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Does Audit Quality Improve Financial Performance? Panel Evidence from Listed Egyptian Firms

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Abstract

Purpose: This study examines whether audit quality improves the financial performance of non-financial firms listed on the Egyptian Exchange (EGX) or merely reflects it. Design/methodology/approach: Using a hand-collected unbalanced panel of 699 firm-year observations (78 firms, 2010–2023) from audited financial statements published in Arabic, we test five audit attributes: Big 4 membership, international network affiliation, an unqualified opinion, audit by the Central Auditing Organization (CAO) and joint audit. We compare pooled OLS, random-effects, fixed-effects and system GMM estimates, complemented by propensity score matching, abnormal working capital accruals, a statistical power analysis and a timing test. Findings: In pooled regressions, an unqualified opinion, joint audit and CAO audit are associated with a return on assets 3.6 to 4.5 percentage points higher. The CAO and joint audit associations vanish under firm fixed effects, system GMM and matching on past profitability. The opinion association persists within firms at half its size (1.9 percentage points; $p = 0.04$) but disappears in GMM and after matching, and its timing points to co-movement rather than causation. Big 4 status and network affiliation are never significant, and no attribute reduces abnormal accruals. Originality/value: The study tests five attributes jointly, two of them specific to Egypt, and separates the absence of an effect from a lack of statistical power. In Egypt, audit attributes reflect client selection and financial condition and do not improve performance.

Keywords: audit quality; financial performance; joint audit; state auditor; Egypt

Introduction

External auditing is one of the main governance mechanisms of listed firms. By attesting to the financial statements, the auditor reduces information asymmetry between managers and capital providers, constrains opportunistic behavior and, in principle, improves resource allocation (Jensen & Meckling, 1976; Watts & Zimmerman, 1983). Since DeAngelo (1981), audit quality has been defined as the joint probability that an

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auditor detects a material misstatement and reports it, and a large literature shows that large audit firms deliver higher financial reporting quality in developed markets (Becker et al., 1998; Francis, 2004; DeFond & Zhang, 2014). Whether audit quality improves firms' financial performance, or simply accompanies firms that already perform well, remains open.

The question is pressing in emerging markets, where regulators encourage large audit firms and joint audits and investors often read a reputable auditor's signature as evidence of soundness. Most emerging-market studies reporting a positive effect of audit quality on performance (Abu Afifa & Saleh, 2023; Abu Afifa et al., 2023) rely on pooled regressions, which compare different firms and cannot separate the effect of the audit from the permanent characteristics of the clients that select a given auditor (Lawrence et al., 2011). In governance research, Wintoki et al. (2012) show that the relations between board structure and performance vanish once unobserved heterogeneity and performance dynamics are taken into account. To our knowledge, no study has applied this approach to audit and performance in Egypt.

The Egyptian audit market combines Big 4 firms operating under local brand names, member firms of second-tier international networks, purely local audit firms and a public-sector auditor, the Central Auditing Organization (CAO, also known as the Accountability State Authority), which audits state-owned enterprises and firms with state ownership; joint audits are common (El-Dyasty & Elamer, 2022). Auditors face low litigation risk and investor protection is limited, two conditions that weaken the governance role of the audit (Fan & Wong, 2005; Choi & Wong, 2007). Egyptian studies focus mainly on financial reporting quality and conclude that Big 4 status does not improve it (El-Dyasty & Elamer, 2021). The direct link between audit attributes and performance, over a long panel covering the CAO, joint audits and the audit opinion, remains to be established.

We therefore ask whether audit quality improves the financial performance of non-financial listed firms in Egypt or is only a marker of that performance. The data are an original panel of 699 firm-year observations (78 firms, 2010–2023) built from financial statements and audit reports published in Arabic. After pooled OLS, the estimates control for permanent firm heterogeneity (fixed effects) and the persistence of performance (system GMM). Propensity score matching on past profitability, abnormal accruals as a direct measure of reported earnings quality and a statistical power analysis complete the design.

In the cross-section, an unqualified opinion, joint audit and the CAO are associated with higher profitability. The associations for the CAO and joint audit disappear within firms and after matching on past profitability. The association for the opinion survives within firms at half its size, disappears under GMM and after matching, and is symmetric in timing: next year's opinion is associated with current profitability as strongly as the prior year's opinion. Big 4 status and international affiliation are never associated with performance, and no audit attribute reduces earnings management. Audit attributes therefore reflect firms' characteristics and circumstances and do not change them.

The study extends the Big 4 versus non-Big 4 dichotomy by testing five audit attributes simultaneously, two of them (the CAO and joint audit) specific to Egypt. Methodologically, it shows that cross-sectional associations often reported in emerging markets do not survive controls for heterogeneity and selection, and it distinguishes the absence of an effect from a lack of statistical power. It also informs regulators

(the Financial Regulatory Authority, FRA), public-sector auditors and investors about what an auditor's signature does and does not reveal about a firm's performance.

The next section develops the theory, institutional setting and hypotheses. The Data and Methodology section describes the sample, variables and identification strategy, and the Results section reports the estimates and robustness analyses. The Discussion relates the findings to prior studies, and the Conclusion sets out contributions, implications and limitations.

Literature Review and Hypotheses Development

Theoretical Background

Three frameworks predict an association between audit quality and performance but interpret it differently. Agency theory (Jensen & Meckling, 1976) views the audit as a monitoring mechanism that makes accounting manipulation more costly, reduces agency costs and disciplines managers' use of resources (Watts & Zimmerman, 1983); switching to a higher-quality auditor should then improve performance. Signaling theory (Spence, 1973) views the choice of a reputable auditor as a costly signal that only well-performing firms would send, so the association reflects selection. The insurance hypothesis (Wallace, 1980) posits that large, more solvent audit firms insure investors against losses, a role that depends on litigation risk and hence on the institutional setting.

All three predict a positive cross-sectional correlation but diverge on what happens when the same firm changes auditor, so discriminating among them requires within-firm variation and treatment of the endogeneity of auditor choice (Lawrence et al., 2011; DeFond et al., 2017). Large profitable firms more often choose large auditors, state ownership determines CAO audit, and modified opinions hit already fragile firms. Past performance also drives both current performance and governance choices, a "dynamic endogeneity" that, once addressed, removes the causal effect of board structure on performance (Wintoki et al., 2012). Naive estimates thus face three sources of bias: permanent unobserved heterogeneity, reverse causality and the persistence of performance. In our design, a causal effect requires the association to persist under firm fixed effects and after matching on past profitability and, for the opinion, with the prior-year opinion.

