, such as reputation, identity, and the desire for sustainable and intergenerational continuity; these priorities encourage more prudent behavior and discourage the short-termism associated with EM practices (Achleitner et al., 2014; Habib et al., 2022).

2.2. Ownership structure as a corporate governance mechanism

The theoretical perspectives discussed above imply that ownership structure plays an important role in shaping managers' incentives to engage in REM. Different ownership types vary in their monitoring capacity, investment horizons, and incentives, leading to contrasting theoretical predictions regarding their association with REM. Ownership structure is a key internal mechanism of corporate governance. Gillan and Starks (1998) define corporate governance as the system of laws, rules, and factors governing company operations. Within this broader framework, ownership structure determines monitoring incentives and the distribution of decision-making power within the firm.

Consistent with these competing perspectives, ownership structure may either constrain opportunistic REM through effective monitoring or permit strategic REM when managers use operational decisions to credibly signal future performance (Habib et al., 2022). Accordingly, depending on the underlying theoretical perspective, ownership structure may either constrain opportunistic REM or facilitate strategic REM used to signal favorable future prospects. While ownership structure can be analyzed from various dimensions, this study focuses on ownership type, as it significantly shapes monitoring incentives and is closely tied to decision-making authority and economic interests (Kumar & Zattoni, 2015). Accordingly, we examine how different ownership types relate to monitoring incentives and managerial behavior, and how these differences are associated with REM.

Because ownership types differ in their objectives, monitoring capacity, and incentives, the theoretical perspectives outlined above generate distinct predictions regarding the relationship between each ownership type and REM. We therefore develop separate hypotheses for institutional, family, and insider ownership.

2.2.1. Institutional ownership

Institutional investors differ in their investment horizons and monitoring effectiveness. Prior literature often characterizes long-term institutional investors as informed monitors that constrain REM (Chung et al., 2002; Ronen & Yaari, 2008), whereas short-term or transient institutional investors may encourage REM by increasing pressure on managers to achieve short-term performance targets (Duggal & Millar, 1994; Njah & Jarbou, 2013). However, investment horizon is not the only factor that moderates the relationship between institutional ownership and REM. Garel et al. (2021) show that when institutional investors experience attention-grabbing shocks in unrelated parts of their portfolios, they temporarily reduce their monitoring intensity of portfolio firms, creating an opportunity for managerial opportunism. Managers of firms with distracted institutional shareholders exploit this temporary reduction in monitoring by engaging in EM.

Taken together, these competing arguments suggest that institutional ownership may either constrain or encourage REM, depending on the monitoring incentives and attention of institutional investors. Accordingly, we formulate the following hypotheses:

H1. Institutional ownership is associated with REM.

H1a. According to the monitoring hypothesis, institutional ownership is negatively associated with REM.

H1b. According to the institutional investor opportunism and distraction hypotheses, institutional ownership is positively associated with REM.

2.2.2. Family ownership

Family control gives rise to competing theoretical predictions regarding REM. The SEW perspective predicts lower REM because families prioritize stability, long-term legacy preservation and reputation (Achleitner et al., 2014). By contrast, the family entrenchment hypothesis posits that controlling families may use REM to protect private benefits or maintain control, particularly when external monitoring is weak (Prencipe et al., 2008; Wang, 2006). These competing theoretical perspectives suggest that family ownership may either discourage or facilitate REM, depending on whether socioemotional wealth preservation or entrenchment incentives dominate. Accordingly, we propose the following hypotheses:

H2. Family ownership is associated with REM.

H2a. According to socioemotional wealth theory, family ownership is negatively associated with REM.

H2b. According to the entrenchment hypothesis, family ownership is positively associated with REM.

2.2.3. Insider ownership

Insider ownership is associated with REM through two competing theoretical mechanisms. The alignment hypothesis suggests that as insider ownership increases, managerial and shareholder interests become more closely aligned, thereby reducing managers' incentives to engage in REM (Goh et al., 2013). Conversely, the entrenchment hypothesis posits that insiders may exploit their power to secure personal gain, increasing earnings manipulation (De Miguel et al., 2005; Mellado & Saona, 2020; Teshima & Shuto, 2008).

Therefore, theory predicts negative and positive associations between insider ownership and REM, leading to the following hypotheses:

H3. Insider ownership is associated with REM.

H3a. According to the alignment hypothesis, insider ownership is negatively associated with REM.

H3b. According to the entrenchment hypothesis, insider ownership is positively associated with REM.

The hypotheses formulated above suggest that ownership structure is associated with REM. However, the expected direction of this relationship differs both across ownership types and across competing theoretical perspectives within each ownership category. Table 1 summarizes hypotheses H1-H3 and their theoretical foundations.

2.3. Drivers of heterogeneity

Heterogeneity refers to variation in effect sizes that exceeds what can be attributed to sampling error alone. In the context of this meta-analysis, heterogeneity implies that the association between ownership structure and REM is not uniform, but rather conditional on contextual and methodological factors. This phenomenon can be attributed to variations in study populations, designs, methods, and empirical settings. Prior research demonstrates that the relationship between ownership structure and REM is far from uniform. Some studies find a positive relationship between a certain ownership type and REM, while others find negative or neutral associations. For instance, Sakaki et al. (2017) report a negative relationship between stable institutional ownership and REM, while Kaidoński et al. (2020) find no general relationship in Poland but note a weak negative correlation for long-

Table 1

Hypotheses and theoretical foundations for the relationship between ownership structure and REM.

Hypothesis	Ownership type	Underlying theory	Theoretical mechanism	Theoretical rationale	Expected relationship with REM
H1	Institutional				
H1a	Institutional	Agency theory	Monitoring hypothesis	Effective monitoring by institutional investors reduces managers' incentives to engage in REM	(−)
H1b	Institutional	Agency theory	Investor opportunism/distracton	Short investment horizons or temporary investor distraction reduce monitoring effectiveness, increasing managers' opportunities to engage in REM.	(+)
H2	Family				
H2a	Family	SEW theory	Preservation of socioemotional wealth	The preservation of non-financial goals (e.g., legacy, reputation, and family control) discourages short-term value-destroying REM.	(−)
H2b	Family	Agency theory	Family entrenchment	Controlling families may use REM to preserve private benefits when external monitoring is weak.	(+)
H3	Insider				
H3a	Insider	Agency theory	Alignment hypothesis	Greater alignment between managers' and shareholders' interests reduces incentives to engage in REM.	(−)
H3b	Insider	Agency theory	Entrenchment hypothesis	Greater insider ownership strengthens managerial entrenchment, increasing managers' ability and incentives to engage in REM	(+)

term institutional ownership. [Achleitner et al. \(2014\)](#) find a negative link between family control and REM in German-listed companies, while [Eng et al. \(2019\)](#) report a positive association between family ownership and REM in the U.S. and China. Regarding insider ownership, [Potharla and Shette \(2022\)](#) show a varying association based on ownership size, while [Shayan-Nia et al. \(2017\)](#) find no link between insider ownership and REM in financially distressed Malaysian companies.

These conflicting findings suggest that the ownership–REM relationship is contingent on factors beyond ownership type alone. Taking this evidence into consideration, identifying the sources of heterogeneity is crucial for explaining the wide dispersion of empirical findings. Broadly, this heterogeneity arises from two sources: contextual influences, such as national culture and institutional environments, and methodological differences across primary studies. Accordingly, the following sections discuss these two sources of heterogeneity in turn.

2.3.1. Cultural differences

National culture plays a critical moderating role in shaping EM practices. Drawing on [Hofstede's \(1980\)](#) cultural dimensions, countries high in individualism tend to value personal accountability and transparency, potentially reducing REM. Conversely, high power distance cultures may tolerate hierarchical decision-making with less scrutiny, facilitating opportunistic behavior. Furthermore, in societies with low uncertainty avoidance, there may be greater acceptance of ambiguous financial reporting ([Han et al., 2010](#); [Paredes & Wheatley, 2017](#)). These cultural characteristics may be correlated with both the effectiveness of ownership oversight and the motivation of senior management to engage in REM. Thus, cultural context is not merely a regional characteristic but an institutional factor that may shape the effectiveness of corporate governance mechanisms ([Hofstede et al., 2010](#)).

The theoretical perspectives developed in Section 2.2 suggest that these cultural dimensions may interact directly with different ownership structures. For instance, the alignment hypothesis for insider ownership may be more potent in cultures high in individualism. Research confirms that such cultures are associated with greater transparency and accountability ([Salter & Niswander, 1995](#)), conditions under which aligning managers' and shareholders' interests is likely to be more effective. Conversely, the entrenchment hypothesis could be more relevant in high power distance cultures, which may tolerate less scrutiny of controlling insiders or families, thereby facilitating opportunistic REM. These links between culture and EM are empirically supported in the literature ([Han et al., 2010](#)). Similarly, the SEW perspective in family firms might be stronger in cultures with high uncertainty avoidance, where a preference for stability aligns with preserving the firm for the long term.

Beyond these theoretical arguments, empirical research also suggests that national culture is linked to ownership structures themselves. Some studies indicate that cultural dimensions are associated with ownership concentration, which in turn is associated with corporate governance practices ([Sacristán-Navarro et al., 2022](#)) and earnings quality ([Han et al., 2010](#); [Lyu et al., 2017](#)). Social connections among corporate insiders tend to be stronger in collectivist societies, reducing the effectiveness of corporate monitoring and exacerbating agency problems. [Bartosik-Purgat and Hadryś-Nowak \(2014\)](#) further suggest that family ownership is associated with higher power distance, which may reinforce family entrenchment and increase the likelihood of opportunistic REM. Finally, [Aberg et al. \(2025\)](#) show that the relationship between stewardship and SEW in family firms is contingent on cultural dimensions, particularly power distance and uncertainty avoidance.

Given this context, we expect that national culture will moderate the ownership–REM relationship:

H4. National culture moderates the relationship between ownership structure and REM.

2.3.2. Structural and methodological sources of heterogeneity

Heterogeneity arises because the expected value of an empirical estimate depends heavily on the research choices made by authors; failing to account for this variation can cause bias at the meta-level ([Stanley & Doucouliagos, 2012](#)). Following [Geyer-Klingenberg et al. \(2019\)](#), we classify these sources of variation into two categories: structural heterogeneity, which reflects genuine differences in the underlying economic relationship (e.g., due to different cultural or legal environments), and methodological heterogeneity, which stems from differences in study design and estimation techniques. This distinction is essential in meta-analysis, as it separates variation driven by economic context from variation introduced by empirical implementation choices.

In the context of REM, methodological variation is particularly acute. Differences in the measurement of REM (e.g., abnormal production, discretionary expenses, cash flow manipulation), operationalization of ownership, sample period, estimation techniques, and model specifications can all lead to variations in reported results. These choices are often not neutral, as they can systematically alter both the magnitude and even the sign of estimated relationships. Prior meta-analytic work confirms that such methodological variation is systematically associated with differences in reported effect sizes in corporate governance and accounting research (e.g., [Geyer-Klingenberg et al., 2020](#); [Gupta & Chauhan, 2023](#)). Consequently, two studies examining the same ownership type may reach opposite conclusions simply because they use different REM proxies, aggregation levels, or econometric approaches. This makes comparability across studies particularly challenging and

reinforces the need for a structured synthesis approach.

