

Owner-Manager Duality and Formal Credit Participation among Formal Firms in Ghana: Does External Financial Audit Moderate the Relationship

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Abstract

Concentrating ownership and executive control in one person may either strengthen a firm through unified leadership or weaken its credit position through limited oversight and information opacity. External financial audit may reduce these concerns by increasing the credibility of financial statements. This study examined whether owner-manager duality was associated with current formal credit participation among formal firms in Ghana and whether external financial audit moderated that relationship. This study analyzed the Ghana World Bank Enterprise Survey 2023. Formal credit participation was coded as one when an establishment held a loan, a line of credit, or both from a financial institution. Owner-manager duality indicated that the largest owner was also the top manager. External audit indicated that an external auditor checked and certified the previous fiscal year's financial statements. After removing World Bank nonresponse codes and incomplete control variables, the analytical sample contained 689 establishments. Survey-weighted logistic regression controlled for logged firm age, employment size, realised industry and region. Hierarchical models, average predicted probabilities, legal-form controls, alternative survey weights, an expanded credit measure, influence tests, cross-validation and 1,000 stratified bootstrap replications were used. Weighted estimates indicated that 21.9% of firms held current formal credit, 83.6% had owner-manager duality, and 68.0% had externally audited financial statements. In the additive model, duality had a positive but narrowly nonsignificant association with credit, adjusted odds ratio = 1.67, 95% confidence interval [0.97, 2.88], $p = .065$. External audit was not independently significant. In the full interaction model, the duality odds ratio among unaudited firms was 1.63, 95% confidence interval [0.55, 4.82], $p = .377$. The audit odds ratio among non-duality firms was 1.11, 95% confidence interval [0.35, 3.57], $p = .856$. The duality-by-audit interaction was essentially null, adjusted odds ratio = 1.03, 95% confidence interval [0.30, 3.60], $p = .959$. Adjusted credit probabilities ranged from 15.0% for unaudited non-duality firms to 23.9% for audited duality firms, but the probability-scale interaction was not significant. The moderation hypothesis was not supported in any major robustness analysis. The findings suggest that external audit and owner-manager leadership were not sufficient, by themselves or jointly, to explain current formal credit participation. Firm scale and the broader lending context appear more important.

Keywords: Owner-manager duality, external audit, formal credit, SME finance, corporate governance, Ghana

DOI: 10.7176/EJBM/18-9-06

Publication date: September 30th 2026

1. Introduction

Access to formal credit allows firms to finance working capital, acquire equipment, respond to shocks and pursue growth opportunities. Yet many private firms in developing economies remain outside formal loan markets or depend mainly on internal funds and informal sources. The financing problem is especially serious for smaller firms because lenders often have limited reliable information about their cash flows, governance and repayment capacity. Firm size, age, collateral, financial records, banking relationships and the institutional environment all influence whether a lender is willing to provide credit (Beck et al., 2005; Berger & Udell, 1998, 2006; Fouejieu et al., 2020).

Ghanaian firms operate within this wider challenge. Credit decisions are shaped by the quality of business records, lending technologies, credit-reference information and the perceived risk of the borrower. Recent Ghanaian evidence highlights the importance of lending methods and credible information for small and medium-sized enterprises seeking finance (Gyimah et al., 2022). Evidence from another emerging banking market also shows that lender characteristics and branch conditions can shape SME financing opportunities (Khan, 2024). However, less attention has been given to how the internal structure of ownership and management interacts with externally verified financial information.

This study focuses on owner-manager duality. In the World Bank Enterprise Survey, duality exists when the largest owner is also the top manager. This structure is common in private firms because founders and principal owners often remain directly responsible for daily operations. It differs from the CEO-chair duality commonly studied in listed corporations. In a private establishment, owner-manager duality combines residual financial claims with operational authority in the same individual.

The implications for credit are theoretically mixed. Agency theory suggests that concentrated authority may weaken checks and balances, increase managerial discretion and limit the reliability of information supplied to outsiders (Jensen & Meckling, 1976). Banks may be concerned when decisions, records and strategic control depend heavily on one person. Evidence from public-company loan markets shows that CEO duality can be associated with stricter loan terms because lenders perceive greater information asymmetry and entrenchment risk (Chen et al., 2022).

Stewardship theory provides a different view. An owner-manager has a direct economic interest in the business's survival and value. Unified authority can reduce conflict between owners and managers, shorten decision processes and signal commitment. The owner-manager may also provide personal information, guarantees and long-term relationships that help lenders assess the firm. Research on small-business borrowing has produced mixed evidence on whether owner-management agency costs are priced by banks (Brau, 2002; Niskanen & Niskanen, 2010).

External financial audit may help resolve the competing interpretations. An audit provides independent examination of financial statements and may increase the credibility of information used in lending. Audited private firms can obtain lower loan prices, stronger credit ratings or better access to finance because lenders face lower verification costs and information risk (Blackwell et al., 1998; Dedman & Kausar, 2012; Minnis, 2011). Recent evidence from emerging economies also links audited statements with formal credit access (Alduraywish, 2023).