Institutional Setting in Egypt

The Egyptian Standards on Auditing, modeled on the International Standards on Auditing (ISA), were adopted by Decree No. 166 of 2008 and remained unchanged throughout the sample period. The Egyptian Accounting Standards, modeled on but not identical to IFRS, were revised in 2015 and by Ministerial Decree No. 69 of 2019. The FRA, established by Law No. 10 of 2009, registers and supervises the auditors authorized to certify listed firms' financial statements; there is no single independent oversight body for the profession.

The Big 4 operate under local brand names (Allied for EY, Hazem Hassan for KPMG, Mansour for PwC, and firms associated with Deloitte). The CAO, governed by Law No. 144 of 1988, audits state-owned enterprises and firms in which the state holds a significant stake (World Bank, 2002). Joint audits are voluntary or result from pairing the CAO with a private audit firm (El-Dyasty & Elamer, 2022). Litigation risk is low, investor protection limited and ownership concentrated (Omran et al., 2008), which weakens auditors'

incentives to supply high quality (Fan & Wong, 2005; Choi & Wong, 2007). Year effects absorb the period's macroeconomic shocks: the 2011 political transition, the November 2016 flotation of the Egyptian pound, the 2020 pandemic and the 2022–2023 devaluations.

Hypotheses Development

For DeAngelo (1981), large audit firms spread reputation and quasi-rents over many clients, have more to lose from a failed audit and should therefore be more independent. Clients of large US audit firms report lower discretionary accruals (Becker et al., 1998), and reviews conclude that large audit firms are superior overall (Francis, 2004; Knechel et al., 2013). DeFond and Zhang (2014) counter that audit quality depends as much on client as on auditor characteristics, and Lawrence et al. (2011) show that the "Big 4 effect" largely disappears once clients are matched on their characteristics, whereas DeFond et al. (2017) recover it under other matching specifications. Emerging-market evidence on performance is mixed. In Jordan, Abu Afifa and Saleh (2023) find a positive effect of auditor size on ROE and earnings per share but not on ROA, and Abu Afifa et al. (2023), using GMM on 344 observations, find a positive effect on ROA and ROE partly mediated by earnings management. In Saudi Arabia, Kateb and Belgacem (2024) find a positive Big 4 effect on Tobin's Q but not on accounting measures. In Egypt, El-Dyasty and Elamer (2021) show over 2011–2018 that the Big 4 do not deliver higher audit quality, and Diab et al. (2024) find no moderating effect of audit quality on the dividends–performance relation for EGX 100 firms (2015–2021). Following agency theory, we nonetheless posit:

H1: Firms audited by a Big 4 firm exhibit higher financial performance.

Membership in an international network, Big 4 or second-tier, provides common methodologies, quality reviews and training, and exposes the local firm to international reputational risk. Francis and Wang (2008) show that the effect of these networks on earnings quality depends on the country's investor protection. El-Dyasty and Elamer (2021) find that in Egypt affiliation with a foreign audit firm, unlike Big 4 status alone, is associated with higher audit quality, which justifies a separate test.

H2: Firms audited by an audit firm affiliated with an international network exhibit higher financial performance.

A qualified or adverse opinion signals disagreement between auditor and management or a scope limitation, and can impair access to finance, reputation and hence future performance. It can also result from an already deteriorated situation: Dopuch et al. (1987) show that modified opinions can be predicted from financial variables, and Kausar et al. (2009) document the subsequent underperformance of firms receiving a going-concern opinion. Chen et al. (2000) find a negative but delayed Shanghai market reaction to first-time modified opinions. The direction of causality is therefore ambiguous.

H3: Firms receiving an unqualified opinion exhibit higher financial performance.

Supreme audit institutions review both the regularity of state-owned enterprises' accounts and their management of public funds. In China, government audit improves state-owned groups' investment decisions, including mergers and acquisitions (Liang et al., 2024). In Egypt, El-Dyasty and Elamer (2021) find no association between CAO involvement and financial reporting quality, and CAO clients span very diverse industries, some structurally profitable (fertilizers, petrochemicals) and others in difficulty (state-owned steel). Without an unambiguous theoretical prediction, we state a non-directional hypothesis.

H4: Audit by the CAO is associated with financial performance.

Joint audit rests on the "four eyes" principle, under which two independent auditors monitor each other (Ratzinger-Sakel et al., 2013). In Sweden, voluntary joint audits are associated with more conservatism and lower abnormal accruals (Zerni et al., 2012). French and Danish evidence is more mixed: joint audit increases audit fees (André et al., 2016), its effect depends on the composition of the auditor pair (Lobo et al., 2017) and the allocation of work (Haak et al., 2018), and its abolition in Denmark did not reduce quality (Holm & Thinggaard, 2018). In Kuwait, where joint audit is mandatory, the value relevance of earnings increases with the number of Big 4 firms in the team (Alfraih, 2016). Egyptian auditors perceive joint audit as beneficial to quality (Hegazy & Ebrahim, 2022), but El-Dyasty and Elamer (2022) find no association with financial reporting quality and observe a higher cost of debt.

H5: Firms subject to a joint audit exhibit higher financial performance.

Data and Methodology

Sample and Data Sources

The population comprises non-financial EGX-listed firms over 2010–2023. As no commercial database reliably covers Egyptian audit reports over this period, we built our own from the audited annual statements filed in Arabic with the Exchange, retaining firm-years with complete statements and a signed audit report. Financial institutions, whose ratios are not comparable, are excluded (Table 1).

Table 1: Sample construction

Step	Firms	Firm-year observations
Firm-years 2010–2023 with usable statements and audit report	79	708
Less: financial institution (investment bank)	−1	−9
Final sample (unbalanced panel)	78	699
of which 2010–2018	78	548
of which 2019–2023	57	151
ROA sample (complete controls)	78	690
ROE sample (positive equity)	78	672
NPM sample (excluding holding companies without revenue)	72	599
System GMM sample (ROA, one lagged year)	77	577

Source: Authors' compilation.