To account for this, we model these methodological factors as moderators in our meta-regression. Specifically, we capture variation in research design through variables reflecting (i) the proxy used to measure REM, (ii) ownership measurement definitions, (iii) sample characteristics such as country coverage and time period, and (iv) econometric choices including endogeneity controls and estimation techniques. This leads us to our final hypothesis:

H5. Research sample composition and method choices moderate the relationship between ownership structure and REM.

3. Methodology

To synthesize the fragmented empirical evidence and rigorously account for publication selection bias, we employ meta-regression analysis (MRA). MRA expands on traditional meta-analysis and is described as “the regression analysis of regression analyses” (Stanley & Jarrell, 1989). In fields of empirical research where regression parameters are commonly reported as key outcomes, MRA offers a way to combine effect sizes from multiple primary studies into a single overall effect and explain the variability among these effect sizes by identifying study characteristics linked to this variation. By integrating regression estimates from a large number of primary studies, MRA provides a more precise estimate of the underlying relationship while explicitly accounting for heterogeneity across studies.

While estimates of any primary study are subject to its specific research design, MRA explicitly controls for study-specific characteristics, such as the estimation technique, model specification, variable definitions, and other author-specific methodological choices. This ability to explicitly model design-induced variation is a key advantage of MRA over conventional narrative reviews or simple meta-analytic averages. Due to its distinctive features, MRA has become a common method for research synthesis in business and management research (among many others, Bajzik, 2021; Bhaskar et al., 2023; Białkowski & Perera, 2019; Bogaert & Boone, 2016; Carney et al., 2011; Doucouliagos et al., 2012; Fernau & Hirsch, 2019; Geyskens et al., 2009; Huang et al., 2020; Pérez-Calero et al., 2019; Song et al., 2018; Van Iddekinge et al., 2018).

Our analysis follows a two-step meta-regression approach in line with current best practices in meta-regression analysis (Cook et al., 2026; Havránek et al., 2020). First, we estimate basic models to assess the mean relationship between each ownership type (institutional, family, and insider) and REM, as well as to test for publication selection bias. Second, we estimate augmented models incorporating a comprehensive set of moderator variables to explain heterogeneity in effect sizes, capturing differences in study design, data characteristics, measurement of REM, and key methodological choices such as control for endogeneity.

3.1. Effect size estimates

The effect size is the foundation of meta-regression analysis, which measures the strength of the relationship between selected variables (Irsova et al., 2024). In the primary studies of our sample, the effect size is the regression coefficient, which reflects the estimated strength and direction of the association between ownership structure and REM. However, because primary studies differ in how these variables are operationalized, as well as in model specification and included controls, the resulting coefficients are not directly comparable across studies.

We chose the partial correlation coefficient as it provides a standardized, unitless measure of the relationship, which is essential for synthesis when primary studies operationalize variables differently (Abdullah et al., 2015; Geyer-Klingenberg et al., 2019; Hang et al., 2018; Havranek et al., 2018, among others). It is important to note that the partial correlation coefficient is a purely statistical effect size, indicating

the direction and strength of an association rather than its direct economic magnitude (Geyer-Klingenberg et al., 2020). Although converting regression coefficients into partial correlations introduces additional variation, this variation reflects differences in model specification across primary studies rather than a limitation of the conversion procedure itself. We therefore treat it as a source of heterogeneity and explicitly account for it in the augmented meta-regression models through moderator variables capturing differences in study design and model specification (Stanley & Doucouliagos, 2012). The partial correlation coefficient can be calculated as follows:

$$r_{ij} = \frac{t_{ij}}{\sqrt{t_{ij}^2 + df_{ij}}} \quad (1)$$

where t_{ij} represents the t -statistics reported in the primary study, df_{ij} denotes the degrees of freedom, with i as the subscript for the estimate ($i = 1, \dots, m$), and j as the subscript for the study ($j = 1, \dots, n$).

The standard error of the partial correlation is estimated as follows:

$$SE(r_{ij}) = \sqrt{\frac{(1 - r_{ij}^2)}{df_{ij}}} \quad (2)$$

Relevant data, including the t -statistics and degrees of freedom, were manually gathered from each primary study regression model to estimate partial correlations and the corresponding standard errors. Since degrees of freedom are rarely mentioned in articles, information on the number of observations and explanatory variables in each regression is used to approximate the degrees of freedom.

3.2. Basic meta-regression model

The basic meta-regression model is used to assess the presence of publication selection bias. When publication selection is present, the reported effect sizes positively correlate with its standard error, *ceteris paribus*. Otherwise, they will be independent (Stanley & Doucouliagos, 2012). This relationship is tested with the following equation:

$$r_{ij} = \beta_0 + \beta_1 SE(r_{ij}) + \varepsilon_{ij}, \quad (3)$$

where r is the partial correlation coefficient between the independent and the dependent variables, $SE(r)$ is the standard error of the partial correlation, ε is the error term, and i and j are estimate and study subscripts, respectively. If the null hypothesis that $\beta_1 = 0$ is rejected, then it can be expected that there is a publication selection bias (Egger et al., 1997). The β_0 measures mean partial correlation, assuming that $SE(r)$ is close to zero. If the null hypothesis that $\beta_0 = 0$ is rejected, then it could be said that there is a genuine effect beyond the publication selection bias (Stanley, 2008).

3.3. Augmented meta-regression model

Reported estimates of the relationship between ownership structure and REM may differ because primary studies vary in their data, model specification, estimation methods, and variable definitions. To explain this heterogeneity, we augment the basic MRA model by incorporating a set of moderator variables that capture these study characteristics. The selected moderators are described in the following section. Thus, the objective of the augmented model is to explain the variation of effect sizes by identifying study characteristics that are associated with this variation using the following equation:

$$r_{ij} = \beta_0 + \beta_1 SE(r_{ij}) + \sum_{l=1}^L \gamma_l Z_{ijl} + \varepsilon_{ij}, \quad (4)$$

where Z denotes the vector of moderator variables capturing heterogeneity in partial correlations, and all other terms are defined as above.

The coefficient γ reflects the moderating role of the particular study characteristic on the effect size. β_1 is interpreted as in the basic regression, and β_0 is a conditional intercept, i.e., the expected partial correlation corrected for publication selection when all moderators equal zero. Because continuous moderators are not mean-centered, this reference point typically lies outside the observed range of the data. Therefore, the intercept should not be interpreted as an adjusted average effect and is not directly comparable to the unconditional mean effect reported elsewhere in the study. Consequently, substantive interpretation should focus primarily on the moderator coefficients rather than on the intercept level. Accordingly, the MRA variable Z_{ijl} can be interpreted as a moderator for the relationship between the respective ownership variables and REM. As for the basic MRA model, we estimated model (4) by WLS and report standard errors clustered at the study-level.

3.4. Specification of the meta-regression models

Two econometric issues are particularly important when estimating meta-regression models: heteroscedasticity and within-study dependence (Geyer-Klingenberg et al., 2020; Irsova et al., 2024).

Heteroscedasticity arises from the non-constant variance in the error term because the effect size estimates collected from different primary studies naturally have different levels of precision. To address heteroscedasticity, which is a common challenge in meta-analysis in business and economics, we estimate all meta-regression models using unrestricted Weighted Least Squares (WLS), with weights equal to the inverse of the squared standard errors (Stanley, 2005, 2008). This approach assigns greater weight to more precise estimates, effectively addressing the inherent heteroscedasticity of meta-analytic data (Geyer-Klingenberg, 2022). We followed Stanley and Doucouliagos (2017), who demonstrate in their simulation analysis that unrestricted weighted least squares meta-regression outperforms both fixed-effects and random-effects models, particularly in the presence of publication bias.

A second econometric issue is the dependence among effect sizes reported within the same primary study. This dependence arises because primary studies frequently report multiple regression estimates based on the same sample, implying that these observations are not statistically independent. To account for this dependence, all meta-regression models are estimated with study-level clustered standard errors, which represent standard practice in MRA (Stanley & Doucouliagos, 2012).

4. Selection of moderator variables

Heterogeneity arises when reported estimates of the same underlying relationship differ across primary studies beyond what can be explained by sampling variation alone (Geyer-Klingenberg et al., 2020). Understanding these differences is one of the principal objectives of MRA because it helps explain why empirical findings diverge across studies. Therefore, the vector Z in Eq. (4) represents the variables moderating the heterogeneity. Since moderators are often dummy variables, they indicate the presence (or absence) of a particular study characteristic. The coefficients of vector γ capture the contribution of each moderator to the reported effect size. Following the recommendations of Geyer-Klingenberg et al. (2020), we classify the moderator variables into conceptually distinct groups reflecting variable measurement, data characteristics, methodological choices, institutional environment, publication characteristics, and sample composition. This classification provides a structured framework for explaining heterogeneity in the reported relationship between ownership structure and REM.

Several moderator variables are categorical; consequently, their coefficients are interpreted relative to a baseline (reference) category. Unless otherwise stated, the reference category is selected as either the most comprehensive specification or the largest subgroup in the sample. The rationale for the chosen reference category is discussed for each group of moderators where relevant.

4.1. REM measurement

As previously mentioned, in our research, we applied the definition of REM proposed by Roychowdhury (2006). The general definition is as follows: REM = Abnormal levels of operating cash flow + Abnormal levels of discretionary expenditures + Abnormal levels of production costs.¹ The aggregate three-component measure (REM_Total) serves as the baseline category because it most comprehensively captures the theoretical construct of real earnings management proposed by Roychowdhury (2006). Nevertheless, many primary studies adopt simplified operationalizations based on one or two components of the original measure (e.g., Farooqi et al., 2014), which may contribute to heterogeneity in the reported results. To capture this variation (in addition to REM_Total), we introduce two moderator variables: REM_1_Element and REM_Dual. REM_1_Element equals one when REM is measured using only one of the three components of the Roychowdhury (2006) framework. REM_Dual equals one when REM is measured using any combination of two of the three components. Specifically, REM_Dual captures studies defining REM as either (i) abnormal operating cash flows combined with abnormal discretionary expenditures or (ii) abnormal discretionary expenditures combined with abnormal production costs. These variables capture partial operationalizations of REM relative to the full baseline specification.

4.2. Geographical regions and cultural similarities

To capture geographical heterogeneity, we classify the countries represented in the primary studies into two regions using a dummy variable indicating whether an observation is based on North American or non-North American data. The baseline category is *North America*, which accounts for 18.6% of the estimates in our sample. The second category comprises all regions outside North America (*Non-North America*). These countries are grouped together because they are geographically diverse, and several primary studies rely on multinational samples. This classification ensures comparability while preserving sample coverage.

