The impact of the 2016 EU audit reforms, oversight, and corruption on earnings management: evidence from European banks using a dynamic panel approach

International Journal of Finance & Economics

WILEY

RESEARCH ARTICLE OPEN ACCESS

The Impact of the 2016 EU Audit Reforms, Oversight, and Corruption on Earnings Management: Evidence From European Banks Using a Dynamic Panel Approach

Maria Christofidou[1] | Epameinondas Katsikas[2] | Dimitrios Koufopoulos[3] | Konstantinos Spanos[4]

[1]Henley Business School, University of Reading, Reading, UK | [2]Faculty of Social Sciences, Northeastern University of London, London, UK | [3]University of London Worldwide, London, UK | [4]Business School, Oxford Brookes University, Oxford, UK

Correspondence: Konstantinos Spanos (kspanos@brookes.ac.uk)

Received: 16 January 2025 | **Revised:** 22 October 2025 | **Accepted:** 18 November 2025

Keywords: banks | corruption | earnings management | EU directive 2014/56 | loan loss provisions | panel

ABSTRACT

This study investigates earnings management in European banks in the context of the 2016 EU audit directive. Using a dynamic panel of 134 banks over 2012–2023, we apply two-step System-GMM estimators with three profitability measures—Earnings Before Provisions and Taxes (EBPT), Return on Assets (ROA), and Return on Equity (ROE). The results show that earnings management was persistent before the directive but declined markedly thereafter. Profitability constrained manipulation in the pre-directive period, but its influence largely disappeared as regulation emerged as the dominant disciplining force—except for EBPT, which gained importance after 2016. Capitalization reduced manipulation before the directive but lost significance afterward, while economic growth, which previously fuelled manipulation, was fully neutralised. Governance effects also shifted: institutional quality alone did not reduce manipulation, but the directive enhanced its effectiveness, whereas governance divergence showed weaker and less stable effects. These findings advance scholarly understanding of how regulation and governance interact to shape earnings management and highlight practical implications for policymakers, regulators, auditors and bank managers.

1 | Introduction

Earnings management in the banking sector has long attracted the attention of regulators, scholars and practitioners because of its implications for transparency, financial stability and market confidence (Beatty and Liao 2014; Tran et al. 2018; Nikulin and Downing 2020; Di Martino et al. 2017). Banks often face incentives to manipulate reported earnings to smooth income, meet capital requirements or influence perceptions of financial health (Garsva et al. 2012; Peterson 2019; Lourenço et al. 2018). From a theoretical perspective, this behaviour is consistent with agency theory (Jensen and Meckling 1976; McNichols and Wilson 1988; Kanagaretnam et al. 2004), which emphasises managerial incentives to protect private benefits, and the political cost hypothesis, which suggests firms adjust reported earnings to avoid regulatory scrutiny or higher capital demands. Signalling theory further highlights the strategic use of reported earnings to project financial strength, especially in uncertain environments (Beatty and Liao 2014).

The role of regulatory frameworks in mitigating earnings management (EM) has been widely studied. In the US, the Sarbanes–Oxley Act (SOX) was found to reduce EM (Krishnan et al. 2011), although other studies reported only marginal improvements in audit quality (Davis et al. 2009). Similar effects have been observed internationally. Barth et al. (2008) showed that the adoption of International Accounting Standards (IAS) improved transparency through less EM and more timely loss

recognition, though they acknowledged that institutional incentives also played a role. Conversely, Ahmed et al. (2013) documented that mandatory IFRS adoption in 2005 initially increased income smoothing and aggressive accruals, contrasting with findings by Leventis et al. (2011) of improved accounting quality. More recent studies emphasise contextual variation: Nikulin and Downing (2020) reported no significant reduction in EM among Russian banks after regulatory changes, while Di Fabio et al. (2021) found that stricter supervision can reduce EM but also encourage income smoothing as banks signal stability under pressure. Finally, Aggelopoulos et al. (2025) highlighted a novel within-year mechanism, showing how banks shift provisions throughout the year to manage reported income, particularly during recessions.

Audit quality and governance mechanisms are central in constraining such practices. Stronger oversight and effective governance frameworks can limit discretionary behaviour, enhance transparency and improve the credibility of financial reporting. However, the effectiveness of governance varies across contexts. In particular, corruption and anti–money laundering (AML) enforcement influence financial integrity.

Studies have shown that higher levels of corruption are linked to weaker investor protection and greater manipulation, while robust AML systems strengthen monitoring and compliance (Lourenço et al. 2018; Peterson 2019). Related evidence highlights how corruption interacts with banks' provisioning practices: Akins et al. (2017) show that banks in corrupt environments delay loan loss recognition to smooth income, while Lee et al. (2022) find that CEO overconfidence amplifies such behaviour, although stronger institutions mitigate the effect. These findings underline the importance of institutional quality in moderating discretionary behaviour. Caramanis and Lennox (2007) established a negative relationship between audit effort and upward earnings management, suggesting that thorough audits can effectively deter EM.

Additionally, Bratten et al. (2020) demonstrated that banks engaging industry specialist auditors exhibit reduced LLP-based earnings management due to the auditors' greater expertise in detecting discretionary practices. Salema et al. (2021) showed that Big Four audit firms reduce EM in Islamic banks in the MENA region, though the impact was not significant for conventional banks. The introduction of Directive 2014/56/EU in Europe, which mandates auditor rotation and limits non-audit services, was specifically designed to enhance audit quality and reduce earnings manipulation.

Another important dimension highlighted in the literature is that accounting measures, even when well-intentioned and well-designed, do not necessarily reduce corruption, as they may be circumvented, watered down, or even transformed into tools that facilitate corrupt practices rather than prevent them. This suggests that anti-corruption strategies should not rely on accounting mechanisms in isolation but should instead be deployed synergistically, combining multiple approaches tailored to the specific context in which corrupt activities occur (Anessi-Pessina et al. 2024).

Recent work has also examined the broader consequences of the 2014 European audit reform. For example, Castillo-Merino et al. (2024) analyse the reform's impact on audit activity, audit outcomes, and the audit market, providing qualitative evidence on the auditing profession rather than on banks' reporting behaviour. Similarly, Zarza Herranz et al. (2020) investigate audit committee competence and earnings management in non-financial firms across major EU countries (2006–2013), showing that governance capacity matters for constraining manipulation. While these studies shed light on related governance dimensions, neither directly evaluates the role of Directive 2014/56/EU in shaping earnings management within the EU banking sector.

The European Union sought to address these challenges by introducing Directive 2014/56/EU, which came into effect in 2016. The directive aimed to improve audit quality, harmonise standards, and strengthen governance in response to weaknesses revealed by the global financial crisis. This regulatory reform provides a unique natural experiment to assess how external oversight alters the persistence of earnings management and the role of governance in constraining it. While prior studies have examined the determinants of earnings management and the role of governance in non-financial firms, there remains limited evidence on how major regulatory reforms affect banks' incentives to engage in earnings manipulation, particularly in relation to profitability and institutional quality.