The sample covers 15 industries, the largest being real estate and construction (121 observations), cement and building materials (93) and food and agribusiness (86). Coverage is dense over 2010–2020 (43 to 72 firms per year) and partial over 2021–2023 (15 to 20 firms per year), as digitized statements are missing for some firms. We address this imbalance with year effects in all models, estimations on the 2010–2018 and 2015–2023 subperiods, and a test of interaction with the post-2019 period.

Data Collection and Verification

The statements, often scanned, were processed under a written, standardized data-entry protocol. The generative artificial intelligence tool Claude (Anthropic) was used to read the scanned Arabic-language financial statements and audit reports and to extract the values required by this protocol; each record was then subjected to five checks, and records that failed were re-examined or excluded: (1) firm name and balance sheet date match the statement header, and only complete twelve-month fiscal years are kept; (2) total assets equal equity plus liabilities, with consistent subtotals; (3) total assets are measured gross, including under the Egyptian "total investment" format, which nets out current liabilities; (4) amounts are converted into Egyptian pounds; and (5) separate statements are preferred and one basis is kept per firm, years available only on another basis being excluded.

Variables

ROA, independent of the financing structure, is the main dependent variable; ROE measures shareholder profitability and the net profit margin (NPM) operating profitability. Accounting measures suit the managerial discipline predicted by agency theory, and the low liquidity of some Egyptian stocks makes their prices poorly informative. Audit attributes are coded solely from the signatories of each year's audit report (Table 2).

Table 2: Variable definitions and coding of audit attributes

Variable	Code	Definition and coding
Return on assets	ROA	Net income / Total assets
Return on equity	ROE	Net income / Shareholders' equity (undefined if equity ≤ 0)
Net profit margin	NPM	Net income / Revenue
Big 4	AUD_BIG4	1 if a signatory belongs to the EY, KPMG, PwC or Deloitte network (317 observations); 0 otherwise
International network	AUD_INTL	1 if a signatory belongs to an international network, Big 4 included (second-tier networks such as Mazars, Grant Thornton, BDO: 254 observations); 0 for local firms and the CAO (126 observations)
Unqualified opinion	AUD_OPINION	1 if unqualified, including with an emphasis-of-matter paragraph; 0 if qualified, adverse or a disclaimer, or if any joint auditor qualifies
State auditor	AUD_CAO	1 if the Central Auditing Organization (CAO) signs, alone or with a private firm; 0 otherwise
Joint audit	JOINT_AUD	1 if at least two distinct audit firms or bodies sign (two partners of one firm do not count); 0 otherwise
Firm size	FSIZE	Natural logarithm of total assets
Leverage	LEV	(Total assets − Shareholders' equity) / Total assets
Liquidity	LIQ	Current assets / Current liabilities
Sales growth	GROWTH	Relative change in revenue
Asset tangibility	TANG	Fixed assets / Total assets

Table 2: Variable definitions and coding of audit attributes *(continued)*

Variable	Code	Definition and coding
Abnormal accruals	AWCA	Abnormal working capital accruals (Equation 3)

Notes: Local audit firms are assigned to the international network of which they are members in the year concerned; a change of network is coded from that fiscal year. The auditor network could not be identified for two observations, so the three auditor categories cover 697 firm-years.

Source: Authors' compilation.

Size captures scale and market power, leverage financial risk and debt discipline, liquidity short-term flexibility. Sales growth and asset tangibility, which reduce the sample, enter only a robustness test. Continuous variables are winsorized at the 1st and 99th percentiles; year and sector effects absorb macroeconomic shocks and structural profitability differences.

Identification Strategy

Identification is tightened step by step: a causal effect of audit should survive each step, whereas selection should fade as differences between firms are neutralized. The first step is the static model:

$$PERF_{it}=\alpha+\beta_1 BIG4_{it}+\beta_2 INTL_{it}+\beta_3 OPINION_{it}+\beta_4 CAO_{it}+\beta_5 JOINT_{it}+\gamma_1 FSIZE_{it}+\gamma_2 LEV_{it}+\gamma_3 LIQ_{it}+\lambda_t+\mu_i+\varepsilon_{it} \quad (1)$$

where PERF is ROA, ROE or NPM, λ_t year effects, μ_i time-invariant firm heterogeneity and ε_{it} the error. Pooled OLS with year and sector effects ignores μ_i, conflating audit effects with selection; random effects (Swamy–Arora, for unbalanced panels) treat μ_i as uncorrelated with the regressors; two-way fixed effects remove μ_i, identifying audit coefficients only from within-firm changes of auditor or opinion.

The second step addresses reverse causality and the persistence of performance with the dynamic model:

$$PERF_{it}=\rho\, PERF_{i,t-1}+\beta' AUDIT_{it}+\gamma' CONTROLS_{it}+\lambda_t+\mu_i+\varepsilon_{it} \quad (2)$$

estimated by system GMM (Arellano & Bond, 1991; Blundell & Bond, 1998). Lagged performance and the audit variables are treated as endogenous (lags 2–3), controls as predetermined (lags 1–2) and year effects as exogenous. The instrument matrix is collapsed (Roodman, 2009), giving 41 instruments for 77 firms, and the two-step estimator uses Windmeijer (2005) corrected standard errors.

As fixed effects rely on few auditor changes, the third step uses propensity score matching (Rosenbaum & Rubin, 1983): each treated observation (for example, CAO-audited) is matched to its nearest untreated neighbor, with replacement, within a caliper of 0.2 standard deviations of the logit of the score (Austin, 2011). The logit includes firm size, leverage, liquidity, and year and sector effects, and in a second specification prior-year ROA. An association vanishing in the second specification reflects selection of already profitable firms.

The fourth step relates audit attributes to the abnormal working capital accruals of DeFond and Park (2001), used in Egypt by El-Dyasty and Elamer (2022):

$$AWCA_{it}=(WC_{it}-(WC_{i,t-1}/S_{i,t-1})\times S_{it})/(TA_{i,t-1}) \quad (3)$$

where WC is working capital (current assets − current liabilities), S revenue and TA total assets. The measure does not require cash flows, which some statements lack; a higher |AWCA| indicates greater potential earnings management.