Because Section 2 identifies national culture as an important source of heterogeneity (H4), we additionally classify observations according to broad cultural regions. Following the broad notion of cultural groupings proposed by Huntington (2002), while adapting it to the countries represented in our sample, we distinguish three cultural clusters: Western, China, and Other. The *Western* cluster comprises North America and Europe, the *China* cluster includes China, Korea, and Taiwan, and the residual category (*Other*) contains all remaining countries. These clusters should be interpreted as broad institutional-cultural proxies rather than direct measures of national culture. The *Western* cluster serves as the baseline category because it represents both the largest subgroup in our sample (approximately 50% of all estimates) and the institutional setting in which much of the corporate governance literature has developed. *China* is treated as a separate category because of its distinctive institutional environment and its prominence in the recent REM literature, whereas the remaining countries are grouped into the residual category (*Other*).

Throughout the analysis, the regional composition of the sample is treated as a sample-composition moderator and evaluated under Hypothesis H5, whereas the culture-based clusters address the moderating role of national culture under Hypothesis H4.

¹ Since Abnormal levels of operating cash flow and Abnormal levels of discretionary expenditures have negative signs (unlike Abnormal production costs) they are multiplied by minus 1, so that the higher values indicate greater REM.

4.3. Methodological heterogeneity

To account for methodological heterogeneity, we include moderator variables capturing key research design choices in the primary studies. Specifically, these moderators indicate whether ownership is the primary variable of interest and whether endogeneity is addressed using instrumental variable approaches, lagged variables, or the two-step Heckman procedure. An additional moderator indicates whether the primary study employs robust standard errors to account for potential violations of classical regression assumptions.

Fixed-effects models are widely used to control for unobserved heterogeneity and improve the consistency of estimated coefficients (Breuer & Dehaan, 2024). Accordingly, we include a moderator indicating whether the primary study controls for fixed effects (e.g., firm, industry, or year effects).

4.4. Inclusion of control variables

Because prior research suggests that firms use REM and AEM as substitute earnings management strategies (Cohen et al., 2008; Zang, 2012), we include a moderator indicating whether the primary regression controls for AEM. In our analysis, if estimates regarding the relationship between REM and ownership structure are derived from regressions that include AEM, we will set the corresponding dummy variable to one; otherwise, it will be set to zero. We expect this moderator to be negatively associated with the reported REM effect size.

Because ownership concentration may shape both monitoring effectiveness and managerial incentives (Mellado & Saona, 2020), we include a moderator indicating whether ownership concentration is controlled for in the primary study. The moderator equals one if ownership concentration is included in the regression specification and zero otherwise.

Because primary studies operationalize ownership differently, we include additional moderators capturing differences in ownership measurement. We further distinguish measurement methods by introducing additional variables for family and insider ownership. In the case of family ownership, an additional dummy variable is set to one, indicating that family members are significant blockholders. For insider ownership, a value of one for this additional variable indicates that the dominant share of this ownership type was measured using the dummy variable (zero if other measures were employed).

Prior research suggests that stable institutional investors monitor managers more effectively than transient investors (Kaldonński et al., 2020; Sakaki et al., 2017). Accordingly, we include a moderator indicating whether institutional stability is controlled for in the primary study. This variable is set to one if the primary study regression has controlled for the stability of institutional ownership and zero otherwise. We expect that accounting for the stability of institutional ownership will moderate the relationship between this type of ownership and REM, with greater stability of institutional investors anticipated to have a mitigating effect on REM practices.

In line with previous literature (e.g., Achleitner et al., 2014; Mellado, 2020), we also incorporate other firm-specific dummy variables that may affect managers' incentives to engage in EM through REM. These variables include profitability and the market-to-book value ratio. If estimates are derived from regressions that include these control variables, the respective dummy is set to one, and zero otherwise.

4.5. Macro variables

We include macroeconomic and institutional variables that may be associated with REM. Francis et al. (2016) show that REM increases with legal strength at the national level, while AEM decreases. We incorporate the Rule of Law Index from the World Justice Project (World Bank Data), which measures adherence to legal standards across countries and ranges approximately from -2.5 to 2.5 . Higher values indicate

stronger rule of law. This variable captures institutional enforcement strength across countries.

We also include the natural logarithm of GDP per capita as a proxy for macroeconomic development. Higher GDP per capita is associated with more developed financial systems and stricter regulatory environments, which may shape managers' incentives for earnings manipulation. This captures cross-country economic development differences.

4.6. Journal quality

To capture publication quality, we introduce a dummy variable equal to one if the study is published in a peer-reviewed journal and zero otherwise. In addition, we include the natural logarithm of the number of citations as a proxy for study impact. These variables capture publication visibility and quality differences.

4.7. Other sample characteristics

To capture sample characteristics, we include the natural logarithm of the number of observations in the primary study regressions. We also include the average year of the data to capture temporal variation in institutional environments and accounting standards. These variables control for differences in sample design and time period.

5. Data collection

Data collection began with a systematic search of publications on earnings management (EM) in the major electronic databases Google Scholar, ScienceDirect, JSTOR, and SSRN. Fig. 1 summarizes the study identification and sample selection process. We employed a keyword search strategy using terms such as “earnings management,” “earnings manipulation,” “managing earnings,” and “manipulating earnings.” This initial screening yielded a pool of 336 potentially relevant papers.

To be included in the final meta-analytic sample, studies had to meet three eligibility criteria:

- Topical focus: The study focuses on REM or both REM and AEM.
- Model specification: The study treats REM as the dependent variable (consistent with Roychowdhury, 2006) and analyzes its relationship with independent explanatory variables.
- Statistical reporting: The study provides the necessary empirical data for meta-analysis, including regression coefficients, sample sizes, and precision measures (such as *t*-statistics, standard errors, or *p*-values).

Applying these criteria yielded 184 eligible studies. We subsequently reviewed all reported regression models to identify estimates examining the relationship between ownership structure and REM. This screening resulted in a final sample of 49 primary studies comprising 808 unique regression estimates. The complete list of included studies is provided in Appendix A.

This figure illustrates the study selection process and the number of studies retained or excluded at each stage of the sample construction procedure.

6. Results

This section presents the empirical findings of our meta-analysis in three stages. First, we provide descriptive statistics for the collected estimates across ownership types. Second, we examine the distribution of effect sizes and assess the presence of publication selection bias using both visual inspection and formal Funnel Asymmetry Tests (FAT-PET). Finally, we report the results of the augmented meta-regression models to explain the heterogeneity in reported effect sizes, identifying the methodological and contextual factors that moderate the relationship between ownership structure and REM.

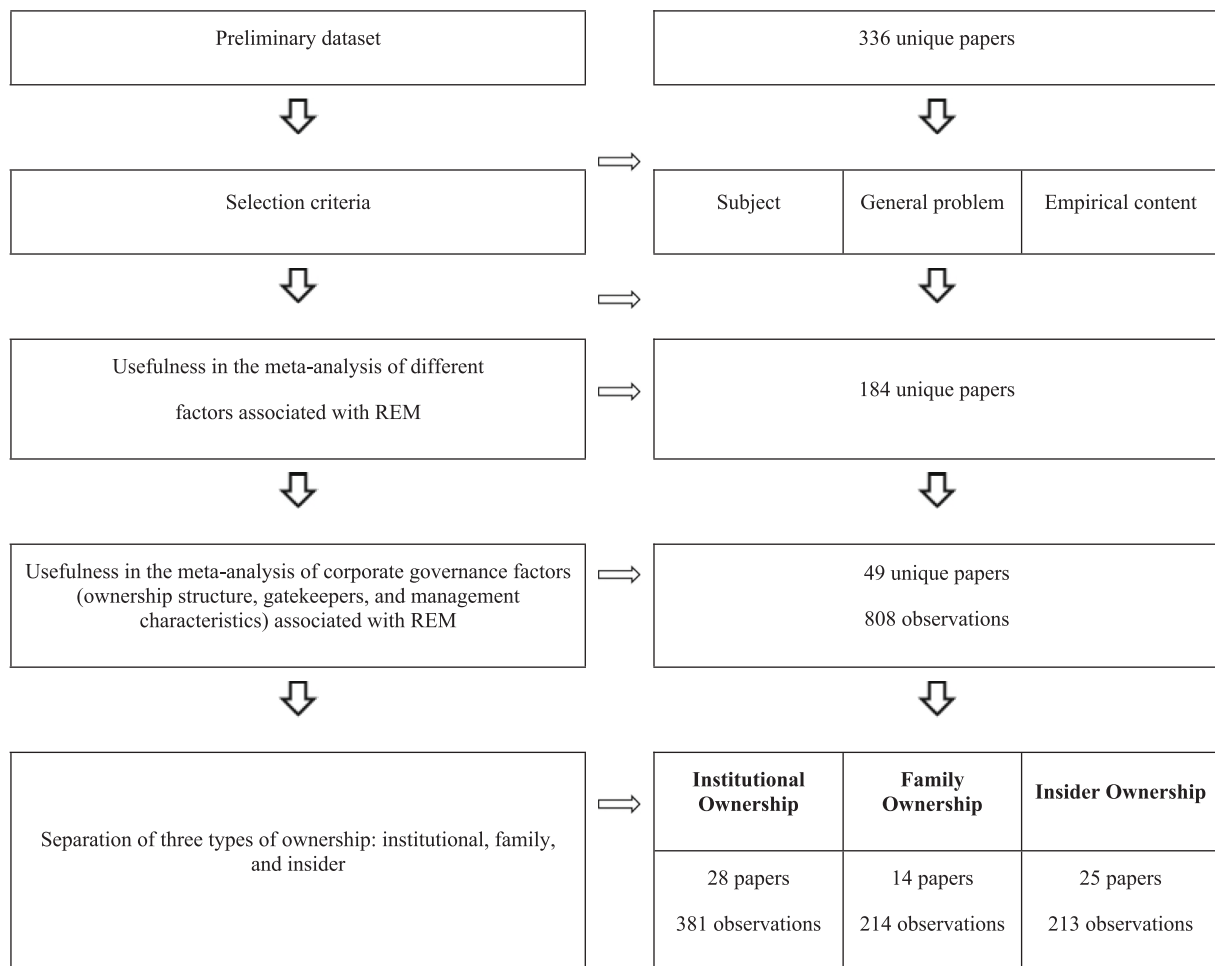


Fig. 1. Sample building process.

6.1. Descriptive statistics

Table 2 presents descriptive statistics for the partial correlation

coefficients, grouped by ownership type and study characteristics. North American studies account for approximately 18.6% of all reported estimates. More than 90% of the observations originate from peer-

Table 2

Descriptive statistics.