Although the literature on earnings management in banks is extensive, evidence on how regulatory reforms reshape managerial discretion remains fragmented. Studies on IFRS adoption, the Sarbanes–Oxley Act in the U.S., and other international reforms yield mixed results—some finding improvements in reporting quality (Barth et al. 2008; Leventis et al. 2011), others reporting limited or even adverse effects (Ahmed et al. 2013; Nikulin and Downing 2020). Much of this work also focuses narrowly on discretionary loan loss provisions, leaving open how broader profitability dynamics and institutional settings mediate regulation's effects. Recent contributions, such as Castillo-Merino et al. (2024) on audit activity and Zarza Herranz et al. (2020) on audit committee expertise, address related governance dimensions but stop short of evaluating the direct consequences of Directive 2014/56/EU in the banking sector. This reform, implemented in 2016, provides a unique natural experiment to test whether stronger audit oversight and governance harmonisation reduce entrenched earnings management practices.

Accordingly, this paper asks: How did Directive 2014/56/EU reshape earnings management in European banks, and through which profitability and governance channels did these effects materialise? This study makes four contributions. First, it provides the first systematic empirical evidence on the impact of Directive 2014/56/EU in the banking sector, using a dynamic panel dataset of 134 banks across 26 EU countries over 2012–2023. This design spans both pre- and post-reform periods and employs a two-step System-GMM estimator that explicitly models persistence in earnings management. This enables us to identify not only whether the directive reduced manipulation but also whether it broke the entrenched continuity of such practices. Second, it extends prior work on corruption and loan-loss provisioning (e.g., Akins et al. 2017; Lee et al. 2022) by moving beyond a single focus on discretionary provisions to examine earnings management across multiple profitability measures (earnings before provisions and taxes, return on assets, and

return on equity). Third, it incorporates macroeconomic conditions and introduces novel governance indices—capturing institutional quality and governance divergence through corruption control and anti–money laundering enforcement—thus linking regulatory reform with institutional effectiveness in ways not previously examined. Fourth, it generates important policy insights: regulatory oversight curbs entrenched manipulation and strengthens institutional discipline, yet equity-related earnings management remains more persistent, suggesting the need for complementary reforms.

Together, these contributions advance theoretical debates on agency, political cost, and signalling theories by clarifying how external regulation interacts with profitability and governance to shape earnings management, while also providing practical guidance for regulators, auditors and bank managers.

The remainder of the paper is structured as follows. Section 2 describes the data and methodology. Section 3 presents the estimated results. Section 4 reports robustness checks. Section 5 discusses the main findings and their implications. Section 6 concludes.

2 | Data and Methodology

2.1 | Data

This study analyses annual data from a panel of 134 banks across 26 EU countries over the period 2012–2023. The data and sample used in this study provide several advantages. First, the coverage of 134 banks across 26[1] EU countries represents approximately 85%–90% of total banking assets, ensuring representativeness of the European sector. Second, the observation period (2012–2023) spans both the pre- and post-directive phases, enabling a robust evaluation of regulatory effects. Third, the focus on listed and systemically important institutions guarantees higher-quality disclosures and comparability under IFRS reporting standards. Table 1 provides detailed descriptions of the variables, their definitions, and the respective data sources used.

At the same time, the sample design presents limitations. The exclusion of smaller and unlisted banks restricts generalizability beyond the largest institutions. Moreover, the exclusive focus on EU banks limits external validity to non-European settings, where institutional frameworks may differ significantly. Finally, the reliance on annual, secondary data prevents us from capturing intra-year patterns of earnings management, such as those identified in studies employing monthly observations (Aggelopoulos et al. 2025).

Other studies have adopted different strategies. For example, Bratten et al. (2020) examined 273 US banks over 2000–2008 to derive institutional insights, while Akins et al. (2017) and Lee et al. (2022) exploited broader cross-country datasets, offering greater external validity but with less comparability in institutional settings. Nikulin and Downing (2020) focused on Russia, underscoring the role of local regulation in shaping earnings management. Alternative approaches might involve cross-industry global datasets, loan-level or transaction-level microdata, or quarterly/monthly reporting data to capture finer earnings management dynamics. Although these approaches expand scope or granularity, they often face challenges of availability, consistency and comparability.

2.2 | Methodology

We measure earnings management through the discretionary component of loan loss provisions (DLLP), following Cornett

TABLE 1 | List of variables and sources.

Variables	Description	Sources
LoanLossesProvisons	Closing provision for loan losses as a fraction of Total Loans at the Beginning of the period (%)	SNL
NonPerformingLoans	Non-Performing Loans as a fraction of Total Loans at the Beginning of the period (%)	SNL
AllowanceLoansLosses	Allowance for Loan Losses (Total Loans -Net Loans) as a fraction of Total Loans, all at the Beginning of the Period (%)	SNL
CapitalAssetsRatio	Capital Adequacy Ratio (%)	SNL
EarningsBeforeProvisonsTaxes	Earnings Before Provision for Taxes as a fraction of Opening Total assets (%)	
BankSize	Logarithm of Total Assets	SNL
ReturnsOnAssets	Return on Assets (%)	SNL
ReturnsOnEquity	Return on Equity (%)	SNL
EconomicGrowth	Annual percentage growth rate of GDP (%)	World Bank
Corruption Perception Index	Corruption Perception Index- range of 0–100	TI website
Anti-Money Laundering Index	Anti-Money Laundering Index (0 = Low Risk 10 = High Risk)	BIG

Note: Summary statistics and the correlation matrix are presented in Appendix A (Tables A2 and A3). The list of banks by country is available from the authors upon request to conserve space. Corruption Perceptions Index (CPI) published by Transparency International https://www.transparency.org/en/cpi, while the Anti-Money Laundering (AML) Index published by the Basel Institute on Governance https://index.baselgovernance.org/ranking.

et al. (2009). In the first step, non-discretionary LLP (NDLLP) is estimated as a function of observable credit risk factors:

$$LLP_{it} = \alpha + \beta_1 NPL_{it} + \beta_2 ALL_{it} + \beta_3 GGDP_{it} + \varepsilon_{it} \quad (1)$$

where *LLP* represents Loan Loss Provisions of bank i in year t, NPL stands for non-performing loans, *ALL* indicates Allowance for Loan Losses, and *GGDP* represents economic growth. Finally, ϵ is the residual term, capturing discretionary provisions (*DLLP*). The fitted values $\widehat{LLP}_{it}$ from the panel OLS model represent *NDLLP*, reflecting the portion of *LLP* aligned with credit risk and regulatory compliance. The residual term $\left(\varepsilon_{it} = LLP_{it} - \widehat{LLP}_{it}\right)$ quantifies *DLLP*, capturing the discretionary adjustments made to *LLP*, which are indicative of earnings management practices. The estimation results for equation (1) are presented in Appendix A (See Table A1). In the second step, we model DLLP in a dynamic panel setting:

$$DLLP_{it} = \alpha + \beta_1 DLLP_{it-1} + \beta_2 X_{it} + \beta_3 Z_{it} + \mu_i + \lambda_t + u_{it} \quad (2)$$

where X_{it} includes bank-level controls (profitability, capitalization, size), and Z_{it} includes macroeconomic and governance variables. Bank (μ_i) and time (λ_t) effects are included.

The model is estimated using the system GMM estimator of Blundell and Bond (1998), which is appropriate for panels with large N and smaller T. To avoid instrument proliferation, we collapse instruments and restrict lag depth, and we report Hansen tests for instrument validity and Arellano–Bond tests for serial correlation. Robustness checks are conducted using alternative profitability measures (ROA, ROE).

