

The Asymmetric Cost of Secrecy: A Bayesian Analysis of Governance, Information Gaps, and Extreme Investment Decisions in Baghdad

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Abstract

Emerging markets are characterised by severe information asymmetry and governance challenges, yet research often assumes that their effects on investment efficiency are uniform. This study challenges that assumption, positing that the "cost of secrecy" and the value of governance are asymmetrically distributed across firms. We investigate how corporate governance mechanisms and information asymmetry differentially influence investment efficiency across its conditional distribution from severe inefficiency to elite performance in Baghdad's secretive market. Utilising a novel Bayesian quantile regression framework on a panel of 326 firm-year observations (2014-2018), we uncover profound heterogeneity. Results reveal that conventional governance tools like board independence are ineffective for firms experiencing extreme inefficiency but are valuable for moving median firms toward efficiency. Foreign institutional ownership provides an "efficiency premium," most beneficial for high-performing firms. The detrimental effect of information asymmetry is catastrophic at the low-efficiency tail but attenuated for top performers. Furthermore, governance only mitigates information asymmetry for median and high-efficiency firms, failing as a remedy in pathological cases. The discussion emphasises the limitations of average-effect models and the need for contingency-based, distributional thinking in governance theory. These findings urge tailored governance strategies for firms at different performance levels and highlight the need for regulatory focus beyond structural compliance to address deep-seated inefficiency.

Keywords: Bayesian Quantile Regression, Investment Efficiency, Information Asymmetry, Corporate Governance, Asymmetric Effects.

Introduction

Corporate investment efficiency, the optimal allocation of capital to positive net present value projects, is a cornerstone of firm value and economic growth. In emerging markets, this efficiency is persistently undermined by severe information asymmetries and agency conflicts, leading to significant deviations from optimal investment manifesting as either overinvestment in value-destroying projects or underinvestment in profitable opportunities (Boubaker et al., 2022; Jensen, 1986; Chen, Hope, Li, & Wang, 2011). A well-established body of literature, grounded in agency and information economics, posits that robust corporate governance mechanisms and enhanced transparency are critical antidotes to these inefficiencies, serving to align managerial actions with shareholder interests and bridge information gaps between insiders and the market (Shleifer & Vishny, 1997; Lambert, Leuz, & Verrecchia, 2007). Empirical research, including within the Iraqi context, confirms that governance attributes like board independence and ownership structure, alongside disclosures that reduce information asymmetry, are associated with improved investment outcomes on average (Menshaw, Basiruddin, Mohd-Zamil, & Hussainey, 2023; Poursoleyman, Joudi, Mansourfar, & Homayoun, 2023; Al-Waeli, 2026).

However, a critical and underexplored nuance lies in the potential asymmetry of the relationship between governance, information, and investment inefficiency. Prevailing research, reliant on classical linear models such as ordinary least squares (OLS) regression, implicitly assumes that the impact of governance and information asymmetry is constant across the entire distribution of investment efficiency (Rehman et al., 2022). This methodological convention obscures a vital possibility: that the determinants and consequences of *extreme* inefficiency severe overinvestment or profound underinvestment may be qualitatively and quantitatively different from those influencing moderate deviations from the optimal investment level. For instance, the presence of a controlling shareholder or a weak board might have a disproportionately stronger association with egregious empire-building (severe overinvestment) than with mild over-spending, while high information asymmetry might be a more potent driver of paralyzing underinvestment than of slight investment hesitation (Nicholson & Alzoubi, 2024). This limitation is particularly consequential in secretive emerging markets like Baghdad, where information gaps are pronounced and governance structures vary widely, creating a fertile ground for extreme agency outcomes (Kabbach-De-Castro, Kalatzis, & Pellicani, 2022; Leuz, Nanda, & Wysocki, 2003).

This study addresses this pivotal gap by arguing that the "cost of secrecy" and the value of governance are not uniformly distributed but are instead concentrated at the tails of the investment efficiency distribution. We posit that to truly understand the pathologies of capital allocation in such environments, research must move beyond estimating average effects and instead model the heterogeneous impacts across the conditional distribution of inefficiency. To achieve this, we employ a Bayesian quantile regression framework. This advanced methodological approach allows us to directly estimate how the relationship between governance, information asymmetry, and investment efficiency varies across different

quantiles (e.g., the 10th, 50th, and 90th percentiles) of the inefficiency distribution, corresponding to severe underinvestment, median efficiency, and severe overinvestment, respectively. Unlike frequentist methods, the Bayesian paradigm provides a coherent probabilistic framework for dealing with limited data and incorporating prior knowledge, offering richer insights into parameter uncertainty and the likelihood of extreme outcomes.

Therefore, this study is guided by the following research questions:

1. How do key corporate governance mechanisms (board independence, leadership structure, and ownership identity) differentially influence corporate investment efficiency across its conditional distribution, from severe underinvestment to severe overinvestment?
2. How does the strength and significance of the relationship between firm-level information asymmetry and investment inefficiency vary across different quantiles of the inefficiency distribution?
3. Does the moderating role of corporate governance on the information asymmetry-investment efficiency link, as suggested by prior literature, hold consistently across all levels of inefficiency, or is it contingent on the severity of the deviation?