INSTITUTIONAL OWNERSHIP							
	Overall mean	North America	Non-North America	Peer Reviewed	Non-Peer Reviewed	Focus	Non-focus
Mean effect	−0.015	−0.008	−0.019	−0.015	−0.044	−0.011	−0.019
CI 95%	−0.025, −0.006	−0.016, 0.000	−0.033, −0.004	−0.024, −0.006	−0.044, −0.044	−0.024, 0.001	−0.029, −0.008
No. of observations	381	69	324	375	6	139	242
No. of studies	28	10	20	27	1	14	14
FAMILY OWNERSHIP							
	Overall mean	North America	Non-North America	Peer Reviewed	Non-Peer Reviewed	Focus	Non-focus
Mean effect	0.009	0.027	0.006	0.014	−0.017	0.012	−0.000
CI 95%	−0.005, 0.023	0.015, 0.039	−0.008, 0.019	0.002, 0.026	−0.017, −0.017	−0.005, 0.029	−0.020, 0.019
No. of observations	214	28	186	183	31	170	44
No. of studies	14	2	13	13	1	11	3
INSIDERS OWNERSHIP							
	Overall mean	North America	Non-North America	Peer Reviewed	Non-Peer Reviewed	Focus	Non-focus
Mean effect	−0.009	−0.007	−0.010	−0.008	−0.021	−0.034	−0.005
CI 95%	−0.015, −0.003	−0.014, 0.001	−0.018, −0.003	−0.013, −0.002	−0.047, 0.004	−0.058, −0.010	−0.010, 0.001
No. of observations	213	53	160	172	41	63	150
No. of studies	25	8	17	22	3	10	15

Notes: This table reports descriptive statistics for the collected partial correlation coefficients by ownership type. Estimates are further classified according to geographical region, publication status, and whether ownership type is the primary explanatory variable in the original study. Confidence intervals are based on standard errors clustered at the study level.

Table 3
The basic MRA model.

	(1) Institutional Ownership	(2) Family Ownership	(3) Insider Ownership
Mean effect ($\hat{\beta}_0$)	−0.006 (−0.98)	0.011 (0.81)	−0.008*** (−3.28)
Bias ($\hat{\beta}_1$)	−1.070** (−2.08)	−0.149 (−0.22)	−0.122 (−0.29)
Number of observations	381	214	213
Number of studies	28	14	25

Notes: This table reports the results of the basic meta-regression model used to test for publication selection bias. The coefficient $\hat{\beta}_1$ measures the magnitude of publication selection bias (FAT), while $\hat{\beta}_0$ represents the estimated mean partial correlation corrected for publication selection bias (PET). Models are estimated by weighted least squares using the inverse of the squared standard errors as weights. Reported t-statistics (in parentheses) are based on standard errors clustered at the study level. ***, ** and * denote significance at the 1%, 5%, and 10% levels, respectively.

reviewed publications, and in nearly half of the sample ownership type constitutes the primary explanatory variable of the original study. The unadjusted mean effect sizes reveal distinct patterns across ownership types. Institutional and insider ownership exhibit negative average partial correlations with REM, whereas family ownership is associated with a positive average partial correlation. The positive association for family ownership appears strongest in the North American subsample. These descriptive statistics provide an initial overview of the data but do not account for publication selection bias or heterogeneity across studies. These issues are examined in the following sections using formal meta-regression analysis.

6.2. Analysis of publication selection Bias

We begin by assessing publication selection bias using funnel plots. Fig. 2 displays the reported partial correlation coefficients against their precision (the inverse of the standard error). In the absence of publication selection bias, the estimates are expected to form a symmetrical inverted funnel.

Visual inspection reveals notable differences across ownership types. The funnel plot for institutional ownership exhibits clear asymmetry, suggesting the presence of publication selection bias. By contrast, the distributions for family and insider ownership appear relatively symmetrical, providing no strong visual indication of selective reporting.

This figure presents the partial correlation coefficients reported in the primary studies plotted against their precision (the inverse of the standard error). The histograms in the right-hand panels illustrate the distribution of the reported effect sizes.

To complement the graphical evidence, we formally test for publication selection bias using the basic meta-regression model presented in Eq. (3). The coefficient on the standard error, $\hat{\beta}_1$, corresponds to the Funnel Asymmetry Test (FAT), whereas the intercept, $\hat{\beta}_0$, represents the estimated mean effect after correcting for publication selection bias (Stanley, 2008). Following Doucouliagos and Stanley (2013), we classify publication selection bias as “little to modest” if the bias coefficient is statistically insignificant or $|\hat{\beta}_1| < 1$, “substantial” if the bias coefficient is statistically significant and $1 \leq |\hat{\beta}_1| \leq 2$, and “severe” if the bias coefficient is statistically significant and $|\hat{\beta}_1| > 2$.

The basic MRA results are consistent with the visual evidence from the funnel plots. For institutional ownership, the estimated publication bias coefficient is negative and statistically significant ($\hat{\beta}_1 = -1.070$, $p < 0.05$), indicating selective reporting in favor of studies documenting a stronger negative association between institutional ownership and

REM. According to the classification of Doucouliagos and Stanley (2013), the magnitude of this bias is substantial. By contrast, the publication bias coefficients for family and insider ownership are statistically insignificant, providing no evidence of systematic publication selection.

After correcting for publication selection bias, the estimated mean effects ($\hat{\beta}_0$) are statistically insignificant for both institutional and family ownership, indicating no genuine underlying association beyond selective reporting. Consequently, Hypotheses H1 and H2 are not supported.

For insider ownership, the corrected mean effect remains negative and statistically significant (partial correlation = -0.008 , $p < 0.01$). However, its magnitude is economically negligible, falling well below the threshold of ± 0.07 that is commonly interpreted as a meaningful effect size in empirical economics (Doucouliagos, 2011). Accordingly, although the result is statistically significant, it provides only limited empirical support for the alignment hypothesis (H3a).

6.3. Heterogeneity analysis

To identify the specific drivers of variation in reported effect sizes, we estimate the augmented MRA model defined in Eq. (4). Consistent with our baseline specifications, we employ WLS estimation with robust standard errors clustered at the study level. Results are reported separately for each ownership type (Tables 4–6).

6.3.1. Institutional ownership

Table 4 reports the augmented meta-regression results for institutional ownership. Overall, the evidence indicates that heterogeneity in the reported effect sizes is associated primarily with methodological choices rather than by geographical, cultural, or macroeconomic differences.

The results show that controlling for endogeneity is consistently associated with larger reported partial correlations between institutional ownership and REM (Models 2, 3, 5, and 6). Because the average reported association between institutional ownership and REM is negative, the positive moderator coefficient indicates that studies addressing endogeneity report weaker negative associations than studies that do not. One possible explanation is that simpler regression specifications are more susceptible to omitted-variable bias or reverse causality. If institutional investors tend to invest in firms with stronger governance and lower inherent incentives to engage in REM, failure to account for endogeneity may overstate the strength of the reported negative association. Accordingly, the weaker associations observed in studies addressing endogeneity are consistent with this interpretation, although the present meta-analysis cannot establish the underlying causal mechanism.

By contrast, ownership concentration is statistically significant only in Models 2 and 5, where controlling for ownership concentration is associated with a stronger negative association between institutional ownership and REM. We find no evidence that institutional ownership stability or whether institutional ownership is the primary explanatory variable systematically moderates the reported effect sizes.

Among the methodological moderators, the measurement of REM also contributes to heterogeneity. Studies measuring REM using a single proxy (*REM_1Element*) report significantly larger partial correlations than studies employing the aggregate three-component measure proposed by Roychowdhury (2006). This finding suggests that simplified measures of REM are associated with a weaker mitigating relationship between institutional ownership and REM. By contrast, using a two-component REM measure (*REM_Dual*) does not explain significant variation in the reported results.

Turning to sample characteristics, studies based on larger estimation samples report significantly larger partial correlations across all model specifications, whereas the average sample period does not explain significant variation in the reported estimates.

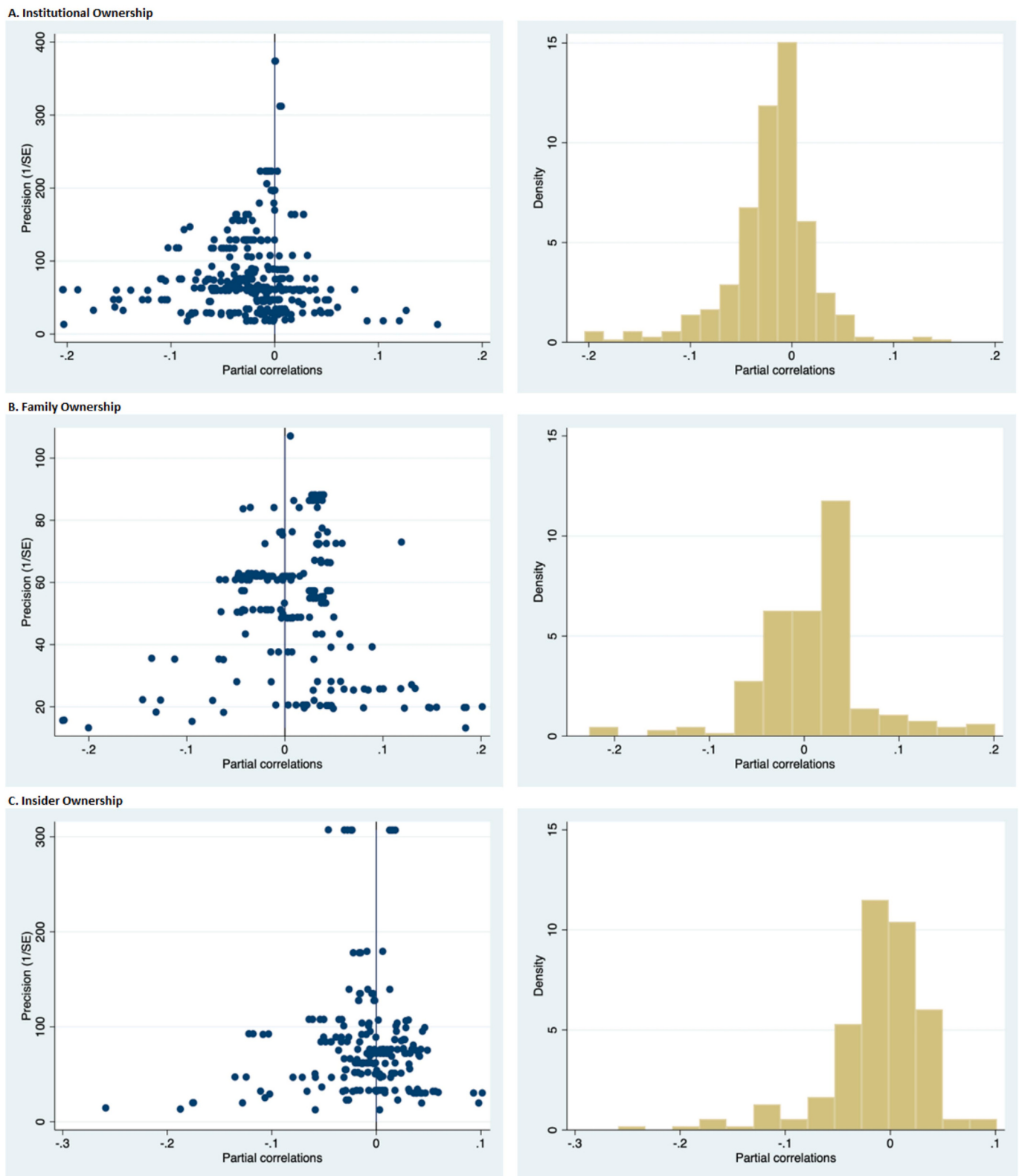


Fig. 2. Funnel plot of collected estimates.