If lenders are concerned that an owner-manager can dominate financial reporting, external audit may be particularly useful for duality firms. The auditor can provide an independent check without changing the internal leadership structure. Under this complementarity argument, audit should weaken any negative relationship between owner-manager duality and formal credit. It may also help lenders distinguish committed owner leadership from unmonitored managerial control.

The relationship is not automatic. Audits may be undertaken because lenders already require them, creating reverse causality. Audit quality may differ, and an audit does not guarantee strong cash flow, collateral or loan demand. The survey outcome also identifies whether a firm currently holds formal credit, not whether every firm wanted, applied for or was approved for credit. These distinctions require careful interpretation.

This study contributes in four ways. First, it provides current national evidence using the Ghana World Bank Enterprise Survey 2023. Second, it examines a direct ownership-management measure rather than using legal form or ownership concentration as a proxy. Third, it tests external audit as a moderator rather than only as an independent predictor. Fourth, it applies the World Bank weights, realised industry information and multiple

robustness analyses, including legal-form controls and an expanded credit outcome.

The article follows the IMRaD structure. The next section develops the agency, stewardship and information-assurance arguments. The Methods section explains the survey, variables and statistical procedures. The Results section reports descriptive patterns, logistic models, adjusted probabilities and sensitivity checks. The Discussion considers theoretical, managerial and policy implications and states the limitations of the cross-sectional evidence.

2.0 Theoretical Background and Hypotheses

2.1 Owner-Manager Duality and Formal Credit Participation

Agency theory separates ownership from management and examines the costs that arise when managers may not act fully in the interests of owners or external financiers (Araral, 2026; Jensen & Meckling, 1976). In many private firms, however, the largest owner is also the manager. This arrangement reduces the classic owner-manager conflict but may increase conflict between the controlling owner and outside creditors. The individual who controls operations may also control information, investment decisions and the timing of payments.

Lenders need credible information about the ability and willingness of a borrower to repay. Small firms often lack public market information, independent analyst coverage and long reporting histories. Banks therefore combine hard information from financial statements with soft information obtained through relationships, interviews and observation (Berger & Udell, 2006; Petersen & Rajan, 1994). Owner-manager duality may affect both information channels.

From an agency-risk perspective, duality may reduce transparency. A dominant owner-manager may have fewer internal checks on financial reporting and may make decisions that increase private benefits or business risk. Succession risk can also be greater when knowledge and authority are concentrated in one person. Public-firm evidence shows that lenders can respond to duality with higher prices or shorter maturities when they believe that governance risk has increased (Chen et al., 2022).

Private-firm evidence is less uniform. Banks often require personal guarantees and examine the owner's credit history. Direct owner management may therefore help lenders connect the firm's behaviour with an identifiable responsible person. Brau (2002) found no clear owner-manager agency premium in small-business loan terms, while Niskanen and Niskanen (2010) showed that ownership-management agency conditions can influence borrowing in more complex ways. These studies indicate that context and lender information matter.

Stewardship theory argues that managers can be motivated by achievement, responsibility and the long-term welfare of the organisation rather than only personal gain (Davis et al., 1997). An owner-manager has both financial and psychological attachment to the firm. Unified leadership can support rapid decisions and credible commitment. Boyd (1995) proposed that the effect of duality depends on organisational conditions, which helps explain inconsistent findings across settings.

For Ghanaian private firms, the direction is therefore uncertain. The agency argument predicts lower credit participation because lenders may perceive governance and information risk. The stewardship and commitment argument predicts higher participation because the controlling owner can act decisively, pledge personal resources and maintain close lender relationships. The article adopts the conservative agency expectation because formal lenders generally require credible separation between business information and the personal authority of the borrower.

Hypothesis 1: Owner-manager duality is negatively associated with current formal credit participation among formal firms in Ghana.

2.2 External Financial Audit as a Moderating Assurance Mechanism

External audit is an assurance service. An independent auditor examines whether financial statements are prepared in accordance with the applicable reporting framework and are free from material misstatement. The audit does not remove business risk, but it can reduce the lender's cost of verifying accounting information. This role is particularly relevant for private firms, where alternative public information is limited (Vanstraelen & Schelleman, 2017).

Empirical research supports the information value of audit in debt markets. Allee and Yohn (2009) showed that privately held small businesses produce financial statements partly in response to external demand and that financial information is connected to credit use. Blackwell et al. (1998) found that auditor assurance was associated with lower loan pricing. Minnis (2011) showed that financial-statement verification created value in private-firm debt financing. Dedman and Kausar (2012) linked voluntary audit with private-firm credit ratings. Briozzo and Albanese (2020) reported that voluntary audit supported financing and investment decisions among Latin American SMEs. More recent cross-country evidence also suggests that audited firms can obtain better access to formal credit (Alduraywish, 2023; Changwony et al., 2024).

Audit may be especially valuable where ownership and management are combined. The audit can create an external checkpoint around a firm whose internal decision authority is concentrated. Lenders may be more willing to rely on owner-managed financial information when an independent professional has examined the statements. In this sense, audit can substitute partly for internal governance structures that are common in larger firms.

The expected mechanism is a reduction in information asymmetry rather than a direct change in the owner-manager's behaviour. Audited statements can improve comparability, clarify assets and liabilities, and make cash-flow analysis more credible. Financial-reporting quality is often important for private-firm bank debt, although its value varies by firm size and risk (Selleslagh & Ceustermans, 2024).