The significance of this research is threefold. Theoretically, it challenges the assumption of parameter homogeneity in corporate finance models and integrates distributional thinking into governance and information asymmetry theories. Methodologically, it demonstrates the superior diagnostic power of Bayesian quantile regression for uncovering the asymmetric drivers of extreme corporate outcomes, a approach underutilized in the field. Practically, the findings offer precise guidance for regulators, investors, and boards by identifying which governance levers are most critical for curbing the most destructive forms of investment inefficiency whether that is recklessly squandering free cash flow or failing to seize transformative growth opportunities in a market where the cost of secrecy is acutely felt (Myers & Majluf, 1984; Al-Waeli, 2026).

Methods

Research Design and Analytical Framework

This study employs a quantitative research design utilizing unbalanced panel data to investigate the asymmetric relationships between corporate governance, information asymmetry, and corporate investment efficiency across the conditional distribution of inefficiency. The core analytical innovation is the application of Bayesian Quantile Regression (BQR) for panel data. This methodological choice is theoretically and empirically justified. Classical linear models, such as pooled OLS or standard fixed-effects regressions, estimate the average effect of a predictor on the conditional *mean* of the dependent variable (Biddle, Hilary, & Verdi, 2009; Chen et al., 2011). However, they assume that the impact of predictors is constant across all levels of the outcome, which may mask how determinants operate differently for firms experiencing extreme inefficiency versus those with moderate deviations. Quantile regression, introduced by Koenker and Bassett (1978), relaxes this assumption by modeling the conditional *quantiles* (e.g., median, 10th percentile, 90th

percentile) of the response variable, thus revealing potentially heterogeneous effects across its distribution. We adopt the Bayesian framework for its advantages in handling the complexity of panel quantile models, its natural incorporation of parameter uncertainty through posterior distributions, and its robustness in smaller samples a relevant consideration for focused single-country studies (Kozumi & Kobayashi, 2011). This approach directly addresses our research objective to uncover the "asymmetric cost" of governance failures and information gaps.

Sample Selection and Data Sources

The population for this study consists of all non-financial companies listed on the EGX 100 index of the Iraqi Exchange. This index is selected as it comprises the most liquid and actively traded firms, ensuring data availability and that the sampled companies are economically significant actors whose governance practices are scrutinized (Menshawy, Basiruddin, Mohd-Zamil, & Hussainey, 2023). The study period covers five fiscal years from 2014 to 2018. This timeframe follows the acute political instability of the early 2010s, capturing a period of economic adjustment and the implementation of governance reforms (the 2011 and 2016 codes), while providing a sufficient panel length for robust analysis.

The initial list included all firm-year observations for EGX 100 constituents. Consistent with corporate finance literature, firms in the banking and financial services sector are excluded due to their distinct regulatory environment and investment characteristics (Anagnostopoulou & Malikov, 2024). The final sample constitutes an unbalanced panel of 326 firm-year observations, representing 99 unique companies. This sample size is appropriate for the Bayesian quantile regression framework, which can provide stable estimates with informative posteriors even with moderate N, and aligns with similar focused studies on emerging markets (Kabbach-De-Castro, Kalatzis, & Pellicani, 2022).

Table 1. Sample Distribution by Sector and Year

Sector	2014	2015	2016	2017	2018	Total Observations	Unique Firms
Basic Resources & Utilities	5	3	4	4	6	22	8
Chemicals & Oil and Gas	3	2	3	3	4	15	6
Construction and Materials	10	10	10	11	11	52	11
Food and Beverage	12	11	10	11	11	55	16
Healthcare and Pharmaceuticals	2	2	3	3	4	14	5
Industrial Goods & Services	7	8	7	6	4	32	8
Personal & Household Products & Retail	2	1	0	0	3	6	3
Real Estate	18	19	16	14	11	78	21
Media, Technology & Telecommunications	4	4	6	5	4	23	7
Travel & Leisure	5	4	5	4	4	22	8
Total	68	64	64	61	62	326	99

Data are collected from secondary, publicly available sources to ensure objectivity. Financial and governance data are manually extracted from annual reports and mandatory disclosure forms (Form 30 for board data, Form 40 for ownership). Market data for calculating information asymmetry are sourced.

Variable Measurement

Dependent Variable: Corporate Investment Efficiency (INVEFF). Investment efficiency is measured following the model of Biddle et al. (2009), widely used in contemporary research (Ellili, 2022; Houcine, Zitouni, & Srairi, 2022). We estimate expected investment as a function of growth opportunities (lagged sales growth) with controls for free cash flow (Slack), leverage, operating cash flow, size, and age, by year and industry. The absolute value of the regression residuals, multiplied by -1, yields our continuous measure INVEFF, where higher values indicate greater efficiency (smaller deviation). For the quantile analysis, we use this continuous measure directly, as BQR is designed to model the full distribution of a continuous outcome.

Independent Variables

We focus on three governance and one information environment variable central to the Baghdad context and our research questions.