We find little evidence that contextual factors explain heterogeneity in the reported results. Neither the geographical distinction between North American and non-North American samples nor the cultural classifications (*China* and *Other* relative to the *Western* baseline) is statistically significant. Likewise, the Rule of Law Index and GDP per capita do not explain differences in the reported effect sizes.

Similarly, none of the remaining firm-level or publication-related moderators—including profitability, market-to-book ratio, AEM controls, fixed effects, robust standard errors, publication status, and study citations—consistently explains heterogeneity across studies.

Taken together, these findings provide partial support for Hypothesis H5, indicating that methodological choices—particularly the treatment

Table 4
Institutional ownership and REM - heterogeneity analysis.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept ($\hat{\beta}_0$)	3.68 (0.84)	2.38 (0.67)	2.15 (0.45)	3.68 (3.68)	2.38 (0.67)	2.12 (0.44)
Bias ($\hat{\beta}_1$)	1.231** (2.50)	2.334*** (3.32)	2.444** (2.39)	1.236** (2.39)	2.325*** (3.24)	2.440** (2.39)
Control for Concentration	−0.029 (−1.63)	−0.031* (−1.80)	−0.030 (−1.62)	−0.029 (−1.63)	−0.031* (−1.80)	−0.030 (−1.59)
Control for Inst Stability	0.004 (0.34)	−0.002 (−0.17)	−0.001 (−0.10)	0.004 (0.38)	−0.002 (−0.20)	−0.002 (−0.11)
Focus Variable	−0.008 (−0.72)	0.005 (0.38)	0.004 (0.30)	−0.008 (−1.00)	0.005 (0.48)	0.005 (0.38)
Non-North America	0.015 (1.00)		−0.005 (−0.15)	0.015 (1.04)		−0.006 (−0.15)
Rule of Law Index	0.000 (0.04)	−0.001 (−0.09)	−0.001 (−0.12)			
Control for Fixed Effects	−0.009 (−0.99)	−0.012 (−1.45)	−0.013 (−1.47)	−0.009 (−1.07)	−0.012 (−1.60)	−0.012 (−1.47)
Control for Endogeneity	0.012 (1.50)	0.018** (2.17)	0.018** (2.13)	0.012 (1.52)	0.018** (2.18)	0.018** (2.10)
Control for Robust SE	−0.006 (−0.79)	−0.004 (−0.51)	−0.004 (−0.53)	−0.006 (−0.76)	−0.004 (−0.62)	−0.005 (−0.64)
Ln # Observations in Estimation	0.011*** (2.75)	0.016*** (3.58)	0.017*** (2.80)	0.011*** (2.94)	0.016*** (3.64)	0.017*** (2.89)
Average Year of Data	−0.002 (−0.88)	−0.001 (−0.74)	−0.001 (−0.50)	−0.002 (−0.87)	−0.001 (−0.73)	−0.001 (−0.48)
Control for Profit	0.005 (0.53)	−0.001 (−0.15)	−0.002 (−0.17)	0.005 (0.55)	−0.001 (−0.16)	−0.002 (−0.20)
Control for MTB	0.005 (0.55)	0.004 (0.39)	0.004 (0.37)	0.005 (0.66)	0.004 (0.54)	0.004 (0.55)
Control for AEM	−0.002 (−0.33)	−0.003 (−0.44)	−0.003 (−0.42)	−0.002 (−0.32)	−0.003 (−0.43)	−0.003 (−0.41)
REM_Dual	0.005 (0.63)	0.001 (0.10)	0.000 (0.04)	0.005 (0.63)	0.001 (0.10)	0.000 (0.04)
REM_1_Element	0.008** (2.06)	0.007* (1.81)	0.007* (1.90)	0.008** (2.07)	0.007* (1.82)	0.007* (1.94)
Publ Peer Review	0.011 (0.35)	0.019 (0.75)	0.019 (0.65)	0.011 (0.36)	0.020 (0.80)	0.019 (0.68)
Ln # Study Citation	0.002 (0.25)	0.003 (0.52)	0.003 (0.45)	0.002 (0.26)	0.003 (0.54)	0.003 (0.45)
China		0.017 (1.45)	0.022 (0.78)		0.017 (1.55)	0.023 (0.71)
Other		−0.011 (−0.75)	−0.007 (−0.26)		−0.011 (−0.79)	−0.006 (−0.20)
Ln GDP per capita				0.000 (0.04)	−0.000 (−0.09)	−0.001 (−0.14)
No. of observations	381	381	381	381	381	381
No. of studies	28	28	28	28	28	28

Notes: This table shows the results of the heterogeneity analysis using meta-regression as in Eq. (4). Variables are defined in Table B in Appendix B. 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 the individual studies. Number of asterisks (***, ** and *) indicate significance on the 1%, 5% and 10%-level respectively. The intercept (β_0) is conditional: it is evaluated at the reference values of all moderators (zero for the continuous moderators); it is not a simple average effect and is not directly comparable in scale to the unconditional mean effect in Table 3.

of endogeneity and the measurement of REM—and sample composition, in particular the size of the estimation sample, systematically moderate the reported relationship between institutional ownership and REM. The geographical origin of the data does not contribute to this variation. By contrast, Hypothesis H4 receives no empirical support, as the cultural classifications do not consistently explain variation in the reported estimates.

6.3.2. Family ownership

Table 5 presents the augmented meta-regression results for family ownership. Unlike the findings for institutional ownership, the reported effect sizes are moderated by both contextual and methodological factors, indicating that the relationship between family ownership and REM is more sensitive to differences in institutional settings and research design.

Among the sample-composition moderators, studies based on non-North American samples significantly lower partial correlations than studies using North American data. Given that the unconditional mean

effect for family ownership is positive, albeit statistically insignificant, these lower reported effect sizes indicate a more strongly mitigating association between family ownership and REM outside North America.

The cultural moderators also explain part of the reported heterogeneity. Relative to the Western baseline, the estimated coefficients for the China and Other cultural clusters are generally positive, indicating weaker mitigating associations in these settings. Although statistical significance varies across specifications, the overall pattern suggests that national culture contributes to explaining differences in the reported relationship between family ownership and REM.

Turning to methodological factors, controlling for endogeneity is consistently associated with larger reported partial correlations, implying a weaker mitigating relationship once endogeneity concerns are explicitly addressed. By contrast, studies employing robust standard errors report significantly smaller partial correlations, suggesting a stronger negative association between family ownership and REM. Unlike the institutional ownership results, alternative measures of REM (REM_Dual and REM_1_Element) are not significantly associated with

Table 5

Family ownership and REM - heterogeneity analysis.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept ($\hat{\beta}_0$)	13.305** (2.22)	4.343 (1.39)	7.250*** (2.93)	13.043*** (2.76)	5.453** (2.47)	8.036*** (3.11)
Bias ($\hat{\beta}_1$)	1.972 (0.65)	2.626 (0.73)	3.087 (0.91)	2.038 (0.46)	2.179 (0.55)	2.756 (0.74)
Control for Concentration	−0.006 (−0.23)	−0.001 (−0.05)	−0.012 (−0.53)	−0.007 (−0.33)	0.007 (0.32)	−0.003 (−0.13)
Focus Variable	0.033 (0.98)	0.080 (1.14)	0.105 (1.56)	0.035 (1.30)	−0.027 (−0.69)	−0.039 (−1.13)
Ownership Presence	0.004 (0.72)	−0.001 (−0.21)	−0.002 (−0.51)	0.004 (1.02)	−0.001 (−0.13)	−0.002 (−0.45)
Non-North America	−0.011 (−0.42)		−0.067** (−2.08)	−0.009*** (−2.65)		−0.069** (−1.99)
Rule of Law Index	−0.001 (−0.07)	0.062 (1.64)	0.082** (2.15)			
Control for Fixed Effects	−0.009 (−0.66)	−0.005 (−0.47)	0.004 (0.43)	−0.009 (−0.68)	−0.006 (−0.52)	0.003 (0.33)
Control for Endogeneity	0.033*** (2.73)	0.050*** (5.14)	0.038*** (3.31)	0.033*** (3.27)	0.049*** (5.03)	0.037*** (3.08)
Control for Robust SE	−0.032 (−1.39)	−0.056*** (−4.42)	−0.042*** (−3.09)	−0.032* (−1.73)	−0.050*** (−3.83)	−0.035** (−2.38)
Ln # Observations in Estimation	0.030 (0.99)	0.029 (0.90)	0.024 (0.81)	0.030 (0.78)	0.027 (0.79)	0.022 (0.71)
Average Year of Data	−0.007** (−2.25)	−0.002 (−1.53)	−0.004*** (−3.07)	−0.007*** (−2.78)	−0.003*** (−2.71)	−0.004*** (−3.35)
Control for Profit	0.026 (1.48)	0.026* (1.69)	0.024 (1.40)	0.027 (1.61)	0.020 (1.48)	0.018 (1.18)
Control for MTB	−0.005 (−0.31)	−0.027** (−2.06)	−0.026** (−2.33)	−0.006 (−0.35)	−0.022* (−1.83)	−0.020* (−1.91)
Control for AEM	−0.064*** (−3.21)	−0.085*** (−6.41)	−0.107*** (−4.24)	−0.065*** (−4.87)	−0.084*** (−5.58)	−0.111*** (−3.29)
REM_Dual	−0.002 (−0.25)	0.002 (0.22)	0.006 (0.47)	−0.002 (−0.24)	0.001 (0.13)	0.006 (0.42)
REM_1_Element	0.007 (0.65)	0.008 (0.74)	0.011 (0.97)	0.007 (0.68)	0.008 (0.76)	0.012 (0.99)
Publ Peer Review	0.095** (2.32)	0.023 (0.45)	−0.041 (−0.71)	0.097** (2.30)	0.014 (0.30)	−0.056 (−0.96)
Ln # Study Citation	−0.004 (−0.73)	0.012 (1.49)	0.021** (2.48)	−0.004 (−0.66)	0.012 (1.47)	0.022** (2.37)
China		0.126 (1.55)	0.233** (2.44)		−0.005 (−0.98)	0.061* (1.78)
Other		0.116*** (2.60)	0.200*** (3.05)		0.061*** (2.69)	0.134*** (2.59)
Ln GDP per capita				0.000 (0.02)	0.020 (1.13)	0.031 (1.55)
No. of observations	214	214	214	214	214	214
No. of studies	14	14	14	14	14	14

Notes: This table shows the results of the heterogeneity analysis using meta-regression as in Eq. (4). Variables are defined in Table B in Appendix B. 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 the individual studies. Number of asterisks (***, ** and *) indicate significance on the 1%, 5% and 10%-level respectively. The intercept (β_0) is conditional: it is evaluated at the reference values of all moderators (zero for the continuous moderators); it is not a simple average effect and is not directly comparable in scale to the unconditional mean effect in Table 3.

the reported effect sizes.