System GMM was chosen because it is well suited for dynamic panels with large N and small T, as in our sample. The estimator effectively models persistence in earnings management, addresses endogeneity by using internal instruments, and ensures efficiency compared to difference GMM in the presence of strong autoregressive dynamics. Our main results are based on the two-step estimator, which is more efficient in the presence of heteroskedasticity. For completeness, we also computed one-step estimates, which yield qualitatively similar results and are available upon request. These features make it the most appropriate method for our research design. Nonetheless, this approach has limitations. System GMM is prone to instrument proliferation and small-sample bias, and its results are sensitive to instrument selection. To mitigate these risks, we collapsed instruments and restricted lag depth. Still, the method is technically demanding and may be less transparent to readers unfamiliar with dynamic panel techniques.

Prior studies illustrate the range of methodological choices. Cornett et al. (2009) employed OLS and fixed effects, while Bratten et al. (2020) and Akins et al. (2017) relied on difference GMM. Di Fabio et al. (2021) applied quantile regressions to capture heterogeneity, and Houqe and Monem (2016) used panel OLS in global settings. Alternatives to our approach include fixed-effects instrumental-variable models, which are easier to interpret but weaker in handling persistence; difference-in-differences designs exploiting the directive as a natural experiment; or quantile and Bayesian dynamic models, which allow for richer heterogeneity but require more complex assumptions. Each alternative provides useful perspectives, though system GMM remains the most efficient and reliable estimator given our objectives and data structure.

To capture governance quality, we construct two indices using Principal Component Analysis (PCA) on the Corruption Perceptions Index (CPI) and the Anti–Money Laundering (AML) Index. The first component, the Institutional Quality Index, reflects overall governance strength, combining lower corruption and stronger AML enforcement. The second, the Governance Divergence Index, captures discrepancies between corruption control and AML performance. Detailed PCA results and loadings are reported in Appendix B.

All variables were tested for stationarity using standard panel unit root tests (Levin–Lin–Chu, Im–Pesaran–Shin and Fisher-ADF). The results confirm that the variables are stationary, ensuring that our estimations are not affected by spurious correlations. For brevity, detailed outputs are omitted but are available upon request.

3 | Estimated Results

In this section, we present the results of the Generalised Method of Moments (GMM) estimators for Earnings Management. Table 2 reports the results of the two-step System-GMM estimator. Models I and II cover the full sample period without distinguishing between the pre- and post-directive environments, while Models III and IV introduce interactions with a post-2016 EU directive dummy, enabling an assessment of how the directive altered the determinants of earnings management.

Across the full period (Models I and II), earnings management is found to be highly persistent, with the lagged dependent variable positive and significant, indicating that banks engaged in manipulation are likely to continue doing so. Profitability (EBPT) is negatively signed but insignificant, while capitalization (CAR) is consistently negative and significant, suggesting that better-capitalised banks were less prone to manipulation. Bank size does not play a significant role, as its coefficients remain small and statistically insignificant. Economic growth is positively and significantly associated with earnings management, showing that expansionary conditions increased incentives for manipulation throughout the full sample. Turning to governance variables (Model II), institutional quality is surprisingly positive and significant, implying that stronger formal institutions alone did not constrain manipulation, whereas governance divergence is negative and significant, suggesting that divergence between corruption control and AML enforcement limited earnings management opportunities.

Models III and IV provide insights into how the determinants of earnings management differ between the pre- and post-directive periods. The lagged dependent variable remains positive and significant in the pre-directive setting, confirming strong persistence of manipulation, whereas after 2016, the

TABLE 2 | System-GMM two-step estimated results (earnings before provisions and taxes).

	Model I	Model II	Model III	Model IV
LaggedEarningsManagement	0.392***	0.385***	0.604***	0.267**
	(0.052)	(0.054)	(0.185)	(0.110)
EarningsBeforeProvisonTaxes	−0.087	−0.090	−0.070**	−0.064
	(0.074)	(0.074)	(0.035)	(0.064)
CapitalAssetsRatio	−0.040***	−0.041***	−0.052***	−0.038*
	(0.009)	(0.010)	(0.018)	(0.020)
BanksSize	−0.066	−0.054	0.002	0.219
	(0.145)	(0.143)	(0.243)	(0.214)
EconomicGrowth	0.014**	0.014**	0.079**	0.055***
	(0.006)	(0.006)	(0.029)	(0.018)
Institutional Quality Index		0.432**		1.193***
		(0.217)		(0.343)
Governance Divergence Index		−0.473**		−0.490*
		(0.219)		(0.272)
Directive_LaggedEarningsManagement			−0.026	0.019
			(0.500)	(0.385)
Directive_EarningsBeforeProvisonTaxes			−0.168***	−0.214***
			(0.063)	(0.082)
Directive_CapitalAssetsRatio			0.018	0.002
			(0.011)	(0.018)
Directive__ BanksSize			0.006	0.023
			(0.012)	(0.019)
Directive_ EconomicGrowth			−0.069**	−0.040**
			(0.029)	(0.019)
Directive_ Institutional Quality Index				−1.162**
				(0.451)
Directive_ Governance Divergence Index				0.429
				(0.291)
_cons	2.119	1.930	0.925	−3.172
	(2.554)	(2.516)	(4.373)	(3.955)
Obs	1607	1607	1607	1607
AR(1) (*p*-value)	0.00	0.05	0.04	0.01
AR(2) (*p*-value)	0.976	0.983	0.843	0.324
Hansen (*p*-value)	0.461	0.324	0.134	0.449
Diff-in-Hansen (*p*-value)	0.533	0.208	0.134	0.255
Nr. of Instruments	10	12	12	19
Groups	134	134	134	134

Note: Significance level: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The AR(1) *p*-values indicate first-order serial correlation, while non-significant AR(2) *p*-values confirm the absence of second-order correlation. Hansen test results show that the instrument set is valid and not overidentified, and Difference-in-Hansen tests further confirm the validity of instrument subsets.

directive interaction terms are insignificant, indicating that persistence disappeared entirely. Profitability shows a stronger disciplining effect in the post-directive period: while the negative coefficients are weakly significant before 2016, the interaction terms reinforce this effect, suggesting that more profitable banks became even less likely to engage in manipulation after the reform. Capitalization plays an important role only before the directive, with consistently negative and significant coefficients, but its effect vanishes afterwards, implying that.

Bank size does not significantly affect earnings management in either period, and the directive does not materially alter this result. Economic growth, however, exhibits a clear shift: in the pre-directive period, expansionary conditions encouraged earnings management, as shown by the positive and significant coefficients. The directive interaction terms are negative and significant, neutralising this effect in the post-directive period and suggesting that the reform curtailed opportunities to exploit favourable macroeconomic conditions for manipulation. Governance-related variables also change meaningfully. Institutional quality is positively associated with earnings management in the pre-directive period, indicating that stronger institutions alone did not constrain manipulation, but this effect is eliminated once the directive is introduced, showing that the reform enhanced the disciplining role of institutions. Governance divergence, by contrast, is negatively associated with earnings management before 2016 but becomes insignificant afterwards, implying that the directive did not reinforce this channel.

Taken together, Models III and IV show that the directive substantially reshaped the drivers of earnings management: persistence largely diminished, profitability became a stronger constraint, capitalization ceased to matter independently, economic growth stopped fuelling manipulation, and institutional quality turned from a risk factor into a disciplining mechanism.