Finally, for each audit variable, we compute the minimum detectable effect (MDE) at 80% power for a two-sided 5% test, MDE ≈ 2.80 × standard error. We also test whether the fixed effects and pooled OLS coefficients are equal, to see whether an effect lost under fixed effects reflects imprecision or a genuine difference.

Specification Tests and Estimation

The static estimator is chosen with the F test (OLS versus fixed effects), the Breusch–Pagan Lagrange multiplier test (OLS versus random effects), and the Hausman (1978) test with its robust Mundlak (1978) version (random versus fixed effects). Autocorrelation is tested with Wooldridge (2010), heteroskedasticity with Breusch–Pagan and multicollinearity with VIFs. Static standard errors are clustered by firm; GMM validity is assessed with the Arellano and Bond (1991) AR(1) and AR(2) tests and the Hansen test.

Estimations were programmed in Python (numpy and scipy). The fixed effects estimator replicates a firm-dummy regression, and the GMM estimator was validated by a Monte Carlo simulation (40 replications, 150 individuals): the bias is below 0.03, and the corrected standard errors match the empirical standard deviation of the estimates. Claude (Anthropic) also assisted in writing the estimation programs and in drafting and translating the manuscript; the authors verified all programs, outputs and text and take full responsibility for them. The complete estimation output is available from the authors on request.

Results

Descriptive Statistics and Trends

In Table 3, ROA varies widely (mean 4.1%, standard deviation 10.8%), and liquidity is highly skewed (median 1.55, mean 6.12), which motivates winsorization.

Table 3: Descriptive statistics

Variable	N	Mean	Std. dev.	Min	Median	Max
ROA	699	0.041	0.108	−0.393	0.035	0.326
ROE	680	0.075	0.181	−0.740	0.061	0.511
NPM	605	0.025	0.523	−3.037	0.081	0.830
AUD_BIG4	697	0.455	0.498	0	0	1
AUD_INTL	697	0.819	0.385	0	1	1
AUD_OPINION	695	0.794	0.405	0	1	1
AUD_CAO	697	0.136	0.343	0	0	1
JOINT_AUD	697	0.182	0.386	0	0	1
FSIZE	699	20.919	1.693	16.821	21.002	25.624
LEV	698	0.422	0.299	0.001	0.390	1.873
LIQ	694	6.122	19.601	0.308	1.550	151.133

Table 3: Descriptive statistics *(continued)*

Variable	N	Mean	Std. dev.	Min	Median	Max
GROWTH	569	0.184	0.562	−0.757	0.094	3.307
TANG	656	0.178	0.200	0.000	0.084	0.794

Notes: Variables winsorized at the 1st and 99th percentiles.

Source: Authors' estimations based on audited financial statements of EGX-listed firms, 2010–2023.

In Figure 1, mean ROA is stable at around 4% in 2012–2018, falls sharply in 2019 and 2020 (economic slowdown, then the pandemic) and partially recovers. Mean ROA declines from 4.8% in 2010–2018 to 1.5% in 2019–2023 (Welch t = 2.96; p < 0.01) and mean ROE from 8.6% to 3.4% (p < 0.01), while leverage rises from 0.41 to 0.48 (p < 0.01), international network affiliation increases from 80% to 89% and joint audits decline from 20% to 11%. Year effects in all models absorb these common trends.

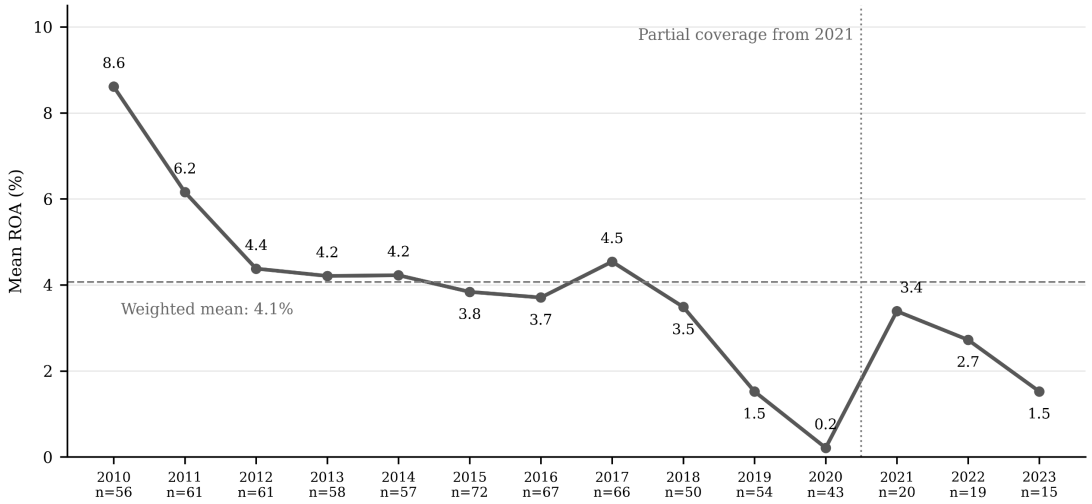

Figure 1: Mean return on assets (ROA) by year, 2010–2023

Notes: Annual means of winsorized ROA; n = number of firms per year; coverage is partial from 2021.

Source: Authors' estimations based on audited financial statements of EGX-listed firms, 2010–2023.

Correlations, Univariate Comparisons and Specification Tests

ROA is positively correlated with joint audit (r = 0.20) and an unqualified opinion (r = 0.14), but not with Big 4 status (r = 0.06) or the CAO (r = 0.03); leverage is its strongest correlate (r = −0.48). The CAO is negatively correlated with an unqualified opinion (r = −0.52), as the state auditor often issues modified opinions, and positively with joint audit (r = 0.30), which justifies estimating the five attributes jointly. The maximum VIF is 2.04 (AUD_CAO) and the mean VIF 1.42, well below the threshold of 5, so multicollinearity is not a concern.

In Welch t-tests (all p < 0.01), ROA is higher by 5.6 percentage points under joint audit and 3.7 with an unqualified opinion, and ROE by 8.9 under joint audit and 9.8 with CAO involvement. Big 4 and international network differences are not significant at the 5% level. These comparisons ignore size, industry and firm heterogeneity.