Several control variables also contribute to explaining heterogeneity. Studies controlling for AEM consistently report significantly smaller partial correlations, indicating a stronger mitigating association between family ownership and REM after accounting for accrual-based earnings management. Likewise, controlling for the market-to-book ratio is associated with smaller reported effect sizes in several model specifications. By contrast, ownership concentration, profitability, ownership measurement, and the use of fixed effects do not consistently explain the observed heterogeneity.

With respect to publication and sample characteristics, more recent studies report significantly smaller partial correlations, whereas sample size does not explain significant variation in the reported estimates. Publication quality variables provide mixed evidence. Peer-reviewed publications are significant only in selected specifications, and the number of citations exhibits no consistent relationship with the reported effect sizes. Similarly, neither the Rule of Law Index nor GDP per capita consistently explains the variation across studies.

Overall, the results provide partial support for Hypothesis H4, indicating that national culture moderates the relationship between family ownership and REM. They also provide partial support for Hypothesis H5, as both sample composition—particularly the geographical origin and the recency of the data—and several methodological choices, including the treatment of endogeneity, the use of robust standard errors, and the inclusion of selected control variables, systematically moderate the reported effect sizes.

6.3.3. Insider ownership

Table 6 reports the augmented meta-regression results for insider ownership. Overall, the findings suggest that heterogeneity in the reported effect sizes is explained primarily by methodological choices, with more limited evidence that cultural differences contribute to the observed variation.

Among the ownership-related moderators, studies in which insider ownership constitutes the primary explanatory variable report significantly more negative partial correlations across all model specifications.

Table 6
Insider ownership and REM - heterogeneity analysis.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept ($\hat{\beta}_0$)	−6.420*** (−2.63)	−4.984* (−1.89)	−7.452*** (−3.06)	−6.646*** (−2.85)	−5.265** (−2.28)	−6.546*** (−3.19)
Bias ($\hat{\beta}_1$)	1.883* (1.69)	2.467 (1.33)	2.548 (1.38)	2.042* (1.70)	2.826* (1.71)	2.649 (1.53)
Control for Concentration	0.020** (2.52)	0.011 (0.62)	0.014 (0.89)	0.018* (1.89)	0.009 (0.57)	0.013 (0.85)
Focus Variable	−0.053*** (−4.11)	−0.046** (−2.17)	−0.049** (−2.35)	−0.046** (−2.41)	−0.035** (−2.16)	−0.042** (−2.06)
Ownership Presence	−0.026 (−1.51)	−0.033 (−1.60)	−0.037** (−2.01)	−0.032 (−1.60)	−0.045*** (−2.64)	−0.041** (−2.53)
Non-North America	−0.014 (−1.49)		−0.024** (−2.36)	−0.011 (−0.78)		−0.016 (−1.37)
Rule of Law Index	−0.001 (−0.12)	0.006 (0.42)	0.009 (0.76)			
Control for Fixed Effects	−0.012** (−2.06)	−0.012* (−1.76)	−0.009 (−1.19)	−0.013** (−2.29)	−0.011* (−1.67)	−0.009 (−1.25)
Control for Endogeneity	−0.011 (−1.58)	−0.010 (−1.40)	−0.006 (−0.65)	−0.013* (−1.69)	−0.009 (−1.33)	−0.006 (−0.71)
Control for Robust SE	0.005 (0.71)	0.019 (1.04)	0.012 (0.71)	0.008 (0.74)	0.023 (1.61)	0.015 (0.93)
Ln # Observations in Estimation	0.015** (2.21)	0.018** (2.05)	0.019** (2.31)	0.016** (2.30)	0.020*** (2.79)	0.020*** (2.61)
Average Year of Data	0.003*** (2.59)	0.002* (1.85)	0.004*** (3.02)	0.003*** (2.77)	0.002** (2.13)	0.003*** (2.98)
Control for Profit	0.036*** (3.94)	0.040*** (3.10)	0.049*** (3.65)	0.035*** (3.70)	0.045*** (3.69)	0.049*** (4.01)
Control for MTB	0.018* (1.92)	0.016 (1.40)	0.009 (0.84)	0.015 (1.51)	0.009 (1.02)	0.008 (0.94)
Control for AEM	0.011 (1.32)	0.008 (0.83)	0.010 (1.09)	0.008 (0.78)	0.005 (0.61)	0.008 (0.96)
REM_Dual	−0.003 (−0.88)	−0.003 (−0.74)	−0.001 (−0.52)	−0.002 (−0.69)	0.000 (0.15)	−0.000 (−0.03)
REM_1_Element	−0.002 (−1.06)	0.000 (0.13)	0.000 (0.03)	−0.001 (−0.67)	0.002 (0.56)	0.001 (0.32)
Publ Peer Review	−0.029* (−1.88)	−0.022 (−0.89)	−0.032 (−1.29)	−0.020 (−0.87)	−0.012 (−0.62)	−0.025 (−0.96)
Ln # Study Citation	−0.000 (−0.11)	0.000 (0.07)	0.002 (0.41)	−0.001 (−0.34)	−0.000 (−0.01)	0.001 (0.26)
China		0.018 (1.02)	0.033* (1.77)		0.031** (2.42)	0.035** (2.49)
Other		0.005 (0.16)	0.028 (0.83)		0.031 (1.01)	0.040 (1.29)
Ln GDP per capita				0.004 (0.39)	0.016** (1.97)	0.013 (1.34)
No. of observations	213	213	213	213	213	213
No. of studies	25	25	25	25	25	25

Notes: This table shows the results of the heterogeneity analysis using meta-regression as in Eq. (4). Variables are defined in Table B in Appendix B. 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 the individual studies. Number of asterisks (***, ** and *) indicate significance on the 1%, 5%- and 10%-level respectively. The intercept ($\hat{\beta}_0$) is conditional: it is evaluated at the reference values of all moderators (zero for the continuous moderators); it is not a simple average effect and is not directly comparable in scale to the unconditional mean effect in Table 3.

Likewise, studies measuring insider ownership using a dummy variable generally report stronger mitigating associations with REM than studies employing alternative ownership measures.

Several methodological moderators also contribute to explaining heterogeneity. Studies controlling for fixed effects consistently report more negative partial correlations, indicating a stronger mitigating association between insider ownership and REM. By contrast, we find no consistent evidence that controlling for endogeneity, using robust standard errors, alternative REM measures, or controlling for AEM systematically moderates the reported results.

With respect to sample characteristics, studies based on larger estimation samples and more recent data report significantly larger partial correlations. Given the negative unconditional relationship between insider ownership and REM, these findings imply that the mitigating association becomes weaker in larger and more recent samples. Studies controlling for profitability also report significantly larger partial correlations, whereas the market-to-book ratio is statistically significant only in selected specifications.

The evidence for contextual moderators is more limited. The geographical distinction between North American and non-North American samples does not consistently explain the reported effect sizes. By contrast, the coefficient on the China cultural indicator is positive and statistically significant in selected specifications, suggesting a weaker mitigating association between insider ownership and REM relative to the Western baseline. The remaining cultural and macro-economic moderators—including the Other cultural cluster, the Rule of Law Index, and GDP per capita—do not consistently explain heterogeneity across studies.

Similarly, publication characteristics contribute little to explaining the reported variation. Neither publication status nor the number of citations exhibits a consistent relationship with the reported effect sizes.

Overall, the findings provide limited support for Hypothesis H4, as evidence of cultural moderation is confined to the China indicator and is not consistently observed across all model specifications. The results provide partial support for Hypothesis H5, indicating that methodological choices—particularly whether insider ownership is the primary

explanatory variable and whether fixed effects are employed—as well as selected sample characteristics systematically moderate the reported relationship between insider ownership and REM.

7. Discussion

A central finding of our analysis is the presence of substantial publication selection bias in the institutional ownership literature. After correcting for this bias, we find no statistically significant average relationship between institutional ownership and REM. This result is consistent with large international evidence reported by [Lemma et al. \(2018\)](#) and challenges the common assumption that institutional investors systematically constrain REM. Although numerous primary studies report a negative association (e.g., [Chung et al., 2002](#); [Min, 2015](#); [Sakaki et al., 2017](#)), our findings suggest that these results do not generalize across the broader literature. More generally, the disappearance of the relationship after correcting for publication bias illustrates the importance of accounting for selective reporting when synthesizing empirical evidence and highlights one of the principal advantages of meta-regression analysis over conventional literature reviews.

Several explanations may account for the absence of an aggregate institutional ownership effect. First, institutional investors are far from homogeneous. Their monitoring incentives differ substantially depending on investment horizon, portfolio diversification, and ownership objectives. While long-term institutional investors often possess both the incentives and ability to monitor managers, transient investors may focus primarily on short-term returns. Moreover, monitoring effectiveness may decline when institutional investors become distracted by other investments within their portfolios, reducing oversight of individual firms ([Garel et al., 2021](#)). Second, improvements in corporate governance and regulatory frameworks may have reduced the incremental monitoring role of institutional investors. Recent evidence suggests that board reforms improve financial reporting quality by mitigating agency problems and information asymmetry ([Chen et al., 2024](#)), potentially reducing the additional governance benefits associated with institutional ownership.

Unlike institutional ownership, the nature of the relationship for family ownership appears to depend strongly on institutional and cultural context. Although we find no statistically significant average relationship between family ownership and REM, this finding contrasts with both the positive association reported by [Eng et al. \(2019\)](#) and the negative association documented by [Achleitner et al. \(2014\)](#), illustrating the substantial heterogeneity present in the primary literature. Our heterogeneity analysis indicates that the association between family ownership and REM is more strongly negative in Western cultural settings. These findings suggest that the governance advantages frequently attributed to family firms are conditional rather than universal.

One possible explanation is that stronger investor protection, more effective legal enforcement, and social norms favoring transparency reinforce the incentives of family owners to preserve reputation and long-term firm value. Consequently, family owners may have stronger incentives to avoid value-destroying REM in institutional environments where external monitoring and reputational mechanisms are more effective. Our findings therefore refine earlier evidence suggesting that family firms generally provide higher-quality financial reporting ([Cascino et al., 2010](#)) by demonstrating that these benefits depend on the surrounding institutional environment.