To ensure the validity of our estimates, we report a uniform set of diagnostic statistics across all tables. As expected in dynamic panel models, the AR(1) tests consistently indicate first-order serial correlation, which reflects the construction of the lagged dependent variable and does not bias the results. More importantly, the AR(2) tests show no evidence of second-order correlation, validating our specification. The Hansen test results confirm that the instrument sets are valid and not overidentified, while difference-in-Hansen tests (not tabulated) support the validity of instrument subsets. Finally, the number of instruments remains well below the number of groups, avoiding instrument proliferation. Taken together, these diagnostics provide reassurance that the System-GMM estimates are both reliable and robust.

4 | Robustness Check

To ensure the robustness of the previous findings, we replace Earnings Before Provisions and Taxes with Returns on Assets and Returns on Equity as alternative profitability measures. These checks help validate whether the observed relationships, including the impact of governance factors and the EU directive, remain consistent across different profitability metrics.

In Table 3, where Returns on Assets is examined as alternative profitability measure, Models I and II cover the full period without distinguishing between pre- and post-directive settings, confirm that earnings management is a persistent practice, with the lagged dependent variable positive and highly significant. Profitability, measured by returns on assets, is consistently negative and strongly significant, indicating that more profitable banks were less inclined to manipulate earnings. Capitalization also plays a disciplining role in the full sample period, as the capital-to-assets ratio is negative and significant across both models. Bank size is insignificant in the baseline specification (Model I) but turns positive and significant once governance variables are included (Model II), suggesting that larger banks may have been more prone to manipulation when governance factors are accounted for. Economic growth is positively and significantly associated with earnings management, showing that expansionary conditions encouraged manipulation across the full sample period. Governance indices display contrasting effects: institutional quality is positively associated with manipulation, while governance divergence is negatively related, pointing to a disciplining effect.

Models III and IV introduce interactions with the EU directive to distinguish between pre- and post-2016 dynamics. In the pre-directive period (main coefficients), persistence remains positive and significant, profitability remains strongly negative, capitalization becomes insignificant, bank size is positive (and significant in Model IV), economic growth is strongly positive, institutional quality is positively related to manipulation, and governance divergence shows a weakly negative effect. These results indicate that before the directive, profitable banks were less likely to manipulate earnings, capitalization had lost its independent role, larger banks were more prone to manipulation, and economic growth provided scope for manipulation.

The post-directive effects reveal important shifts. Persistence weakens and even turns negative in Model IV, suggesting that the directive curtailed the dynamic continuity of manipulation. Profitability, which was a strong constraint before 2016, loses significance after the directive, implying that regulation overshadowed the independent role of bank performance. Capitalization, which was insignificant pre-directive, regains a weakly negative effect in Model IV, suggesting that the reform partly restored its role as a disciplining mechanism. Bank size shows a weaker and less robust positive association in the post-directive period, suggesting that the directive reduced the strength of size-related manipulation advantages. Economic growth becomes significantly negative, showing that the reform curtailed banks' ability to exploit expansionary conditions for earnings management. Institutional quality, which was positively associated with manipulation in the pre-directive period, loses significance once interacted with the directive, implying that the reform enhanced its constraining role. Governance divergence remains weak and inconsistent, and the directive does not materially change its effect.

Taken together, the ROA-based results confirm the strong disciplining role of profitability in the pre-directive period, show

TABLE 3 | System-GMM two-step estimated results (returns on assets).

	Model I	Model II	Model III	Model IV
LaggedEarningsManagement	0.212***	0.202***	0.325*	0.496***
	(0.049)	(0.051)	(0.194)	(0.113)
ReturnsOnAssets	−0.755***	−0.768***	−0.851***	−0.865***
	(0.062)	(0.064)	(0.088)	(0.093)
CapitalAssetsRatio	−0.018**	−0.015**	−0.008	0.004
	(0.008)	(0.006)	(0.011)	(0.014)
BanksSize	0.178	0.267**	0.347	0.536**
	(0.117)	(0.119)	(0.247)	(0.235)
EconomicGrowth	0.036***	0.037***	0.073***	0.087***
	(0.006)	(0.006)	(0.017)	(0.017)
Institutional Quality Index		0.398**		0.476*
		(0.186)		(0.290)
Governance Divergence Index		−0.309*		−0.223
		(0.180)		(0.199)
Directive_LaggedEarningsManagement			−0.104	−0.821*
			(0.456)	(0.440)
Directive_ReturnsOnAssets			0.195	0.178
			(0.167)	(0.163)
Directive_CapitalAssetsRatio			−0.014	−0.027*
			(0.010)	(0.015)
Directive__ BanksSize			0.014	0.028*
			(0.012)	(0.015)
Directive_ EconomicGrowth			−0.047**	−0.050***
			(0.019)	(0.016)
Directive_ Institutional Quality Index				−0.180
				(0.434)
Directive_ Governance Divergence Index				−0.019
				(0.231)
_cons	−2.479	−4.037*	−5.617	−9.162**
	(2.011)	(2.093)	(4.444)	(4.335)
Obs	1581	1581	1581	1581
AR(1)	0.000	0.000	0.001	0.000
AR(2) *p*-value	0.560	0.548	0.661	0.485
Hansen *p*-value	0.582	0.636	0.479	0.487
Diff-in-Hansen (*p*-value)	0.165	0.128	0.459	0.517
Nr. of Instruments	10	12	12	19
Groups	134	134	134	134

Note: Significance level: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The AR(1) *p*-values indicate first-order serial correlation, while non-significant AR(2) *p*-values confirm the absence of second-order correlation. Hansen test results show that the instrument set is valid and not overidentified, and Difference-in-Hansen tests further confirm the validity of instrument subsets.

that capitalization constrained earnings management before the directive and regained some importance afterwards, reveal that size effects were present pre-directive but weakened post-directive, and demonstrate that the directive curtailed the positive effect of economic growth on manipulation while improving the disciplining role of institutional quality.

In Table 4, where Return on Equity is used as the profitability measure, Models I and II confirm the persistence of earnings management over the full period, with the lagged dependent variable positive and highly significant. Profitability, measured by ROE, is consistently negative but only statistically significant in the baseline specification (Model I), suggesting that higher profitability constrained manipulation, though less robustly than under EBPT or ROA. Capitalization also constrained manipulation in the full sample, with negative and significant coefficients, while bank size remained insignificant. Economic growth is positively and significantly associated with earnings management, indicating that expansionary conditions encouraged manipulation before the reform. Governance indicators again diverge: institutional quality is positively linked with manipulation, while governance divergence is negatively associated only in the pre-directive model, implying a disciplining effect that disappears post-2016.

Models III and IV reveal how these dynamics change with the directive. Persistence remains positive and significant, though somewhat reduced, indicating that manipulation remained dynamic but less entrenched after 2016. Profitability continues to constrain manipulation, with the directive interaction term for ROE negative and significant in Model IV, though the effect is weaker and less consistent than in other profitability measures. Capitalization, which strongly reduced earnings management in the pre-directive period, loses significance afterwards, suggesting that regulatory oversight supplanted its independent role. Bank size remains insignificant throughout, confirming no systematic effect. Economic growth, which strongly encouraged manipulation before the reform, is neutralised after 2016, highlighting the success of the directive in curbing the exploitation of favourable macroeconomic conditions. Institutional quality's positive association with manipulation is dampened post-directive, while governance divergence loses its significance, showing that the directive did not reinforce this channel.