The F test ($F(77, 591) = 9.27$, $F(77, 573) = 9.80$ and $F(71, 506) = 7.41$ for ROA, ROE and NPM) and the Breusch–Pagan LM test ($\chi^2(1) = 313.8$, 230.2 and 169.2) reject pooled OLS (all $p < 0.01$). Firm heterogeneity explains 41% of the residual variance of ROA. For ROA and ROE, the Hausman test ($\chi^2(8) = 35.66$; 47.40) and its robust Mundlak version ($\chi^2(8) = 67.56$; 54.80) reject random effects (all $p < 0.01$). Firm effects correlate with the regressors, and only fixed effects are consistent. Time-invariant characteristics are thus related to audit choices, the condition for a selection effect. For NPM, random effects are retained (Hausman $\chi^2(8) = 13.16$, $p = 0.11$; Mundlak $\chi^2(8) = 6.93$, $p = 0.54$). Detected autocorrelation and heteroskedasticity justify firm-clustered standard errors.

Multivariate Results

Table 4 reports increasingly demanding ROA estimations. In pooled OLS, an unqualified opinion ($p < 0.01$), joint audit ($p = 0.02$) and, marginally, the CAO ($p = 0.07$) are significant and economically large relative to a mean ROA of 4.1%. Only the opinion remains significant under random effects. Under fixed effects, the preferred estimator, the CAO and joint audit coefficients fall to zero, while the opinion coefficient halves but stays significant ($p = 0.04$): a firm moving from a qualified to an unqualified opinion has an ROA about 1.9 percentage points higher. System GMM, which addresses performance persistence and opinion endogeneity, shows no audit effect, moderate persistence ($p = 0.09$) and satisfactory AR(2) and Hansen diagnostics.

Table 4: Determinants of ROA

Variable	(1) Pooled OLS	(2) Random effects	(3) Fixed effects	(4) System GMM
ROA t−1	—	—	—	0.242* (0.144)
AUD_BIG4	0.002 (0.015)	0.017 (0.014)	0.020 (0.016)	−0.033 (0.035)
AUD_INTL	−0.003 (0.015)	−0.015 (0.011)	−0.017 (0.013)	−0.064 (0.094)
AUD_OPINION	0.037*** (0.011)	0.023*** (0.009)	0.019** (0.009)	0.036 (0.083)
AUD_CAO	0.045* (0.025)	0.016 (0.021)	0.004 (0.023)	−0.082 (0.081)
JOINT_AUD	0.036** (0.015)	0.009 (0.015)	0.001 (0.019)	0.049 (0.060)
FSIZE	0.015*** (0.005)	0.019*** (0.005)	0.022** (0.009)	0.005 (0.027)
LEV	−0.220*** (0.022)	−0.223*** (0.018)	−0.238*** (0.023)	−0.304*** (0.075)
LIQ	−0.001*** (0.000)	−0.001*** (0.000)	0.000*** (0.000)	−0.001 (0.001)
Year/industry effects	Yes/Yes	Yes/Yes	Yes/absorbed	Yes/No
Observations (firms)	690 (78)	690 (78)	690 (78)	577 (77)
R^2	0.508	0.475 (overall)	0.333 (within)	—
AR(1); AR(2); Hansen (p)	—	—	—	0.005; 0.423; 0.176
Instruments	—	—	—	41

Notes: Firm-clustered standard errors in parentheses (GMM: two-step, Windmeijer correction). *** p < 0.01; ** p < 0.05; * p < 0.10.

Source: Authors' estimations based on audited financial statements of EGX-listed firms, 2010–2023.

Table 5 yields the same conclusions for ROE. An unqualified opinion is significant in pooled OLS, random effects and fixed effects (p = 0.04), but not in GMM. Joint audit is significant only in pooled OLS (p = 0.06), and the univariate CAO premium of 9.8 percentage points disappears with controls for size, leverage and industry. ROE persistence is similar (p = 0.05), and GMM diagnostics are acceptable.

Table 5: Determinants of ROE

Variable	(1) Pooled OLS	(2) Random effects	(3) Fixed effects	(4) System GMM
ROE t−1	—	—	—	0.316* (0.164)
AUD_BIG4	−0.005 (0.029)	0.014 (0.028)	0.022 (0.034)	0.007 (0.074)
AUD_INTL	0.002 (0.033)	−0.009 (0.023)	−0.016 (0.024)	−0.140 (0.160)
AUD_OPINION	0.067*** (0.020)	0.042*** (0.016)	0.030** (0.015)	0.044 (0.120)
AUD_CAO	0.071 (0.059)	0.005 (0.043)	0.005 (0.042)	−0.054 (0.176)
JOINT_AUD	0.059* (0.031)	0.013 (0.029)	−0.012 (0.036)	0.062 (0.142)
FSIZE	0.025** (0.010)	0.049*** (0.013)	0.073** (0.029)	0.083 (0.082)
LEV	−0.250*** (0.073)	−0.405*** (0.075)	−0.499*** (0.090)	−0.793** (0.310)
LIQ	−0.002*** (0.001)	−0.001*** (0.000)	−0.001*** (0.000)	−0.001 (0.001)
Year/industry effects	Yes/Yes	Yes/Yes	Yes/absorbed	Yes/No
Observations (firms)	672 (78)	672 (78)	672 (78)	561 (77)
R^2	0.285	0.222 (overall)	0.250 (within)	—
AR(1); AR(2); Hansen (p)	—	—	—	0.003; 0.225; 0.100
Instruments	—	—	—	41

Notes: As for Table 4.

Source: Authors' estimations based on audited financial statements of EGX-listed firms, 2010–2023.

For NPM (599 observations, 72 firms), an unqualified opinion is positive under random effects (+0.098; p = 0.03) and under fixed effects (+0.099; p = 0.05); other audit attributes are not significant at the 5% level, and leverage (−0.520) and liquidity (−0.010) are negative (p < 0.01).

Controls are stable across estimators. A 10 percentage point rise in leverage is associated with an ROA 2.2 to 3.0 percentage points lower, which fits Egypt's high cost of credit. Size is positive in static models, and liquidity is significant but economically small.