Among the three ownership types examined, insider ownership is the only category exhibiting a statistically significant average relationship with REM. The negative association is consistent with the alignment hypothesis derived from agency theory, according to which managerial ownership aligns managers' interests with those of shareholders and reduces incentives for opportunistic behavior. Our findings therefore reconcile the mixed evidence reported in the primary literature, supporting studies documenting a negative association (e.g., [Cohen et al.,](#)

[2008](#); [Debnath et al., 2021](#); [Hsu, 2015](#)), while contrasting with the positive association reported by [Liu & Tsai \(2015\)](#). At the same time, the estimated effect remains economically small, suggesting that insider ownership should be viewed as one governance mechanism among many rather than as a sufficient safeguard against earnings manipulation.

Beyond the average relationships, our meta-regression demonstrates that methodological choices explain a substantial share of the heterogeneity reported across primary studies. In particular, estimates differ systematically depending on how REM is measured and whether endogeneity is explicitly addressed. Studies controlling for endogeneity generally report a weaker mitigating association for institutional and family ownership, suggesting that part of the negative association reported in simpler models may reflect omitted variable bias or reverse causality rather than a true monitoring relationship. Moreover, the stronger mitigating association observed when primary studies control for accrual-based earnings management is consistent with the view that firms substitute between REM and accrual-based earnings management (AEM), as proposed by [Cohen et al. \(2008\)](#), rather than employing both strategies simultaneously, as suggested by [Chen et al. \(2012\)](#). These findings reinforce the importance of considering alternative earnings management strategies when evaluating the effectiveness of ownership-based governance mechanisms.

By contrast, several frequently examined study characteristics—including ownership concentration, legal environment, macroeconomic development, publication quality, and journal impact—do not consistently explain significant variation in the reported relationships. Overall, these findings indicate that differences in empirical design contribute more to inconsistencies in the ownership-REM literature than differences in publication quality. More broadly, they illustrate the value of meta-regression analysis as a tool for separating genuine economic relationships from variation introduced by research design and publication selection.

8. Summary, implications and further research

This study provides the first comprehensive meta-analysis examining the relationship between ownership structure and real earnings management (REM). Synthesizing evidence from 49 primary studies comprising 808 reported estimates, we combine meta-regression techniques with formal publication bias correction to evaluate whether institutional, family, and insider ownership are systematically associated with firms' propensity to engage in REM. In doing so, we contribute to the literature by providing a comparative synthesis across ownership types, correcting for publication selection bias, and identifying the methodological and contextual factors that explain the substantial heterogeneity observed in previous research.

Three principal conclusions emerge from the analysis. First, once publication selection bias is accounted for, institutional ownership is not significantly associated with REM, providing no support for the monitoring hypothesis (H1). This finding suggests that the mitigating association widely reported for institutional investors is, at least in part, attributable to publication selection bias. Second, family ownership also exhibits no statistically significant average relationship with REM, providing no support for H2. This conclusion rests on a smaller set of primary studies and should therefore be interpreted with caution. Nevertheless, the heterogeneity analysis demonstrates that the association between family ownership and REM depends on the institutional and cultural environment, with a significantly stronger mitigating association observed in Western countries. Third, insider ownership is associated with significantly lower REM, although the estimated effect is economically modest, providing only partial support for the alignment hypothesis (H3a). More broadly, the meta-regression demonstrates that both national culture and methodological choices—including REM measurement and the treatment of endogeneity—systematically moderate the reported relationships, providing partial support for

hypotheses H4 and H5.

These findings have several practical implications. For regulators and policymakers, the results indicate that ownership structure alone should not be regarded as a universally sufficient governance mechanism for constraining REM. In particular, the evidence does not indicate a consistent monitoring relationship for institutional ownership once publication bias is taken into account. Although insider ownership is associated with lower REM, its relatively small economic magnitude suggests that managerial ownership should complement rather than replace other governance mechanisms, including effective boards of directors, high-quality auditing, and strong legal institutions. For investors, the findings emphasize that the governance implications of ownership structure depend on institutional and cultural context, particularly in family-controlled firms. Finally, for researchers, the results demonstrate the importance of carefully considering research design choices, especially the measurement of REM and the treatment of endogeneity, when interpreting empirical evidence.

Like any meta-analysis, this study is subject to several limitations. First, the analysis is necessarily constrained by the number of available primary studies and by the information reported within them. Second, several moderator variables necessarily aggregate conceptually heterogeneous categories. For example, institutional ownership includes investors with substantially different investment horizons and monitoring incentives. Future meta-analyses could distinguish between transient, quasi-indexer, and dedicated institutional investors, thereby providing a more refined understanding of how different investor types are associated with REM.

Ownership structure represents only one component of the broader corporate governance system. Future research could extend the present analysis by examining the role of corporate gatekeepers, defined by Coffee (2001) as “reputational intermediaries who provide verification

services to investors.” These governance mechanisms include boards of directors, financial analysts, auditors, and other monitoring institutions (Ronen & Yaari, 2008). Such analyses could be complemented by considering managerial characteristics, including gender, professionalism, and remuneration systems, as additional determinants of REM.

Finally, this study deliberately focuses exclusively on real earnings management. While this allows for a more precise synthesis of the REM literature, it does not permit conclusions regarding overall earnings quality. Earnings quality is a broader construct that is also affected by AEM and classification shifting. Future meta-analytic research could therefore jointly examine the relationships between ownership structure and the full spectrum of EM strategies including REM, AEM, and classification shifting to provide a more comprehensive understanding of how corporate governance shapes overall earnings quality.

CRediT authorship contribution statement

Bartosz Kabaciński: Conceptualization, Methodology, Data curation, Writing – original draft, Writing – review & editing. **Jerome Geyer-Klingeborg:** Methodology, Formal analysis, Writing – review & editing. **Jacek Mizerka:** Conceptualization, Methodology, Data curation, Writing – original draft, Writing – review & editing, Supervision. **Agnieszka Stróżyńska-Szajek:** Conceptualization, Methodology, Data curation, Writing – original draft, Writing – review & editing, Visualization. **Andreas Rathgeber:** Writing – review & editing.

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Appendix A. List of primary studies included in the meta-analysis

F, IS	Achleitner A.-K., Günther N., Kaserer C., Siciliano G. (2014), Real earnings management and accrual-based earnings management in family firms, <i>European Accounting Review</i> , 23(3): 431–461.
IN	Alawag G. (2021), Business group opportunism: the difference in real earnings management between parent firms and nonparent firms, <i>Asian Journal of Accounting Research</i> , 6(2), 246–261; doi: https://doi.org/10.1108/AJAR-07-2020-0046 .
IN	Alhadab M., Nguyen T. (2018), Corporate diversification and accrual and real earnings management, <i>Review of Accounting and Finance</i> , 17(2): 198–214, doi: https://doi.org/10.1108/RAF-06-2016-0098 .
IS	Al-Haddad L., Whittington M. (2019), The impact of corporate governance mechanisms on real and accrual earnings management practices: evidence from Jordan, <i>Corporate Governance: The International Journal of Business in Society</i> , 19(6): 1167–1186, doi: https://doi.org/10.1108/CG-05-2018-0183 .
IN	Ashraf B.N., Qian N. (2021), The Impact of Board Internationalization on Real Earnings Management: Evidence From China, <i>SAGE Open</i> , 11(3), 215824402110326, doi: https://doi.org/10.1177/21582440211032640 .
IN, F	Attig N., Chen R., El Ghouli S., Guedhami O., Kwok C., Pittman J. (2020), Are insiders equal? Evidence from earnings management in closely held East Asian firms, <i>Research in International Business and Finance</i> , 54, 101243, doi: https://doi.org/10.1016/j.ribaf.2020.101243 .
F	Chang L.-L., Guan Y.-D., Hsiao D.F. (2017), An exploratory study of female directors' constraint on real earnings management, <i>Corporate Management Review</i> , 37(2): 31–85.
IS	Chen C.-L., Huang S.-H., Fan H.-S. (2012), Complementary association between real activities and accruals-based manipulation in earnings reporting, <i>Journal of Economic Policy Reform</i> , 15(2): 93–108, doi: https://doi.org/10.1080/17487870.2012.667965 .
IS	Chi W., Lisic L.L., Pevzner M. (2011), Is Enhanced Audit Quality Associated with Greater Real Earnings Management?, <i>Accounting Horizons</i> , 25(2): 315–335, doi: https://doi.org/10.2308/acch-10.025 .
IS	Cohen D.A., Dey A., Lys T.Z. (2008), Real and Accrual-Based Earnings Management in the Pre- and Post-Sarbanes-Oxley Periods, <i>The Accounting Review</i> , 83(3): 757–787.
IN, IS	Debnath N.C., Chowdhury S.P., Khan S. (2021), Ownership structure and real earnings management: An empirical study on emerging economy, <i>Corporate Ownership and Control</i> , 18(2): 74–89, doi: 10.22495/cocv18i2art6 .
IS	Demers E., Wang Ch. (2010), The impact of CEO career concerns on accruals based and real earnings management, <i>SSRN Electronic Journal</i> , https://doi.org/10.2139/ssrn.1562428 .
IN, IS	Dong N., Wang F., Zhang J., Zhou J. (2020), Ownership structure and real earnings management: Evidence from China, <i>Journal of Accounting and Public Policy</i> , 39(3), 106733, doi: https://doi.org/10.1016/j.jaccpubpol.2020.106733 .
IN	Dou Y., Hope O.-K., Thomas W.B., Zou Y. (2016), Individual Large Shareholders, Earnings Management, and Capital-Market Consequences, <i>Journal of Business Finance & Accounting</i> , 43(7–8): 872–902, doi: https://doi.org/10.1111/jbfa.12204 .
F	Eng L.L., Fang H., Tian X., Yu T.R., Zhang H. (2019), Financial crisis and real earnings management in family firms: A comparison between China and the United States, <i>Journal of International Financial Markets, Institutions and Money</i> , 59: 184–201, doi: https://doi.org/10.1016/j.intfin.2018.12.008 .
IN	Farooqi J., Harris O., Ngo T. (2014), Corporate diversification, real activities manipulation, and firm value, <i>Journal of Multinational Financial Management</i> , 27: 130–151, doi: https://doi.org/10.1016/j.mulfin.2014.06.010 .
F	Feki Cherif Z., Damak Ayadi S., Ben Hamad S.B. (2020), The effect of family ownership on accrual-based and real activities based earnings management: Evidence from the French context, <i>Journal Of Accounting And Management Information Systems</i> , 19(2): 283–310, doi: 10.24818/jamis.2020.02004 .
IN	Garel A., Martin-Flores J.M., Petit-Romec A., Scott A. (2021), Institutional investor distraction and earnings management, <i>Journal of Corporate Finance</i> , 66, 101801, doi: https://doi.org/10.1016/j.jcorpfin.2020.101801 .