Taken together, the ROE-based results highlight that profitability remains a constraining factor, though less robustly than under other measures; capitalization mattered mainly before the directive, economic growth ceased to fuel manipulation after 2016, and institutional quality's perverse effect was weakened by the reform, while governance divergence lost relevance.

Across the three profitability measures, the results present a broadly consistent picture of the dynamics of earnings management and the impact of the 2016 directive. Persistence of manipulation is strong before the directive; it weakens in the EBPT and ROA specifications but remains more pronounced under ROE, indicating that manipulation linked to equity is more entrenched. Profitability generally constrains earnings management, though its role differs across measures: EBPT becomes more important after the directive, ROA remains strongly negative, but its constraining effect weakens post-2016, and ROE shows a negative but less robust disciplining role, with significance limited to some specifications. Capitalization consistently reduced manipulation before the directive but largely lost significance afterwards, except in the ROA specification where a weak disciplining role re-emerges. Bank size does not act as a robust determinant overall, though some positive effects appear in the ROA models that diminish after the directive.

Economic growth consistently encouraged manipulation before the directive, but its effect is neutralised afterwards across all specifications, demonstrating the reform's effectiveness in curbing manipulation during expansionary periods. Institutional quality is positively associated with manipulation in the pre-directive period but loses this perverse effect after 2016, suggesting that the directive strengthened its disciplining role. Governance divergence shows a modest constraining effect before the directive but plays no meaningful role thereafter.

Taken together, the EBPT, ROA and ROE results reinforce the central finding: the 2016 directive reshaped the drivers of earnings management by weakening persistence, neutralising the influence of growth, dampening or eliminating size effects and enhancing the disciplining roles of profitability and institutional quality, while reducing the relevance of capitalization as a constraint.

Similar diagnostic patterns emerge for the ROA- and ROE-based models in Tables 3 and 4. The AR(1) tests again confirm the expected first-order autocorrelation, while the AR(2) results are insignificant, ruling out second-order correlation. Hansen and difference-in-Hansen tests consistently indicate valid and non-overidentified instrument sets, and the number of instruments remains comfortably below the number of banks. These results further reinforce the robustness of our findings across profitability specifications.

5 | Discussion of Results

Directive 2014/56/EU was introduced to improve the quality of statutory audits in the European Union and to enhance transparency and governance in financial reporting. It specifically sought to address shortcomings in the audit and regulatory frameworks that were exposed during the financial crisis. Our results contribute to and extend prior research on regulation, governance, and earnings management. In particular, the finding that Directive 2014/56/EU reduced the persistence of earnings management in European banks aligns with earlier evidence on the role of regulatory change. Leventis et al. (2011) and Barth et al. (2008) reported improvements in accounting quality following IFRS adoption, whereas Ahmed et al. (2013) found that mandatory IFRS initially increased income smoothing. Similarly, Akins et al. (2017) showed that corruption weakens the timeliness of loan loss recognition, while Shi et al. (2023) demonstrated that CEO overconfidence amplifies such effects. Our findings are consistent with Bratten et al. (2020), who documented that auditor expertise reduces discretion in loan loss provisions, underscoring the disciplining role of external oversight. By focusing on the EU audit reform, our study extends this literature by linking regulatory change to the persistence of earnings management in a large cross-country banking sample.

TABLE 4 | System-GMM Two-step estimated results (returns on equity).

Variables	Model I	Model II	Model III	Model IV
LaggedEarningsManagement	0.390***	0.387***	0.727***	0.447***
	(0.055)	(0.057)	(0.114)	(0.140)
ReturnOnEquity	−0.013***	−0.016	−0.016	−0.014
	(0.010)	(0.010)	(0.011)	(0.010)
CapitalAssetsRatio	−0.025***	−0.030***	−0.034**	−0.02
	(0.009)	(0.009)	(0.013)	(0.016)
BanksSize	−0.054	0.009	0.248	0.334
	(0.131)	(0.131)	(0.247)	(0.274)
EconomicGrowth	0.018***	0.017***	0.100***	0.076***
	(0.006)	(0.007)	(0.023)	(0.020)
Institutional Quality Index		0.347*		0.905***
		(0.198)		(0.343)
Governance Divergence Index		−0.428**		−0.389
		(0.209)		(0.259)
Directive_LaggedEarningsManagement			−0.532	−0.448
			(0.403)	(0.421)
Directive_ReturnOnEquity			−0.019	−0.031**
			(0.012)	(0.012)
Directive_CapitalAssetsRatio			0.002	−0.006
			(0.009)	(0.014)
Directive__ BanksSize			0.017	−0.026*
			(0.011)	(0.015)
Directive_ EconomicGrowth			−0.080***	−0.047**
			(0.025)	(0.020)
Directive_ Institutional Quality Index				−0.855*
				(0.494)
Directive_ Governance Divergence Index				−0.030
				(0.280)
_cons	1.478	0.479	−3.873	−5.544
	(2.280)	(2.314)	(4.676)	(5.351)
Obs	1579	1579	1579	1579
AR(1) *p*-value	0.000	0.000	0.003	0.000
AR(2) *p*-value	0.825	0.812	0.830	0.627
Hansen *p*-value	0.306	0.555	0.798	0.369
Diff-in-Hansen (*p*-value)	0.429	0.542	0.757	0.575
Nr. of Instruments	10	12	12	19
Groups	134	134	134	134

Note: Significance level: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The AR(1) *p*-values indicate first-order serial correlation, while non-significant AR(2) *p*-values confirm the absence of second-order correlation. Hansen test results show that the instrument set is valid and not overidentified, and Difference-in-Hansen tests further confirm the validity of instrument subsets.

While the directive represents a central explanatory factor, we acknowledge that the reduction in earnings management may also reflect contemporaneous influences. Basel III implementation, the European Central Bank's supervisory mechanisms, and increased post-crisis regulatory scrutiny may have reinforced the observed changes. Although our empirical design controls for macroeconomic and governance variables, these parallel reforms could also have contributed to the decline in discretionary practices.

Figure 1 illustrates the evolving dynamics of bank behaviour around the implementation of the EU directive. Non-performing loans peak in 2014, immediately before the reform, and then decline sharply, signalling improved asset quality. Earnings management also begins to fall as early as 2013, reflecting anticipatory adjustments to regulatory expectations. Such early reactions are typical when major policy changes are anticipated, as firms align practices ahead of enforcement. Profitability measures show a similar moderation: Earnings Before Provisions and Taxes (EBPT) and Returns on Assets (ROA) stabilise after the directive, consistent with their disciplining role in the regressions. Returns on Equity (ROE), by contrast, remains more persistent, mirroring the regression results that its constraining effect is weaker and less consistent. The graphs also reveal renewed peaks around 2020, which coincide with the COVID-19 shock. These fluctuations likely reflect the temporary stress on banks' asset quality and profitability caused by the crisis, rather than a reversal of the directive's effects.