The moderating role has limits. Audit may be voluntary or required, and the survey does not identify the auditor's quality, the audit opinion or the reason the audit was commissioned. A clean audit does not provide collateral or guarantee future cash flow. If owner-manager duality is interpreted as commitment rather than risk, audit may add little. Audit can also follow existing debt because lenders request audited statements after a relationship has already begun.

Despite these limitations, the information-assurance argument predicts that audit should reduce lenders' concern about concentrated control. The second hypothesis is therefore stated as a buffering effect.

Hypothesis 2: External financial audit positively moderates the relationship between owner-manager duality and formal credit participation, such that any negative duality relationship is weaker among audited firms.

3. Methodology

3.1 Data Source and Survey Design

The study used the Ghana World Bank Enterprise Survey 2023. The survey is part of the World Bank's international programme for collecting comparable establishment-level information on the business environment, finance, management, innovation and performance. Interviews were conducted between February 2023 and February 2024. The public-use file contained 713 establishments and 355 variables (World Bank Group, 2025). The target population covered registered private establishments with at least five employees in eligible manufacturing and service activities. Agricultural enterprises, financial institutions, public organizations and several non-covered service industries were outside the universe. The establishment, rather than the wider corporate group, was the unit of analysis. Each establishment was required to have its own management and financial decision authority.

The World Bank used stratified random sampling. The Ghana strata combined industry, size, region and panel status. The treatment of weights and strata followed established principles for complex survey analysis (Lumley, 2004). Because the number sampled in each stratum was not proportional to the population, observations required weighting for population inference. The median-eligibility weight, *wmedian*, was used in the primary analyses. The weak-eligibility weight, *wweak*, was used as a sensitivity check. Regression weights were divided by their analytical-sample mean to preserve relative selection probabilities without artificially increasing residual precision.

The realised main activity reported during the interview, *d1a2_v4*, was used to construct industry controls. This follows the World Bank recommendation because the realised activity may differ from the sampling-frame category. Four-digit ISIC Revision 4 codes were grouped into six descriptive sectors and three broader regression sectors.

The overall survey response rate was 24.8%. Weighting accounts for the sampling design and alternative

assumptions about eligibility, but it cannot eliminate every form of nonresponse bias. The findings should therefore be interpreted as weighted cross-sectional associations within the covered formal private-sector population.

4. Data Inspection and Analytical Sample

Data inspection took place before modelling. Establishment identifiers were checked for duplication, variable labels and value categories were reviewed, and numerical ranges were examined. All 713 listed identifiers were unique. The focal variables were checked against the questionnaire's value labels and skip patterns.

World Bank negative response codes were treated as missing rather than as valid numerical values. Owner-manager duality had 711 valid yes-or-no responses, external audit had 703, and current formal credit had 696. Firm age was valid for 709 establishments. Employment, realised industry, region and weights were available for all 713. Complete-case analysis produced 689 establishments, equal to 96.6% of the original file. The analytical sample contained 143 establishments with current formal credit.

Firm age was calculated as the interview reference year minus the year operations began. The natural logarithm of age plus one was used to reduce right skew. Permanent full-time employment was also transformed with the natural logarithm. Both transformed controls were centred at their weighted means before model estimation.

Legal form was not included in the primary model because it is closely connected to owner-manager structure and may absorb part of the relationship of interest. It was included in a sensitivity model using three groups: shareholding companies, sole proprietorships, and partnerships or other forms. A further sensitivity analysis excluded sole proprietorships because owner management is structurally common in that group.

The outcome was measured at the time of interview. It does not identify discouraged borrowers, rejected applicants or firms that had no demand for credit. For this reason, the manuscript uses the term formal credit participation or current credit holding rather than treating the variable as a complete measure of unconstrained credit access.

5. Measures

Current formal credit participation. The dependent variable was k82. It asked whether the establishment currently had a loan, a line of credit, both, or neither from a financial institution. Loan only, line of credit only and both were coded one. No current loan or line of credit was coded zero. The measure directly records current formal credit holding. A sensitivity outcome also counted an overdraft facility as formal credit.

Owner-manager duality. The independent variable was b3a, which asked whether the largest owner was also the top manager. Yes was coded one and no was coded zero. This direct private-firm measure should not be interpreted as identical to CEO-chair duality in listed corporations.

External financial audit. The moderator was k21, which asked whether the previous fiscal year's financial statements had been checked and certified by an external auditor. Yes was coded one and no was coded zero. The variable does not identify whether the audit was voluntary, legally required or requested by a lender.

Control variables. The models controlled for logged firm age, logged permanent employment, realised industry and region. Size is especially important because larger firms usually produce more information, possess more assets and have greater credit demand. The controls were selected before interpreting the focal coefficients. Legal form was reserved for sensitivity analysis because of its conceptual overlap with duality.

6. Statistical Analysis

Weighted descriptive statistics were calculated for formal credit, duality, audit, age, employment, sector, region and legal form. Credit rates were then compared across four ownership-audit combinations: non-duality without audit, non-duality with audit, duality without audit, and duality with audit.