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IN, IS	Griffin P.A., Hong H.A., Liu Y., Ryou J.W. (2021), The dark side of CEO social capital: Evidence from real earnings management and future operating performance, <i>Journal of Corporate Finance</i> , 68, 101920, doi: https://doi.org/10.1016/j.jcorpfin.2021.101920 .
F, IS	Gunther N. (2011), Drivers of Earnings Management and Conservatism in the German Stock Market: Effects of IFRS Adoption and Family Governance.
IS	Haga J., Höglund H., Sundvik D. (2018), Stock market listing status and real earnings management, <i>Journal of Accounting and Public Policy</i> , 37(5): 420–435, doi: https://doi.org/10.1016/j.jaccpubpol.2018.09.002 .
IN, IS	Hsu M.-F. (2015), The Influence of Institutional and Insider's Ownership on Accrual and Real Earnings Management, <i>International Research Journal of Applied Finance</i> , 6 (4): 222–249.
IN, IS	Hsu M.-F., Wen S.-Y. (2015), The Influence of Corporate Governance in Chinese Companies on Discretionary Accruals and Real Earnings Management, <i>Asian Economic and Financial Review</i> , 5(3): 391–406, doi: 10.18488/journal.aefr/2015.5.3/102.3.391.406 .
F	Ibrahim G., Mansor N., Nasidi M. (2020), Mediating Effect of Audit Committee Independence on the Link Between Firms Internal Governance Tunneling from Real Earnings Management, <i>International Journal of Academic Research in Business and Social Sciences</i> , 10(2), doi: https://doi.org/10.6007/IJARBSS/v10-i2/6920 .
IN	Kaldoniski M., Jewartowski T. (2017), Agency Costs of Overvalued Equity and Earnings Management in Companies Listed on WSE, <i>Economics and Business Review</i> , 3(17, 1): 7–37, doi: 10.18559/eb.2017.1.2 .
IN	Kaldoniski M., Jewartowski T., Mizerka J. (2020), Capital market pressure, real earnings management, and institutional ownership stability - Evidence from Poland, <i>International Review of Financial Analysis</i> , 71, 101315, doi: https://doi.org/10.1016/j.irfa.2019.01.009 .
IS	Kang S.-A., Kim Y.-S. (2012), Effect Of Corporate Governance On Real Activity-Based Earnings Management: Evidence From Korea, <i>Journal of Business Economics and Management</i> , 13(1): 29–52, doi: https://doi.org/10.3846/16111699.2011.620164 .
IS	Laksmiana I., Yang Y. (2014), Product market competition and earnings management: Evidence from discretionary accruals and real activity manipulation, <i>Advances in Accounting</i> , 30(2): 263–275, doi: https://doi.org/10.1016/j.adiaac.2014.09.003 .
IN	Lemma T.T., Negash M., Mlilo M., Lulseged, A. (2018), Institutional ownership, product market competition, and earnings management: Some evidence from international data, <i>Journal of Business Research</i> , 90: 151–163, doi: https://doi.org/10.1016/j.jbusres.2018.04.035 .
IN	Li C., Tseng Y., Chen T.-K. (2016), Top management team expertise and corporate real earnings management activities. <i>Advances in Accounting</i> , 34: 117–132. doi: https://doi.org/10.1016/j.adiaac.2016.07.007 .
IN, IS	Liu J.-L., Tsai C.-C. (2015), Board Member Characteristics and Ownership Structure Impacts on Real Earnings Management, <i>Accounting and Finance Research</i> , 4(4), doi: https://doi.org/10.5430/afr.v4n4p84 .
F	Liu M., Shi Y., Wilson C., Wu Z. (2017), Does family involvement explain why corporate social responsibility affects earnings management?, <i>Journal of Business Research</i> , 75: 8–16, doi: https://doi.org/10.1016/j.jbusres.2017.02.001 .
IS	Luo H., Zeng Y., Wan L., Shen Y. (2016), Executive heterogeneity, pay bandwagon, and earnings management, <i>Nankai Business Review International</i> , 7(4): 426–450, doi: https://doi.org/10.1108/NBRI-04-2016-0015 .
F	Masri I. (2018), The role of corporate governance in the relationships of family company with real earnings management, <i>Jurnal Akuntansi</i> , 22(1), doi: 10.24912/ja.v22i1.322 .
IN	Mellado, C., & Saona, P. (2020), Real earnings management and corporate governance: a study of Latin America, <i>Economic Research-Ekonomska Istraživanja</i> , 33(1): 2229–2268, doi: https://doi.org/10.1080/1331677X.2019.1691930 .
IN, IS	Min C. (2015), Chinese Sate Controlling, Institutional Participation and Real Earnings Management, <i>International Journal of Economics and Finance</i> , 7(9), doi: https://doi.org/10.5539/ijef.v7n9p255 .
IN, IS	Piosik A., Genge E. (2020), The Influence of a Company's Ownership Structure on Upward Real Earnings Management, <i>Sustainability</i> , 12(1): 152, doi: https://doi.org/10.3390/su12010152 .
F	Razzaque R.M.R., Ali M.J., Mather P.R. (2016), Real earnings management in family firms: Evidence from an emerging economy, <i>Pacific-Basin Finance Journal</i> , doi: https://doi.org/10.1016/j.pacfin.2015.12.005 .
F	Razzaque R.M., Ali M.J., Mather P. (2020), Corporate governance reform and family firms: Evidence from an emerging economy, <i>Pacific-Basin Finance Journal</i> , 59, 101260, doi: https://doi.org/10.1016/j.pacfin.2019.101260 .
IN	Sakaki H., Jackson D., Jory S. (2017), Institutional ownership stability and real earnings management, <i>Review of Quantitative Finance and Accounting</i> , 49(1): 227–244, doi: https://doi.org/10.1007/s11156-016-0588-7 .
IS	Sani A.A., Abdul Latif R., Al-Dhamari R.A. (2020), CEO discretion, political connection and real earnings management in Nigeria, <i>Management Research Review</i> , 43(8): 909–929, doi: https://doi.org/10.1108/MRR-12-2018-0460 .
IN	Shawn H., Lee H., Jung J., Moon S. (2016), Relation Between Real Earnings Management And Audit Quality, <i>The Journal of Applied Business Research</i> , 32(3): 967–980.
IN, IS	Shayan-Nia M., Sinnadurai P., Mohd-Sanusi Z., Hermawan A.-N.A. (2017), How efficient ownership structure monitors income manipulation? Evidence of real earnings management among Malaysian firms, <i>Research in International Business and Finance</i> , 41: 54–66, doi: https://doi.org/10.1016/j.ribaf.2017.04.013 .
IN, IS	Sohn B.C. (2016), The effect of accounting comparability on the accrual-based and real earnings management, <i>Journal of Accounting and Public Policy</i> , 35(5), 513–539, doi: https://doi.org/10.1016/j.jaccpubpol.2016.06.003 .
IS	Sun J., Liu, G. (2016), Does analyst coverage constrain real earnings management?, <i>The Quarterly Review of Economics and Finance</i> , 59: 131–140, doi: https://doi.org/10.1016/j.qref.2015.03.009 .
IN, F	Surifah S. (2015), The effect of the type of controlling shareholders and corporate governance on real and accruals earnings management, <i>Corporate Ownership and Control</i> , 13(1): 927–935, doi: 10.22495/cocv13i1c8p10 .
IN, F, IS	Tang H.-W., Chen A. (2020), How do market power and industry competition influence the effect of corporate governance on earnings management?, <i>The Quarterly Review of Economics and Finance</i> , 78: 212–225, doi: https://doi.org/10.1016/j.qref.2020.02.001 .
IN, F	Wei Y.-S., Chou S.-C. (2020), Corporate entity representatives of business group and real earnings management: evidence from Taiwan, <i>Asia-Pacific Journal of Accounting & Economics</i> , 27(4): 490–509, doi: https://doi.org/10.1080/16081625.2018.1517603 .
IN, IS	Zhao Y., Chen K.H., Zhang Y., Davis M. (2012), Takeover protection and managerial myopia: Evidence from real earnings management, <i>Journal of Accounting and Public Policy</i> , 31(1): 109–135, doi: https://doi.org/10.1016/j.jaccpubpol.2011.08.004 .

Appendix B. List of moderators used in meta-regression

Table B

Variables used in the study and their definitions.

Type of moderator	Variable name	Definition
Institutional ownership stability	Control for Inst Stability	1 if in a primary study regression, the stability of institutional ownership has been controlled, 0 otherwise
Ownership concentration	Control for Concentration	1 if in a primary study regression, ownership concentration has been controlled, 0 otherwise
Variable of interest	Focus Variable	1 if the independent variable referring to a certain type of ownership was a focus variable in the primary study, 0 otherwise

(continued on next page)

Table B (continued)

Type of moderator	Variable name	Definition
Ownership presence	Ownership Presence	1 if the primary study measures ownership using only an indicator of the presence of the particular owner (family, insider), 0 if the primary study measures ownership using the share of the particular owner (family, insider).
Differences in the regional origin of research samples	North America *	1 if the research sample of the primary study contains North American companies, 0 otherwise
	Non-North America	1 if the research sample of the primary study contains non-North American companies, 0 otherwise
Cultural differences in regions of research samples	Western*	1 if the research sample of the primary study contains companies from Western culture cycle, 0 otherwise
	China	1 if the research sample of the primary study contains companies from the Chinese culture cycle, 0 otherwise
	Other	1 if the research sample of the primary study contains companies from other than Western or Chinese culture cycle, 0 otherwise
Differences in real earnings management measurement	REM_Total*	1 if the dependent variable was capturing three dimensions of real earnings management (abnormal production costs, abnormal operating cash flows, and abnormal discretionary expenses), 0 otherwise
	REM_Dual	1 if the dependent variable was capturing two dimensions of real earnings management, 0 otherwise
	REM_1_Element	1 if the dependent variable was capturing one dimension of real earnings management, 0 otherwise
Inclusion of important control variables	Control for Profit	1 if in a primary study regression, the company's profitability has been controlled, 0 otherwise
	Control for MTB	1 if in a primary study regression, the company's market to book value has been controlled, 0 otherwise
	Control for AEM	1 if a primary study regression controlled for accrual-based earnings management, 0 otherwise
Methodological heterogeneity	Control for Fixed Effects	1 if a primary study regression model was a panel fixed effects model, 0 otherwise
	Control for Endogeneity	1 if in a primary study regression model, the endogeneity problem was addressed, 0 otherwise
	Control for Robust SE	1 if a primary study regression model was based on a robust standard errors approach, 0 otherwise
Differences in macro variables	Rule of Law Index	The rule of law index value
Differences in publication quality	Ln GDP per capita	Natural logarithm for gross domestic product per capita
	Publ Peer Review	1 if a primary study was published in a peer-reviewed journal, 0 otherwise
Differences in the sample characteristics	Ln # Study Citation	Natural logarithm from citation score
	Ln # Observations in Estimation	Natural logarithm from the number of observations in the primary estimation
	Average Year of Data	Average year of the data under examination in the primary study

Notes: * denotes baseline category, which is omitted in the meta-regression.

Data availability

Data will be made available on request.

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