Overall, these results underscore the multifaceted impact of the directive. It disrupted entrenched earnings management practices tied to operational performance, while the resilience of equity-related measures highlights the need for complementary reforms to address structural components of bank profitability. Governance indices provide further nuance. Before the directive, greater divergence between corruption control and AML enforcement constrained manipulation, but this effect weakened afterwards, suggesting that the directive reduced the influence of governance discrepancies. In turn, the directive strengthened the disciplining effect of institutional quality on earnings management. Macroeconomic conditions also shifted in their role: while growth initially encouraged manipulation, the interaction terms post-directive show that higher growth became more constraining, reinforcing discipline when combined with stricter oversight. In addition to the directive, contemporaneous regulatory developments such as the phased implementation of Basel

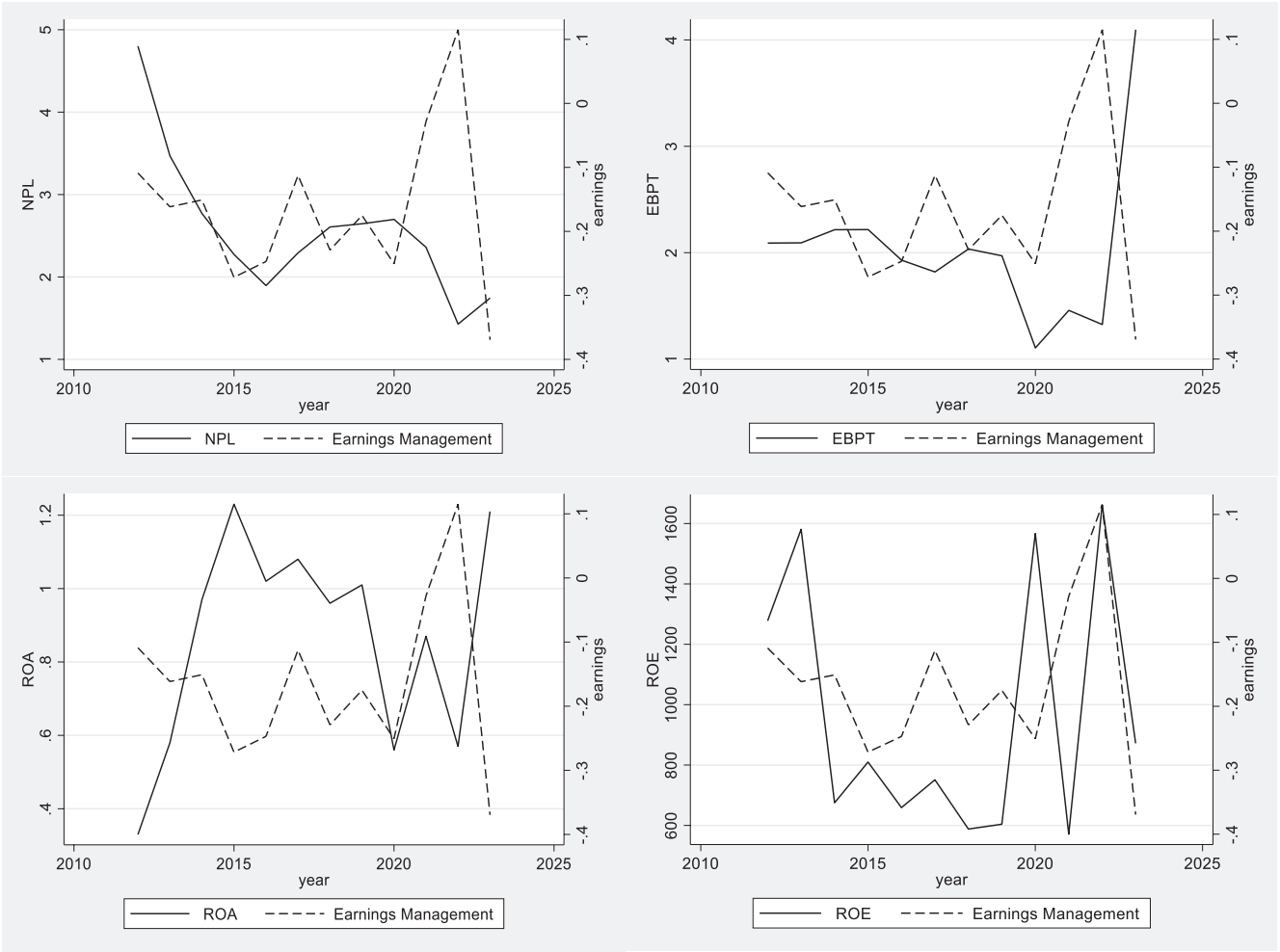

FIGURE 1 | Trends in non-performing loans, earnings management, and profitability measures (EBPT, ROA, ROE) before and after the 2016 EU directive. The figure shows a peak in non-performing loans around 2014, followed by a sharp decline after the directive. Earnings management begins to fall from 2013, indicating anticipatory adjustments by banks. EBPT and ROA stabilise post-directive, while ROE remains more persistent. Renewed peaks around 2020 coincide with the COVID-19 crisis, reflecting temporary stress on bank profitability and asset quality.

III and the strengthening of the ECB's supervisory mechanisms may also have contributed to reduced earnings management.

While our methodological approach and dataset provide strong foundations for identifying the effects of the EU directive, some caveats are worth noting. The focus on large, listed banks enhances the representativeness of the EU sector but excludes smaller and unlisted institutions, limiting external validity. Likewise, annual data constrain the ability to detect intra-year earnings management strategies. Methodologically, system GMM addresses persistence and endogeneity effectively, yet its complexity and reliance on instrument validity remain potential limitations. These issues do not undermine the robustness of our findings but point to areas where complementary approaches—such as higher-frequency data, difference-in-differences designs, or quantile regressions—could yield additional insights.

The implications of our findings extend beyond the European banking sector. For academics, they enrich theoretical debates rooted in agency, political cost, and signalling theories by showing how regulatory oversight interacts with governance quality to constrain managerial discretion. Beyond banking, the results suggest that reforms in other financial and non-financial sectors may achieve similar effects where governance mechanisms are weak or misaligned. For policymakers and regulators, the evidence highlights the effectiveness of EU audit reforms in enhancing transparency and credibility, while also pointing to the importance of complementary measures to address structural drivers of profitability. For accounting bodies and practitioners, the findings underline the need for robust audit quality, strong governance alignment, and transparent reporting practices to strengthen market confidence.

Several general limitations should be acknowledged. Our theoretical framing builds primarily on agency, political cost, and signalling theories, which provide a clear lens on managerial discretion but may not capture the full institutional and cultural dimensions of regulation. Alternative perspectives such as institutional or stakeholder theory could offer additional insights. The scope of the study is also bounded: by focusing on large, listed European banks, we enhance comparability but limit generalizability to smaller institutions, other regions, or non-financial sectors. Likewise, our hypotheses are tailored to the EU regulatory context, which strengthens internal validity but restricts external application. Finally, unobserved influences—such as firm-level governance mechanisms (e.g., board structures, ownership patterns), cultural norms, or parallel reforms (e.g., Basel III, ECB supervision)—may also shape outcomes in ways not fully captured by our models. These limitations open avenues for future research, including cross-country and cross-industry comparisons, the application of alternative theoretical frameworks, and the use of more granular data and complementary methodologies to extend the evidence presented here.

6 | Conclusions

This paper asked how Directive 2014/56/EU reshaped earnings management practices in European banks, and through which profitability and governance channels these effects materialised. Using dynamic panel data methods and system GMM estimators, we provide robust evidence that earnings management was a persistent practice before the directive but weakened substantially in the post-directive period.