Robustness Checks

We test the stability of the associations in pooled OLS, the specification most favorable to an audit effect, with six variants: adding sales growth and asset tangibility (R1); excluding holding companies, whose profitability depends on dividends from subsidiaries (R2); restricting the sample to 2010–2018 (R3) and 2015–2023 (R4); using prior-year audit attributes (R5); and interacting the audit attributes with the post-2019 period (R6). All variants keep the controls, year and industry effects and firm-clustered standard errors.

The audit opinion is significantly and positively associated with ROA in all six variants (0.027 to 0.038) and joint audit in five (0.030 to 0.042; not significant over 2010–2018). The CAO association is less stable and disappears over 2015–2023 (0.017). The post-2019 interactions are not significant (BIG4 × POST2019: 0.001; CAO × POST2019: −0.035), so the relation did not change in the recent period, which mitigates concerns about its lower coverage. Big 4 status and international affiliation are not significant in any specification. For ROE, the unqualified opinion remains significant in all six specifications (+0.049 to +0.077) and the CAO in none. The cross-sectional associations thus withstand these variations; whether they are causal is examined next.

Propensity Score Matching

Table 6 compares, for each attribute, the raw difference between treated and untreated firms on the same subsample with the effect after matching each treated observation to its statistical twin. After matching, the maximum standardized difference is below 0.25 in all eight specifications, against up to 0.73 before matching.

Table 6: Effect of audit attributes on ROA after propensity score matching

Attribute	Score specification	Matched treated	Raw difference (p)	Effect after matching (p)	Max standardized difference after matching
AUD_BIG4	Size, leverage, liquidity	265/314	−0.003 (0.84)	0.000 (0.98)	0.17
AUD_BIG4	+ ROA t−1	225/267	−0.006 (0.68)	0.000 (0.98)	0.24
AUD_OPINION	Size, leverage, liquidity	494/543	+0.002 (0.93)	+0.025 (0.10)	0.16
AUD_OPINION	+ ROA t−1	427/460	−0.003 (0.90)	+0.022 (0.26)	0.15
AUD_CAO	Size, leverage, liquidity	81/81	+0.072** (0.03)	+0.066** (0.05)	0.23
AUD_CAO	+ ROA t−1	58/59	+0.071** (0.05)	+0.013 (0.72)	0.12
JOINT_AUD	Size, leverage, liquidity	126/126	+0.046** (0.02)	+0.025 (0.25)	0.10
JOINT_AUD	+ ROA t−1	96/100	+0.045** (0.03)	+0.007 (0.75)	0.13

Notes: Nearest-neighbor matching with replacement, caliper of 0.2 standard deviations of the logit of the score; logit score model with year and industry effects. Standard errors clustered by firm. ** p < 0.05; * p < 0.10.

Source: Authors' estimations based on audited financial statements of EGX-listed firms, 2010–2023.

Matched on size, leverage and liquidity, CAO-audited firms remain 6.6 percentage points more profitable than their twins (p = 0.05). With prior-year profitability in the score, the difference falls to 1.3 percentage points (p = 0.72), although the raw difference on the same subsample is still 7.1 percentage points (p = 0.05). CAO-audited firms are thus no more profitable than firms that were equally profitable the year before; the association reflects pre-existing profitability. The raw joint audit difference (4.6 percentage points) disappears once firms are matched on size, leverage and liquidity (p = 0.25). The opinion effect after matching is positive (2.2 percentage points) but not significant (p = 0.26), and no effect appears for the Big 4.

Audit Attributes and Earnings Quality

Table 7: AWCA and : 0.144; median: 0.068).

If audit attributes improved the monitoring of managers, they should at least reduce earnings management. Table 7 tests this necessary condition with abnormal working capital accruals (Equation 3), available for 498 observations (mean	**AWCA**	**: 0.144; median: 0.068).**
Table 7: Audit attributes and abnormal accruals (	AWCA	)
Variable	**(1) Pooled OLS**	**(2) Fixed effects**
AUD_BIG4	−0.003 (0.020)	0.046* (0.027)
AUD_INTL	−0.002 (0.032)	0.029 (0.054)
AUD_OPINION	−0.015 (0.016)	0.016 (0.026)
AUD_CAO	0.043* (0.023)	0.019 (0.034)
JOINT_AUD	−0.031 (0.022)	−0.032 (0.024)
FSIZE	−0.032*** (0.007)	0.000 (0.028)
LEV	0.015 (0.058)	−0.095 (0.145)
ROA	−0.177 (0.138)	−0.380* (0.211)
LOSS	0.019 (0.033)	0.007 (0.031)
GROWTH	0.231*** (0.032)	0.222*** (0.030)
Observations (firms)	470 (70)	470 (70)

Notes: LOSS equals 1 if net income is negative. Firm-clustered standard errors in parentheses; year effects, plus industry effects in OLS. *** p < 0.01; ** p < 0.05; * p < 0.10.

Source: Authors' estimations based on audited financial statements of EGX-listed firms, 2010–2023.

No audit attribute significantly reduces abnormal accruals. The only marginal associations run opposite to the expected effect and do not survive a change of estimator: the CAO in OLS (+0.043; p = 0.06) and Big 4 status in fixed effects (+0.046; p = 0.09). Sales growth is the main determinant of working capital accruals. Consistent with El-Dyasty and Elamer (2021, 2022), observable audit attributes in Egypt do not come with higher reported earnings quality, so stronger discipline of managers, the channel through which audit could improve performance, is not observed.

Statistical Power and Timing

The absence of fixed-effects results could stem from few auditor changes: 23 firms change Big 4 status, ten change CAO status and 32 change opinion type. Panel A of Table 8 reports the minimum detectable effect (MDE ≈ 2.80 × standard error) and a test of equality between fixed-effects and pooled OLS coefficients. Panel B examines the timing of the only within-firm association, that of the audit opinion.