Binary logistic regression was used because the outcome had two categories. Model 1 included the controls. Model 2 added owner-manager duality. Model 3 added an external audit. Model 4 added the duality-by-audit interaction. Heteroskedasticity-consistent HC1 standard errors were reported (White, 1980). Results are expressed as adjusted odds ratios with 95% confidence intervals.

Nonlinear interaction coefficients cannot be interpreted as probability interactions without additional calculations

(Ai & Norton, 2003). Average predicted probabilities were therefore calculated for the four combinations while averaging over observed control variables. Five thousand coefficient simulations were used to generate confidence intervals. Conditional odds ratios and probability differences were also calculated. The probability-scale difference-in-differences was used as an additional moderation description (Brambor et al., 2006).

Model adequacy and robustness were assessed in several ways. Variance inflation factors examined multicollinearity. Squared logged-age and logged-employment terms tested remaining nonlinearity. Cook's distance identified influential observations. The model was re-estimated with the weak-eligibility weight, without weights, with six sectors, with legal-form controls, after excluding sole proprietorships, and with an expanded credit measure that included overdraft facilities.

A 1,000-replication stratified bootstrap resampled establishments within the World Bank strata. Ten-fold stratified cross-validation assessed discrimination and Brier error in held-out observations. The cross-validation statistics were used only to describe generalisability, not to present the model as an individual credit-scoring tool.

All tests were two-sided. A probability value below .05 was treated as statistically significant. The statistical analysis was conducted in Python using pandas, statsmodels, patsy, NumPy, SciPy and scikit-learn.

7. Ethical and Data Management Considerations

The study used anonymised secondary establishment data under the World Bank Enterprise Surveys Data Access Protocol. No respondent was contacted, and no attempt was made to identify an establishment or individual. Results are presented only in aggregate form. The firm-level dataset is not redistributed with the manuscript.

8. Results

8.1 Sample Characteristics

The analytical sample contained 689 establishments. One hundred and forty-three held a current loan, line of credit, or both. The weighted formal-credit participation rate was 21.9%. Owner-manager duality was common: 540 establishments reported that the largest owner was also the top manager, corresponding to 83.6% of the weighted population. 450 establishments, representing 68.0%, reported external audit.

The weighted mean firm age was 14.02 years, and the mean number of permanent full-time employees was 28.78. Wholesale and retail represented 39.8% of the weighted sample and had the highest sectoral credit-participation rate, 27.9%. Region 2 had a weighted credit rate of 33.2%, while Region 3 had 7.7%.

Credit, duality and audit also varied by legal form. Shareholding companies represented 55.8% of the weighted sample, sole proprietorships 36.9%, and partnerships or other forms 7.3%. Audit was much less common among sole proprietorships (46.1%) than among shareholding companies (80.4%). These patterns motivated the legal-form sensitivity test.

Table 1
Weighted Characteristics of the Analytical Sample

Characteristic	Unweighted n	Weighted % or M	Weighted SD
Current formal credit, yes	143	21.9	
Owner-manager duality, yes	540	83.6	
External financial audit, yes	450	68.0	
Firm age, years	689	14.02	11.47
Permanent full-time employees	689	28.78	59.48
Realised sector			
Manufacturing	226	16.2	
Construction	42	6.9	
Wholesale and retail	199	39.8	
Transport and storage	20	6.2	
Accommodation and food	153	17.6	
Other services	49	13.2	

Characteristic	Unweighted n	Weighted % or M	Weighted SD
Region			
Region 1	289	70.9	
Region 2	164	14.7	
Region 3	122	10.9	
Region 4	114	3.6	

Note. N = 689. Percentages and means use the World Bank median-eligibility weight. Current formal credit means a loan, line of credit, or both from a financial institution.

8.2 Formal Credit across Duality-Audit Combinations

Unaudited firms without owner-manager duality formed only 4.5% of the weighted sample and had a weighted credit-participation rate of 16.1%. Audited non-duality firms formed 11.9% of the weighted sample and had a rate of 20.8%.

Unaudited duality firms formed 27.6% of the weighted sample and had a credit rate of 20.6%. Audited duality firms were the largest group, representing 56.1%, and had the highest descriptive rate, 23.1%. The pattern was positive across both practices, but the differences were modest.

Table 2

Current Formal Credit by Owner-Manager Duality and External Audit

Owner-manager duality	External audit	n	Credit n	Unweighted credit %	Weighted credit %	Weighted sample %
No	No	49	8	16.3	16.1	4.5
No	Yes	100	22	22.0	20.8	11.9
Yes	No	190	36	18.9	20.6	27.6
Yes	Yes	350	77	22.0	23.1	56.1

Note. The table is descriptive and does not adjust for firm age, employment, industry or region.

8.3 Hierarchical Logistic Regression

Table 3 presents the hierarchical models. In Model 1, larger firms had significantly higher odds of formal credit. Wholesale and retail firms also had higher adjusted odds than manufacturing firms. Region 2 had higher odds than Region 1, while Region 3 had lower odds.

Adding owner-manager duality in Model 2 improved the Akaike information criterion from 680.02 to 678.78. Duality had a positive but narrowly nonsignificant relationship, OR = 1.67, 95% CI [0.97, 2.87], $p = .067$. The direction contradicted Hypothesis 1, which expected a negative association.