Our results show that profitability, capitalization, bank size, and economic growth are key drivers of earnings management, but their influence shifts with the regulatory framework. Profitability generally constrains manipulation, though its disciplining strength varies with different specifications. Capitalization reduces manipulation in the pre-directive period, but its role diminishes afterward as regulation becomes the dominant disciplining force. Bank size has no consistent effect overall, though larger banks appear more prone to manipulation in some specifications, with this tendency weakening after the directive. Economic growth, which strongly encouraged manipulation before 2016, is converted into a constraining factor after the directive, showing that the reform altered the scope for exploiting expansionary conditions.

Governance indicators further shape outcomes. Institutional quality alone does not prevent earnings management, but the directive enhanced its effectiveness, highlighting the importance of strong governance frameworks in curbing discretionary practices. By contrast, the governance divergence index has weaker and less consistent effects, suggesting that discrepancies across governance dimensions require further regulatory attention. We also find evidence of anticipatory adjustments by banks around the directive's announcement, indicating that regulation can influence behaviour even before full implementation.

To ensure robustness, we replicated the analysis using alternative profitability measures—Return on Assets (ROA) and Return on Equity (ROE)—alongside Earnings Before Provisions and Taxes (EBPT). The results consistently support the conclusion that the directive weakened the persistence of earnings management and strengthened the disciplining roles of profitability, governance, and macroeconomic conditions. Notably, while ROA-based results confirm the directive's disciplining effect, persistence remains more visible under ROE, likely reflecting leverage-related structural factors.

Overall, the findings confirm that the 2016 implementation of Directive 2014/56/EU was effective in reducing earnings management practices and strengthening the disciplining role of profitability, size, growth, and governance. These results underline the directive's success in enhancing financial reporting transparency and restoring confidence in the banking sector. At the same time, the persistence observed in equity-related measures suggests that structural drivers of profitability, such as leverage, remain outside the immediate scope of regulatory reforms and require complementary policies.

Beyond summarising empirical results, this study also contributes in four ways. First, it provides the first systematic evidence on the impact of Directive 2014/56/EU in the banking sector, showing that the reform substantially reduced the persistence of earnings management. Second, by employing a dynamic panel covering 134 banks across 26 EU countries from 2012 to 2023, it captures both entrenched manipulation and its evolution before and after the reform. Third, it introduces governance indices that combine corruption control and anti–money laundering enforcement, illustrating how regulation interacts with institutional

quality. Finally, it demonstrates that while regulatory oversight strengthens discipline, equity-related earnings management remains more persistent, pointing to the need for complementary reforms. Together, these contributions clarify what we have learned that was not known before and why the findings matter for policymakers, regulators, auditors, and bank managers.

The study's reliance on large EU banks and annual reporting data restricts generalizability and the ability to capture within-year dynamics. Moreover, while system GMM offers efficiency in modelling persistence, alternative empirical strategies such as difference-in-differences or quantile methods could complement our findings. Broader limitations regarding theoretical framing, scope, and hypotheses are already discussed in Section 5. Despite these boundaries, the study contributes new evidence on how regulation reshapes the drivers of earnings management.

The findings also carry important implications. They suggest that EU-level reforms can play a decisive role in curbing earnings management and enhancing transparency, particularly when they strengthen the disciplining effect of profitability, governance, and macroeconomic conditions. Regulators should therefore continue reinforcing institutional quality and addressing governance divergence, while also complementing existing rules with measures targeting equity-related performance indicators. For bank managers and auditors, the results highlight the importance of adapting internal controls and audit practices to reduce opportunities for manipulation. Such steps would ensure that reforms not only reduce manipulation in the short term but also address structural vulnerabilities in the banking sector over the longer horizon.

Acknowledgements

We acknowledge the use of publicly available data and resources that facilitated this research. No specific individuals or organisations contributed directly to the study.

Funding

The authors have nothing to report.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Endnotes

[1] Croatia is excluded from the sample due to data availability limitations.

References

Aggelopoulos, E., A. Georgopoulos, and G. Kolias. 2025. "Monthly Income Patterns and Earnings Management in Banking." *Accounting Forum* 49, no. 2: 498–522.

Ahmed, A. S., M. Neel, and D. Wang. 2013. "Does Mandatory Adoption of IFRS Improve Accounting Quality? Preliminary Evidence." *Contemporary Accounting Research* 30, no. 4: 1344–1372.

Akins, B., Y. Dou, and J. Ng. 2017. "Corruption in Bank Lending: The Role of Timely Loan Loss Recognition." *Journal of Accounting and Economics* 63, no. 2–3: 454–478.

Anessi-Pessina, E., C. Langella, and M. Sicilia. 2024. "What Roles Does Accounting Play in the Fight Against Corruption? Insights From a Systematic Literature Review." *Accounting Forum* 49, no. 4: 725–753.

Barth, M. E., W. R. Landsman, and M. H. Lang. 2008. "International Accounting Standards and Accounting Quality." *Journal of Accounting Research* 46, no. 3: 467–498.

Beatty, A., and S. Liao. 2014. "Financial Accounting in the Banking Industry: A Review of the Empirical Literature." *Journal of Accounting and Economics* 58, no. 2–3: 339–383.

Blundell, R., and S. Bond. 1998. "Initial Conditions and Moment Restrictions in Dynamic Panel Data Models." *Journal of Econometrics* 87, no. 1: 115–143.

Bratten, B., M. Causholli, and L. Myers. 2020. "Fair Value Exposure, Auditor Specialization, and Banks' Discretionary Use of the Loan Loss Provision." *Journal of Accounting, Auditing and Finance* 35, no. 2: 318–348.

Caramanis, C., and C. Lennox. 2007. "Audit Effort and Earnings Management." *Journal of Accounting and Economics* 45: 116–138.

Castillo-Merino, D., J. Garcia-Blandon, and G. Rodríguez-Pérez. 2024. "Effects of the 2014 European Reform on Audit Activity, the Audit Outcome and the Audit Market: The Auditors' View." *Meditari Accountancy Research* 32, no. 7: 88–119.

Cornett, M. M., J. J. McNutt, and H. Tehranian. 2009. "Corporate Governance and Earnings Management at Large U.S. Bank Holding Companies." *Journal of Corporate Finance* 15, no. 4: 412–430.

Davis, L. R., B. S. Soo, and G. M. Trompeter. 2009. "Auditor Tenure and the Ability to Meet or Beat Earnings Forecasts." *Contemporary Accounting Research* 26, no. 2: 517–548.

Di Fabio, C., P. Ramassa, and A. Quagli. 2021. "Income Smoothing in European Banks: The Contrasting Effects of Monitoring Mechanisms." *Journal of International Auditing, Accounting and Taxation* 43: 100385.

Di Martino, G., G. Dicuonzo, G. Galeone, and V. Dell'Atti. 2017. "Does the New European Banking Regulation Discourage Earnings Management?" *International Business Research* 10, no. 10: 45–56.

Garsva, G., S. Skuodas, and K. Rudzioniene. 2012. "Earnings Management in European Banks: The Financial Crisis and Increased Incentives for Manipulation Through Loan Loss Provisions." *Transformations in Business and Economics* 11, no. 2: 504–526.

Houqe, M. N., and R. M. Monem. 2016. "IFRS Adoption, Extent of Disclosure, and Perceived Corruption: A Cross-country Study." *International Journal of Accounting* 51, no. 3: 363–378.