Table 8: Statistical power and timing of the association

Table 9: Panel A: Minimum detectable effect and comparison of OLS and fixed-effects estimates (ROA)

Variable	Firms changing status	OLS coefficient	FE coefficient [95% CI]	MDE FE	MDE GMM	p (FE = OLS)
AUD_BIG4	23	0.002	0.020 [−0.011, 0.052]	0.046	0.099	0.247
AUD_INTL	16	−0.003	−0.017 [−0.042, 0.007]	0.036	0.265	0.260
AUD_OPINION	32	0.037	0.019 [0.001, 0.037]	0.025	0.232	0.049
AUD_CAO	10	0.045	0.004 [−0.040, 0.049]	0.064	0.226	0.072
JOINT_AUD	22	0.036	0.001 [−0.036, 0.037]	0.052	0.167	0.056

Table 10: Panel B: Prior-year, current-year and following-year audit opinion (fixed effects, separate regressions)

Explanatory variable	ROA: coefficient (SE)	ROA: p	ROE: coefficient (SE)	ROE: p	Observations (ROA)
Opinion in t−1	0.027* (0.014)	0.068	0.051* (0.030)	0.091	581
Opinion in t	0.020** (0.008)	0.013	0.034** (0.014)	0.017	690
Opinion in t+1	0.014* (0.008)	0.084	0.017 (0.015)	0.249	581

Notes: MDE: minimum detectable effect at 80% power (two-sided test, 5% level). FE: fixed effects. p (FE = OLS): approximate test that the FE coefficient equals the pooled OLS coefficient taken as a reference value. Panel B: firm and year fixed effects, firm size, leverage and liquidity. *** p < 0.01; ** p < 0.05; * p < 0.10.

Source: Authors' estimations based on audited financial statements of EGX-listed firms, 2010–2023.

The fixed-effects estimates are conclusive for the opinion, the CAO and joint audit: equality of within-firm and OLS coefficients is rejected, or nearly so, for the opinion (p = 0.05; ROE: p = 0.01), joint audit (p = 0.06; ROE: p = 0.05) and the CAO (p = 0.07). The cross-sectional association overstates the within-firm association by about half for the opinion and entirely for the other two. For the Big 4 and international networks, the fixed-effects MDE (4.6 and 3.6 percentage points of ROA) is large relative to a mean ROA of 4.1%, so a modest effect cannot be ruled out. GMM, with MDEs of 10 to 26 percentage points, says little about the audit variables.

Panel B shows that the within-firm opinion association lacks the timing of a causal effect, under which only the past opinion should be associated with current ROA. For ROA, the following-year opinion is associated with current ROA (+0.014; p = 0.08), as is the prior-year opinion (+0.027; p = 0.07); for ROE, neither is significant at the 5% level. Opinion and profitability move together: a year of financial deterioration is accompanied by a modified opinion, and the opinion cannot be credited with an effect of its own on performance.

Summary of Findings

Table 9 summarizes the result of each identification step by attribute.

Table 9: Summary of results by identification step (ROA)

Attribute	Pooled OLS	Fixed effects	GMM	Matching with ROA t−1	Abnormal accruals	Conclusion
Big 4	ns	ns	ns	ns	No reduction	No association
International network	ns	ns	ns	—	No reduction	No association
Unqualified opinion	+***	+** (≠ OLS)	ns	ns	No reduction	Co-movement, no causal effect established
CAO	+*	ns (≠ OLS)	ns	ns	No reduction	Selection on past profitability
Joint audit	+**	ns (≠ OLS)	ns	ns	No reduction	Selection

Notes: ns: not significant at the 10% level; ≠ OLS: significantly different from the pooled OLS coefficient at the 10% level (Table 8). *** p < 0.01; ** p < 0.05; * p < 0.10.

Source: Authors' estimations based on audited financial statements of EGX-listed firms, 2010–2023.

All five steps point the same way: the associations exist in the cross-section but disappear or shrink sharply once pre-existing differences between firms are controlled for, and the only one that persists, for the audit opinion, lacks the timing of a causal effect.

Discussion

Audit attributes are associated with performance across firms, but the association disappears, or shrinks and loses the timing of a causal effect, when a firm is compared with itself or with firms of similar past profitability.

Big 4 and International Networks (H1, H2)

H1 and H2 are rejected. Big 4 status is unrelated to performance under every estimator and after matching, consistent with El-Dyasty and Elamer (2021), who find no Big 4 advantage in financial reporting quality in Egypt over 2011–2018, and Diab et al. (2024), who find no moderating effect of audit quality on EGX 100 firm performance. Since Big 4 auditors do not reduce earnings management (Table 7), they lack a disciplinary channel to raise profitability. The null network effect agrees with Francis and Wang (2008) for weak investor protection countries and contrasts with El-Dyasty and Elamer (2021) on reporting quality.

Jordanian studies find a positive auditor size effect (Abu Afifa & Saleh, 2023, for ROE; Abu Afifa et al., 2023) using more homogeneous sectoral samples and mostly estimators that retain time-invariant heterogeneity, whereas Table 4 shows that the estimator changes the conclusions; Jordan also differs in ownership structure and the role of the state. Kateb and Belgacem (2024) likewise find a Big 4 effect on Tobin's Q in Saudi Arabia but not on accounting measures, suggesting that large auditors add market credibility rather than profitability. Their governance role depends on litigation risk and investor protection (Fan & Wong, 2005; Choi & Wong, 2007), both weak in Egypt, where ownership is concentrated (Omran et al., 2008). The null result after matching fits Lawrence et al. (2011), although DeFond et al. (2017) recover a Big 4 effect with other matching methods. A modest Big 4 or network effect, below 4 or 5 percentage points of ROA, cannot be ruled out.

Audit Opinion (H3)

Unqualified opinions accompany an ROA 3.7 percentage points higher and an ROE 6.7 percentage points higher across firms, surviving all six robustness tests. The opinion is the only attribute whose association persists within firms: in fixed effects, a move to an unqualified opinion is accompanied by an ROA 1.9 percentage points higher ($p = 0.04$) and an ROE 3.0 percentage points higher ($p = 0.04$). A causal reading is precluded, however. The within-firm association is half the cross-sectional one, a significant difference; it disappears in GMM and after matching on past profitability; and its timing is symmetric, with next year's opinion associated with current profitability ($p = 0.08$) just as the previous year's is ($p = 0.07$). H3 therefore holds only as a cross-sectional association, and a modified opinion records deterioration more than it causes it.

This fits Dopuch et al. (1987), who predict modified opinions from financial condition, Kausar et al. (2009), who document underperformance after going-concern opinions, and Chen et al. (2000), who observe a negative but delayed Chinese market reaction to modified opinions. Qualified opinions are often issued by the CAO (correlation −0.50) and rest on persistent deficiencies: insufficient provisions, fixed assets not physically inventoried, unregularized land title deeds and accumulated losses, which explains the link with time-invariant profitability differences. The within-firm association, which extends to the net profit margin ($p = 0.05$), is consistent with qualifications accompanying weaker years, although causality cannot be established.