External audit was added in Model 3. Duality remained positive and narrowly nonsignificant, OR = 1.67, 95% CI [0.97, 2.88], $p = .065$. Audit was not significant, OR = 1.15, 95% CI [0.75, 1.76], $p = .531$. The model did not support an independent audit association after size, industry, region and duality were considered.

Model 4 tested moderation. Among unaudited firms, duality had an OR of 1.63 (95% CI [0.55, 4.82]), $p = .377$. Among non-duality firms, audit had an OR of 1.11 (95% CI [0.35, 3.57]), $p = .856$. The interaction OR was 1.03 (95% CI [0.30, 3.60]), $p = .959$. Hypothesis 2 was not supported. Adding the interaction increased the Akaike information criterion, indicating no improvement in parsimonious model fit.

Table 3
Hierarchical Weighted Logistic Models Predicting Current Formal Credit

Predictor	Model 1 OR [95% CI]	Model 2 OR [95% CI]	Model 3 OR [95% CI]	Model 4 OR [95% CI]
Owner-manager duality		1.67 [0.97, 2.87]	1.67 [0.97, 2.88]	1.63 [0.55, 4.82]
External financial audit			1.15 [0.75, 1.76]	1.11 [0.35, 3.57]
Duality × audit				1.03 [0.30, 3.60]
Logged firm age	1.15 [0.90, 1.48]	1.14 [0.89, 1.46]	1.14 [0.89, 1.47]	1.14 [0.89, 1.47]
Logged employment	1.64 [1.38, 1.96]***	1.73 [1.43, 2.10]***	1.71 [1.42, 2.07]***	1.71 [1.42, 2.08]***
AIC	680.02	678.78	680.41	682.40
Weighted AUC	0.696	0.703	0.706	0.707

Note. N = 689. All models include realised-industry and region indicators. Continuous controls were centred on weighted means. AIC = Akaike information criterion; AUC = area under the receiver operating characteristic curve. *p < .05. **p < .01. ***p < .001.

8.3 Full Interaction Model

Table 4 presents all coefficients from the full model. Firm size was the strongest continuous predictor. A one-unit increase in logged employment was associated with 71% higher odds of current formal credit, OR = 1.71, 95% CI [1.42, 2.08], p < .001. Wholesale and retail establishments had almost twice the odds of manufacturing establishments. Region 2 had about twice the odds of Region 1, while Region 3 had substantially lower odds. Firm age was not significant.

Table 4
Full Weighted Logistic Regression Model Predicting Current Formal Credit

Predictor	B	SE	Adjusted OR	95% CI	p
Owner-manager duality	0.489	0.553	1.63	[0.55, 4.82]	.377
External financial audit	0.108	0.594	1.11	[0.35, 3.57]	.856
Duality × audit	0.033	0.638	1.03	[0.30, 3.60]	.959
Logged firm age	0.131	0.129	1.14	[0.89, 1.47]	.310
Logged employment	0.539	0.098	1.71	[1.42, 2.08]	< .001
Other sectors	-0.146	0.301	0.86	[0.48, 1.56]	.628
Wholesale and retail	0.665	0.305	1.94	[1.07, 3.54]	.030
Region 2	0.696	0.256	2.01	[1.21, 3.31]	.007
Region 3	-1.192	0.456	0.30	[0.12, 0.74]	.009
Region 4	0.248	0.516	1.28	[0.47, 3.53]	.631
Intercept	-2.112	0.546	0.12	[0.04, 0.35]	< .001

Note. Manufacturing and Region 1 are reference groups. B = log-odds coefficient; SE = HCl robust standard error; OR = odds ratio.

8.4 Adjusted Probabilities and Conditional Effects

Average predicted probabilities gave an accessible interpretation. Unaudited non-duality firms had an adjusted probability of current formal credit of 15.0%, 95% CI [6.5%, 30.3%]. Audited non-duality firms had 16.3%, 95% CI [10.7%, 25.0%].

Unaudited duality firms had a predicted probability of 21.6%, 95% CI [16.6%, 28.4%]. Audited duality firms had 23.9%, 95% CI [20.3%, 28.3%]. The predicted duality difference was 6.0 percentage points among unaudited firms and 7.2 points among audited firms. Neither contrast was significant.

The probability-scale difference-in-differences was only 1.16 percentage points (95% CI [-13.73, 18.03], p = .917). This result confirmed that audit did not change the duality association in a statistically meaningful way.