Jensen, M., and W. Meckling. 1976. "Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure." *Journal of Financial Economics* 3, no. 4: 305–360.

Kanagaretnam, K., G. J. Lobo, and D. Yang. 2004. "Joint Tests of Signaling and Income Smoothing Through Bank Loan Loss Provisions." *Contemporary Accounting Research* 21, no. 4: 843–884.

Krishnan, J., Y. Wen, and W. Zhao. 2011. "Legal Expertise on Corporate Audit Committees and Financial Reporting Quality." *Accounting Review* 86, no. 6: 2099–2130.

Lee, H., D. Choi, H. Y. Lee, and I. Yoon. 2022. "CEO Overconfidence, Loan-Loss Provisions, and the Effect of Country Corruption: An International Investigation." *Emerging Markets Finance and Trade* 59, no. 6: 1835–1851.

Leventis, S., P. E. Dimitropoulos, and A. Anandarajan. 2011. "Loan Loss Provisions, Earnings Management and Capital Management Under IFRS: The Case of EU Commercial Banks." *Journal of Financial Services Research* 40, no. 1e2: 103–122.

Lourenço, I. C., A. Rathke, V. Santana, and M. C. Branco. 2018. "Corruption and Earnings Management in Developed and Emerging Countries." *Corporate Governance: The International Journal of Business in Society* 18, no. 1: 35–51.

McNichols, M., and P. Wilson. 1988. "Evidence of Earnings Management From the Provision for Bad Debts." *Journal of Accounting Research* 26, no. 1: 1–31.

Nikulin, E., and J. Downing. 2020. "Loan-Loss Provisions, Earnings Management, and Capital Management by Russian Banks: The Impact of Changes in Banking Regulation and Oversight." *Eurasian Business Review* 11: 659–677.

Peterson, O. 2019. "Bank Income Smoothing, Institutions and Corruption." *Research in International Business and Finance* 49: 82–99.

Salema, R., M. Usmana, and E. Ezeaniba. 2021. "Loan Loss Provisions and Audit Quality: Evidence From MENA Islamic and Conventional Banks." *Quarterly Review of Economics and Finance* 79, no. c: 345–359.

Shi, W., X. Bi, A. Boateng, and S. Yuan. 2023. "Chairperson (CEO) Facial Structure and Risky Investments: Evidence From Chinese Acquisitions." *Review of Quantitative Finance and Accounting* 61, no. 4: 1177–1205.

Tran, V. D., K. Hassan, and R. Houston. 2018. "Discretionary Loan-Loss Provision Behavior in the US Banking Industry." *Review of Quantitative Finance and Accounting* 55, no. 2: 605–645.

Zarza Herranz, C., F. Lopez-Iturriaga, and N. Reguera-Alvarado. 2020. "Audit Committee Expertise in Large European Firms." *Managerial Auditing Journal* 35, no. 9: 1313–1341.

Appendix A

Table A1 presents the results of a panel OLS analysis examining earnings management, with *Loan Loss Provisions (LLP)* as the dependent variable.

The analysis is based on the model specified in Equation (2) in the methodology section, using abbreviated variable names in the equation but full names in the table for clarity.

The results show that Non-Performing Loans (*NPL*) has a positive and significant effect on LLP, suggesting higher non-performing loans increase earnings management. Economic Growth (GGDP) negatively affects LLP, reflecting the influence of macroeconomic conditions. Conversely, ALL positively impacts LLP, indicating that higher allowances reduce the need for additional provisions. These findings underscore the importance of banks-specific and macroeconomic factors in shaping earnings management practices.

TABLE A1 | Earnings management panel OLS results.

NonPerformingLoans	0.330***	(0.031)
EconomicGrowth	−0.241***	(0.074)
AllowanceLoansLosses	0.511***	(0.141)
_cons	0.821***	(0.079)
Observations	1876	
R^2	0.312	
Wald chi-square	86.2	
p-value	0.000	

Note: Dependent variable LLP. Standard errors in parentheses. We used xtpcse command, to ensure robust and reliable estimates by addressing heteroskedasticity and autocorrelation. The Wald chi-square statistic (86.2, $p < 0.001$) confirms the joint significance of the predictors, indicating they have a statistically significant effect on LLP.

* $p < 0.10$.
** $p < 0.05$.
*** $p < 0.01$.

TABLE A2 | Descriptive statistics.

Variable	Obs	Mean	Std. dev.	Min	Max
LoansLossProvisions	1876	0.829658	1.478972	−7.50394	12.36417
NonPerformingLoans	1876	6.441159	10.13575	−27.732	70.43623
AllowanceLoansLosses	1876	4.299204	5.701518	−57.7995	38.74166
EarningsBeforeProvisonsTaxes	1876	2.336723	9.257926	−20.8791	257.7746
BankSize	1873	17.4208	1.892993	11.60611	21.703
CapitalAssetsRatio	1876	19.7273	9.160154	−10.5839	132.7374
ReturnsOnAssets	1817	0.503704	1.259286	−11.81	6.41
ReturnsOnEquity	1812	5.34372	23.59568	−724.66	54.43
EconomicGrowth	1876	2.161434	3.539559	−10.94	24.62

TABLE A3 | Correlation matrix.

	LLP	NPL	ALL	EBPT	SIZE	CAR	ROA	ROE	GGDP
LLP	1								
NPL	0.476	1							
ALL	0.5937	0.7154	1						
EBPT	−0.0708	−0.0806	−0.0331	1					
SIZE	−0.1669	−0.1694	−0.2627	−0.0424	1				
CAR	−0.1752	−0.1639	−0.139	−0.0586	−0.0621	1			
ROA	−0.5042	−0.3949	−0.2814	0.1382	−0.1222	0.14	1		
ROE	−0.3129	−0.2639	−0.2292	0.0777	−0.053	0.1171	0.5765	1	
GGDP	−0.1988	−0.0709	−0.0578	0.0254	−0.166	0.0749	0.2074	0.1668	1

Note: Correlations among the three credit risk variables (LLP, NPL, ALL) are moderate to high (0.48–0.72) but remain below conventional thresholds (0.80–0.90) for severe multicollinearity. Other correlations remain moderate, suggesting that the risk of collinearity is limited.

Appendix B

Table B1 presents the results of a Principal Component Analysis (PCA) conducted on two governance indices: the AML Index and the CPI Index. The analysis identifies two principal components that capture the variance in these indices. The first component, referred to as the Institutional Quality Index, explains 53.09% of the total variance and reflects the shared governance quality of the two indices, with both contributing equally and positively. The second component, named the Governance Divergence Index, accounts for the remaining 46.91% of the variance and represents the divergence between the indices, highlighting the contrast in relative performance. Together, these components fully explain the variability in the data, offering insights into both the commonalities and discrepancies between AML and CPI governance metrics.

TABLE B1 | Principal component analysis.

Component	Eigenvalue	Difference	Proportion	Cumulative
1	1.148	0.279	0.5743	0
2	0.851		0.4257	1

Note: The eigenvalues indicate the variance explained by each component. The first component (Comp 1) has an eigenvalue of 1.148 and explains 57.43% of the total variance, forming the Institutional Quality Index. The second (Comp 2) explains 42.57% with an eigenvalue of 0.851, capturing relative governance divergence across countries.