State Auditor (H4)

CAO involvement has the strongest cross-sectional association with ROA (+4.5 percentage points in OLS, +6.6 percentage points after matching on size and leverage) but disappears in fixed effects, with a significant difference from OLS, and after matching on prior-year profitability. CAO-audited firms belong

to structurally profitable sectors such as fertilizers (Abou Kir) or petrochemicals (Sidi Kerir), although the state portfolio also includes state-owned steelmaking (Egyptian Iron & Steel). The association thus reflects portfolio composition and cannot be attributed to public-sector audit. El-Dyasty and Elamer (2021) and our accruals estimates likewise show no CAO effect on reporting quality. The result qualifies Chinese evidence of a disciplinary effect of government audit on state-owned groups' investment decisions (Liang et al., 2024), probably because Chinese government audit carries sanctioning power over managers, whereas the CAO acts mainly as statutory auditor.

Joint Audit (H5)

H5 is rejected. Joint audit is associated with ROA in univariate analysis (5.6 percentage points higher) and pooled OLS (+3.6 percentage points; $p = 0.02$), but not in fixed effects, GMM or after matching on size and leverage, and does not significantly reduce abnormal accruals once size is controlled for. This agrees with El-Dyasty and Elamer (2022) for Egypt and Holm and Thinggaard (2018), who find that abandoning joint audit in Denmark did not impair quality, and qualifies Zerni et al. (2012) on voluntary Swedish joint audit, Alfraih (2016) and Egyptian auditors' favorable perception (Hegazy & Ebrahim, 2022). In Egypt, joint audit often follows from state ownership (the CAO paired with a private firm) or the choice of large firms, so it identifies large, already profitable firms. Pair composition and work allocation also matter (Lobo et al., 2017; Haak et al., 2018), but our data do not reveal them.

Alternative Explanations

Lack of power is addressed for the opinion, the CAO and joint audit, whose within-firm coefficients differ from the cross-sectional ones ($p \leq 0.07$), but not fully for Big 4 auditors and networks. Coding error would attenuate fixed-effects coefficients but would not explain strong, stable cross-sectional associations. Prior-year attributes, the dynamic model and the timing test (Table 8, Panel B) reveal no lagged effect. The thinner 2021–2023 coverage does not drive the results, as the 2010–2018 estimates and the post-2019 interaction show.

Five approaches with different identifying assumptions (fixed effects, GMM, matching, accruals, power) make selection considerably more credible than causation. As Wintoki et al. (2012) find for governance, measurable effects vanish once heterogeneity and performance persistence are controlled, and audit quality is partly a consequence of client characteristics (DeFond & Zhang, 2014). Pooled regressions, common in emerging-market studies, would have supported three of the five hypotheses on our data, whereas none fully survives more demanding identification.

Conclusion

This article asked whether audit quality improves the financial performance of listed non-financial firms in Egypt or is merely a marker of it. Using an original panel of 699 observations (78 firms, 2010–2023) built from financial statements and audit reports published in Arabic, we examined five audit attributes: Big 4 status, international network affiliation, the audit opinion, CAO engagement and joint audit. The unqualified opinion, the CAO and joint audit are associated with higher profitability across firms, but the CAO and joint audit associations disappear in fixed effects, in GMM and after matching on past profitability. The opinion association persists within firms at half the size, disappears in GMM and after matching, and next year's opinion is associated with current profitability just as the previous year's opinion is, so the opinion moves

with the firm's financial condition without improving it. Big 4 status and international affiliation are never associated with performance, no audit attribute reduces earnings management, and leverage is the most consistent determinant of profitability. In Egypt, audit attributes reflect firm characteristics and do not alter them.

Contributions and Implications

The study covers 14 years, including the 2011 political transition, the 2016 flotation of the Egyptian pound and the COVID-19 health crisis, and is one of the first to measure jointly the effect of the CAO, the audit opinion and joint audit on performance in Egypt. It shows that the conclusions depend entirely on how heterogeneity and selection are treated, and it separates the absence of an effect from a lack of statistical power, which the regional literature rarely does. On the theoretical side, the evidence supports interpreting the audit–performance association in terms of signaling and selection (Spence, 1973; DeFond & Zhang, 2014) rather than agency discipline where litigation risk is low.

For the Financial Regulatory Authority (FRA) and the EGX, qualified opinions signal firms with persistently lower profitability and warrant closer monitoring and more visible communication to investors instead of treatment as a formality; the new auditing standards, which require a detailed report including key audit matters, offer an opportunity to strengthen this signal. Public-sector audit has no measurable effect on the performance of firms with state ownership, so if the CAO and policymakers want to improve how these firms are run, certification of the financial statements must be supplemented by management recommendations with follow-up. Investors learn little about future profitability from the name of the audit firm; the audit opinion and leverage are more informative. For firms, choosing a Big 4 auditor or a joint audit improves performance only with better internal governance.

Limitations and Future Research

The panel is unbalanced: coverage is thinner for 2021–2023 (54 observations) because digitized financial statements are unavailable for some firms, although the conclusions do not depend on this period. Auditor changes are rare, which limits the power of fixed effects for Big 4 auditors and international networks and the strength of the GMM instruments. Abnormal working capital accruals measure earnings quality only approximately, because cash flow data are not available for all firms, and audit fees are not disclosed in Egypt. Accounting ratios may miss a credibility effect that a market-based measure could reveal. The results pertain to Egypt and do not transfer directly to markets with higher litigation risk.

Extending the panel to recent years would allow study of the new Egyptian auditing standards and the expanded audit report. Market measures (Tobin's Q, stock returns) could test whether audit operates through perceived credibility, as Kateb and Belgacem (2024) suggest. Externally imposed auditor changes, for example when an audit firm switches international networks, would provide quasi-natural experiments in difference-in-differences designs. Future work could also examine the composition of joint auditor pairs and the allocation of work, which determine the effectiveness of joint audit (Lobo et al., 2017; Haak et al., 2018).

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