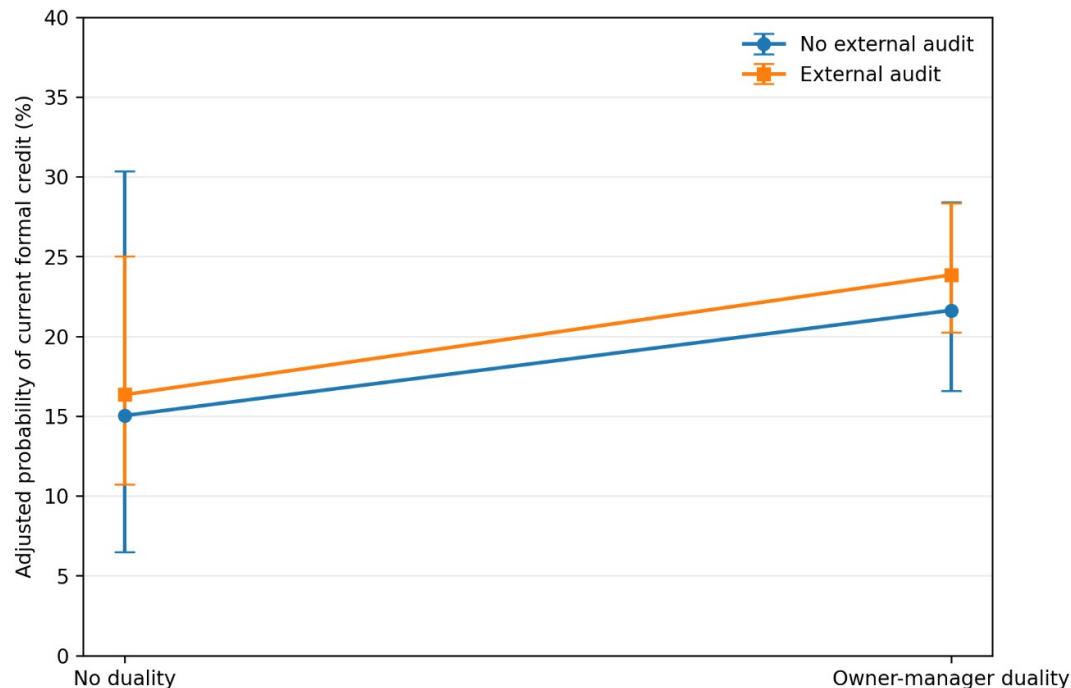
Table 5
Average Predicted Probability of Current Formal Credit

Owner-manager duality	External audit	Predicted %	95% CI
No	No	15.0	[6.5, 30.3]
No	Yes	16.3	[10.7, 25.0]
Yes	No	21.6	[16.6, 28.4]
Yes	Yes	23.9	[20.3, 28.3]

Note. Predictions average over observed controls and use the full weighted model.

Figure 1

Adjusted Formal Credit Probability by Owner-Manager Duality and External Audit



Note. Error bars show 95% confidence intervals. The nearly parallel lines illustrate the null interaction.

8.4 Diagnostics and Robustness Checks

Variance inflation factors for the control variables were below 1.5. The duality, audit and interaction terms had values of 3.09, 4.98 and 6.68. These increases are expected when an interaction is formed from two binary variables and did not prevent estimation. Quadratic logged-age and logged-employment terms were not significant ($p = .213$ and $p = .868$).

The weak-eligibility-weight model produced an interaction OR of 1.40, $p = .604$. The unweighted model produced an interaction OR of 0.79, $p = .645$. The six-sector model produced OR = 1.01, $p = .983$. A legal-form-adjusted model produced OR = 1.35, $p = .662$. Thus, the primary null moderation conclusion did not depend on the weighting or industry grouping.

Excluding sole proprietorships changed the interaction OR to 4.56, but the interval was extremely wide (95% CI [0.80, 26.14]), and $p = .089$. This sensitivity shows that the estimated direction depends on which legal structures are represented. It does not provide stable evidence of moderation. The expanded outcome, which also counted overdraft facilities, produced an interaction OR of 1.04 ($p = .945$).

Cook's distance had a maximum of 0.040. Fifty-three observations exceeded the heuristic $4/N$ threshold, reflecting the combination of survey weights and a binary outcome. Removing the most influential observation or all observations above the threshold did not produce a significant interaction. Because the observations were valid, the full sample was retained.

The stratified bootstrap completed all 1,000 replications. The bootstrap interaction interval ranged from OR =

0.25 to 4.01 and the two-sided bootstrap p value was .980. The wide interval reflects uncertainty rather than evidence of a hidden effect. Ten-fold cross-validation produced a weighted AUC of .652 and a Brier score of .165. The model has modest discrimination and should not be used as a credit-scoring system.

Table 6
Sensitivity Results for Focal Relationships

Analysis		Duality OR	Audit OR	Interaction OR	Interaction p
Primary	median	1.63	1.11	1.03	.959
Weak	eligibility	1.16	0.88	1.40	.604
Unweighted model		1.49	1.27	0.79	.645
Six realised sectors		1.64	1.13	1.01	.983
Legal-form adjusted		1.30	1.05	1.35	.662
Excluding	sole proprietorships	0.33	0.49	4.56	.089
Expanded	credit including overdraft	1.44	1.44	1.04	.945
Drop	most influential	2.86	1.90	0.60	.494
Stratified bootstrap				1.03 [0.25, 4.01]	.980

Note. All odds ratios come from adjusted interaction models. The bootstrap row reports the point estimate and percentile 95% interval from 1,000 within-stratum replications.

9. Discussion

9.1 Summary and Interpretation of Findings

This study examined owner-manager duality, external financial audit and current formal credit participation among formal establishments in Ghana. The agency-based expectation of a negative duality relationship was not supported. The additive estimate was positive and close to significance. External audit was not independently significant after controls, and it did not moderate the duality relationship. The interaction was almost exactly one.

The positive direction of duality is more consistent with stewardship and commitment arguments than with a simple agency-risk interpretation. When the largest owner manages the business, the lender may deal directly with the person who has the strongest economic interest in repayment and firm survival. The owner-manager may provide personal guarantees, relationship information and rapid decisions. These features can partially offset concerns about weak internal monitoring.

The result should not be overstated. In the full interaction model, duality had wide confidence intervals, and its conditional effects were not significant. The additive relationship was only narrowly below conventional precision. The evidence therefore does not establish that duality improves formal credit. It shows that Ghanaian lenders did not appear to penalise duality in the way predicted by the strict agency hypothesis.

This conclusion is compatible with earlier small-business research. Brau (2002) found that banks did not impose a clear owner-manager agency premium in loan prices or collateral. Niskanen and Niskanen (2010) showed that borrowing consequences depend on specific ownership-management agency conditions. The Ghanaian results support a contextual rather than universal view of owner-manager structure.

The audit finding differs from research that finds audited private firms have stronger access to debt or lower borrowing costs (Alduraywish, 2023; Briozzo & Albanese, 2020; Minnis, 2011). Several explanations are possible. First, audit may be widespread among firms with and without current loans, reducing its ability to distinguish borrowers. Almost 68% of the weighted sample was audited.

Second, audit may be endogenous to financing. Some firms may obtain audits because a lender requires them, while others may be audited for tax, ownership, or regulatory reasons. The binary survey measure does not identify the reason, timing, opinion or auditor quality. A lender may care more about cash flow, collateral and banking history than the presence of an audit alone.

Third, the outcome measures current credit participation rather than credit approval. Firms without current credit include those that did not need a loan, were discouraged, did not apply, repaid previous credit or were rejected.

Audit may reduce application constraints without necessarily increasing the current stock of loans. Research using application and denial measures may therefore find stronger audit effects than the present outcome.

Fourth, the interaction argument assumed that audit would compensate for governance concerns created by duality. The data showed little sign that lenders treated duality as a problem in the first place. If duality is neutral or mildly positive, there is limited negative risk for audit to buffer. This helps explain the nearly parallel predicted-probability lines.

Firm size was the most consistent predictor. Larger firms had substantially higher odds of current credit. This pattern is common in SME finance because larger firms generally have more assets, longer records, greater borrowing needs and lower information costs (Beck et al., 2005; Berger & Udell, 1998). The result suggests that scale and observable lending capacity matter more than the ownership-audit combination studied here.

The sector and regional patterns also show that credit participation reflects the economic setting. Wholesale and retail firms had higher adjusted odds than manufacturing firms, perhaps because working-capital needs and short transaction cycles create demand for credit lines. Region 2 had higher participation, while Region 3 had lower participation. These broad differences may reflect local banking coverage, sector composition and market conditions, but the survey does not permit a detailed causal explanation.

10. Theoretical Implications

The study contributes to the duality debate by showing that a private-firm owner-manager variable cannot be interpreted automatically through listed-company CEO-chair theory. In private firms, duality can reduce one agency conflict while increasing another. The controlling owner and manager are the same person, but the main external conflict may be between that person and creditors. Theory should identify which principal-agent relationship is relevant to the outcome.

The findings support contingency thinking. Boyd (1995) argued that duality outcomes depend on organizational and environmental conditions. In Ghanaian formal firms, close relationships, personal guarantees and concentrated responsibility may reduce the governance penalty predicted by agency theory. Future models should include lender relationships, collateral, and personal credit information as mechanisms.

The audit result also refines information-assurance theory. Audit can improve financial credibility, but its effect depends on the lender's decision problem and the information already available. Audit may be important for loan price, maturity, denial or discouragement even when it is not associated with current credit holding. Researchers should match the audit mechanism to a precise credit outcome.

The null interaction cautions against assuming that two governance practices are complementary because they appear theoretically compatible. External assurance and concentrated ownership-management did not produce a measurable joint relationship with credit. Complementarity should be tested directly and interpreted on the probability scale in nonlinear models.

10.1 Managerial Implications

Owner-managers should not assume that personal commitment alone will secure formal credit. Lenders require evidence of repayment capacity. Firms should maintain timely accounts, separate business and personal transactions, document cash flows and prepare realistic borrowing proposals. Unified control is most useful when transparent systems support it.

External audit should be treated as part of a wider financial-information strategy. A completed audit is more valuable when management can explain the statements, reconcile them with bank records and show how borrowed funds will generate repayment cash flow. Firms should also keep management accounts during the year rather than relying only on an annual audit.

Non-owner managers should clarify authority and owner support when approaching lenders. Banks may need confidence that the manager can make binding decisions and that owners will support repayment. Formal delegation, board approval and clear governance documents can reduce uncertainty.

Firms should build banking relationships before an urgent financing need arises. Regular account use, accurate transaction records and timely communication create information that may matter more than formal structure alone. Relationship lending remains important where hard information is limited (Petersen & Rajan, 1994).

10.2 Policy and Development Implications

Enterprise-finance programmes in Ghana should avoid treating external audit as a single solution to credit constraints. Audit may improve information, but smaller firms also need accounting capacity, collateral alternatives, credit-reference coverage and affordable loan products. Support should connect record-keeping, financial management, and lender engagement.

Public and professional bodies can develop proportionate assurance services for smaller firms. Full audit may be expensive where borrowing needs are modest. Independent review, agreed-upon procedures or verified digital financial records may provide useful assurance at lower cost, provided lenders accept the standard and understand its limitations.

Banks can improve credit assessment by combining audited statements with transaction data and relationship information. A binary distinction between audited and unaudited firms may be too simple. Lenders should consider the quality, timeliness and consistency of records and whether the owner-manager has separated business finances from personal finances.

Credit-reference systems can complement audit by recording repayment behaviour across institutions. Evidence from Ghana indicates that credit-reference information can strengthen lending methodologies for SMEs (Gyamfi, 2012; Gyimah et al., 2022). Better information sharing may reduce the disadvantages faced by firms that lack extensive collateral or long formal histories.

Policies should also recognise heterogeneity across legal forms and regions. Sole proprietorships have different governance and audit patterns from shareholding companies. Regional differences in credit participation suggest that technical assistance and lender outreach should not be concentrated only in the largest commercial centres.

11. Limitations and Future Research

First, the study is cross-sectional. It cannot establish that duality or audit caused formal credit participation. Current credit may lead firms to obtain audits, and lenders may influence governance arrangements. Panel data or credible instruments would be needed for causal analysis.

Second, the dependent variable identifies current formal credit rather than unmet demand, application, approval, loan value, price or maturity. A firm without current credit is not necessarily constrained. Future research should use the survey's application and discouragement information to separate demand from supply.

Third, owner-manager duality is a binary measure. It does not capture ownership percentage, family control, board oversight, succession planning or the manager's competence. It also differs from CEO-chair duality in listed firms. More detailed governance data would permit stronger theoretical tests.

Fourth, the audit variable is binary. It does not identify audit quality, opinion, auditor size, independence, legal requirement or lender involvement. These differences may explain why audit effects vary across studies. Future work should distinguish voluntary from mandatory audits and examine the timing relative to loan decisions.

Fifth, the model controls for age, size, industry and region but cannot include every lending determinant. Collateral, profitability, relationship length, owner credit history, loan demand and financial literacy may confound the relationships. Some of these variables are unavailable or observed only for applicants and borrowers.

Sixth, legal form is closely related to owner management. The sensitivity excluding sole proprietorships changed the direction and size of the interaction but remained imprecise. Larger samples within each legal form are needed to determine whether the relationship differs systematically.

Seventh, the overall response rate was 24.8%. Survey weights correct the known sample design and eligibility assumptions but cannot remove all unobserved nonresponse. The findings should be interpreted with the normal caution required for establishment surveys.

Eighth, cross-validation showed modest discrimination. The model is useful for explaining average associations, not for approving or rejecting individual borrowers. A responsible credit-scoring model would require richer financial, transaction and repayment data and separate validation.

Future studies can extend the analysis with panel Enterprise Survey data, matched bank records or field experiments that improve financial-reporting quality. Comparative studies across African economies could test whether audit matters more where credit bureaus, accounting institutions or bank competition differ. Qualitative interviews with lenders could also reveal how owner management and audit are interpreted in Ghanaian credit decisions.

12. Conclusion

This study examined owner-manager duality, external financial audit and current formal credit participation among Ghanaian formal firms. Owner-manager duality showed a positive but statistically uncertain additive relationship. External audit was not independently significant, and it did not strengthen or weaken the duality relationship. The hypothesised audit moderation was not supported.

The evidence suggests that lenders do not respond to owner-manager duality through a simple agency-risk rule. Unified ownership and management may communicate commitment as well as concentration of control. External audit can improve financial credibility, but it is not sufficient to explain whether a firm currently holds formal credit.

The practical implication is that governance labels should not replace a full assessment of firm scale, cash flow, records, collateral and banking relationships. Ghanaian enterprise-finance policy should strengthen these broader information and financing systems while encouraging proportionate external assurance.

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Appendix A

Variable Definitions and Coding

Construct	WBES variable	Direct definition	Analytical coding
Current formal credit	k82	Current loan, line of credit, both, or none from a financial institution	1 = loan/line/both; 0 = none
Owner-manager duality	b3a	Largest owner is also the top manager	1 = yes; 0 = no
External financial audit	k21	Previous fiscal year statements checked and certified by an external auditor	1 = yes; 0 = no
Firm age	a14y and b5	Interview year minus year operations began	ln(age + 1), centred
Employment size	l1	Permanent full-time employees	Natural logarithm, centred
Realised industry	d1a2_v4	Main activity reported during interview	Three groups; six in sensitivity
Region	a2	World Bank survey region	Four categories
Legal form	b1	Shareholding, sole proprietorship, partnership or other	Three sensitivity groups
Primary survey weight	wmedian	Median eligibility assumption	Normalised to analytical N

Construct	WBES variable	Direct definition	Analytical coding
Alternative survey weight	wweak	Weak eligibility assumption	Sensitivity analysis
Expanded credit	k82 and k7	Loan/line of credit or overdraft facility	Sensitivity outcome

Note. Negative World Bank response codes were treated as missing. No proxy variable was used for the dependent variable, independent variable or moderator.