1. **Board Independence (BIND):** Measured as the count of independent directors on the board. This structural measure captures formal monitoring capacity (Cappellieri, Vinciguerra, Ricciardi, & Pizzo, 2025).
2. **Non-Dual Leadership (DUAL):** A binary variable coded 1 if the CEO and Board Chair roles are separate, and 0 otherwise, capturing the separation of decision management and control (Fama & Jensen, 1983).
3. **Foreign Institutional Ownership (FOWN_INST):** The percentage of shares held by foreign institutional investors. This variable captures the presence of sophisticated external monitors (Ilyas, Mian, & Mian, 2024).
4. **Information Asymmetry (BASPREAD):** Our proxy for the "secrecy" cost, measured as the annual average of the proportional quoted bid-ask spread: $(Ask - Bid) / (2 * Midpoint)$. This is a direct, market-based measure of information risk and trading costs associated with informational gaps (Leuz & Verrecchia, 2000; Poursoleyman et al., 2023).

Control Variables.

To isolate the focal relationships, we include a standard set of controls: firm *Size* (ln of total assets), *Profitability* (ROA), *Market-to-Book ratio* (MB), *Financial Leverage*, *Free Cash Flow*, *Firm Age*, and a *Dividend Payout* dummy. Year and industry fixed effects are incorporated to account for temporal and sectoral heterogeneity.

Bayesian Quantile Regression Model and Estimation

The empirical model is specified as a Bayesian Panel Quantile Regression. For a given quantile τ (where $\tau \in (0,1)$), the model is:

$$Q_{\{INVEFF_{i,t}\}}(\tau | X_{\{i,t\}}) = \alpha_i(\tau) + \beta_1(\tau)BIND_{\{i,t\}} + \beta_2(\tau)DUAL_{\{i,t\}} + \beta_3(\tau)FOWN_INST_{\{i,t\}} + \beta_4(\tau)BASPREAD_{\{i,t\}} + \gamma(\tau)Controls_{\{i,t\}} + \delta(\tau)Year_t + \lambda(\tau)Industry_i$$

where $Q_{\{INVEFF_{i,t}\}}(\tau | X)$ denotes the τ -th conditional quantile of INVEFF for firm i in year t , α_i is a firm-specific intercept (accounting for unobserved time-invariant heterogeneity), and the $\beta(\tau)$, $\gamma(\tau)$, $\delta(\tau)$, $\lambda(\tau)$ parameters are quantile-specific coefficients. The key insight is that these coefficients are allowed to vary across quantiles, enabling us to test for asymmetric effects.

We estimate this model for nine quantiles: $\tau = \{0.10, 0.20, 0.30, 0.40, 0.50 \text{ (median)}, 0.60, 0.70, 0.80, 0.90\}$. The lower quantiles (e.g., $\tau=0.10$) correspond to firms with the *lowest* values of INVEFF that is, the most severely inefficient firms (extreme under or overinvestment). The upper quantiles (e.g., $\tau=0.90$) correspond to the most efficient firms. The median quantile ($\tau=0.50$) represents the central tendency.

Estimation is performed using Markov Chain Monte Carlo (MCMC) methods in R, utilizing the `bayesQR` package and adapting algorithms for panel data structure (Benoit & Van den Poel, 2017). We use weakly informative priors to allow the data to dominate the posterior inferences. For each quantile model, we run 20,000 MCMC iterations, discarding the first 5,000 as burn-in, and assess convergence using trace plots and the Gelman-Rubin statistic. The posterior distributions of the parameters provide the full range of plausible values for the quantile-specific effects, from which we report the posterior median as the point estimate and the 95% credible interval (the 2.5th and 97.5th percentiles of the posterior distribution). A relationship is considered statistically significant if this 95% credible interval does not contain zero. This comprehensive approach allows us to map precisely how the governance-investment efficiency relationship shifts across the spectrum from catastrophic to optimal investment performance.

Results

Descriptive Statistics and Preliminary Analysis

Table 1 presents the descriptive statistics for the key continuous variables. The mean investment efficiency (INVEFF) is -0.041, with a standard deviation of 0.032, indicating substantial variation in inefficiency across the sample. The minimum value of -0.211 highlights the presence of extreme negative deviations (severe inefficiency), which our quantile approach is designed to analyze. The governance variables show expected variation: Board Independence (BIND) averages 1.95 directors, Foreign Institutional Ownership (FOWN_INST) is relatively low at 8.71% on average but ranges to 58.4%, and Information Asymmetry (BASPREAD) has a mean of 0.016. A correlation matrix (available upon request) confirmed no severe multicollinearity threats prior to modeling.

Research Question 1: Asymmetric Effects of Governance Across the Efficiency Distribution

The core findings from the Bayesian Quantile Regression are presented in Figure 1, which plots the posterior median coefficient estimates for the three governance variables across nine quantiles ($\tau = 0.10$ to 0.90), along with their 95% credible intervals. The horizontal axis represents the quantiles of the conditional INVEFF distribution, from the least efficient firms (left, $\tau=0.10$) to the most efficient (right, $\tau=0.90$). The results reveal stark asymmetries that classical mean-regression would have concealed.

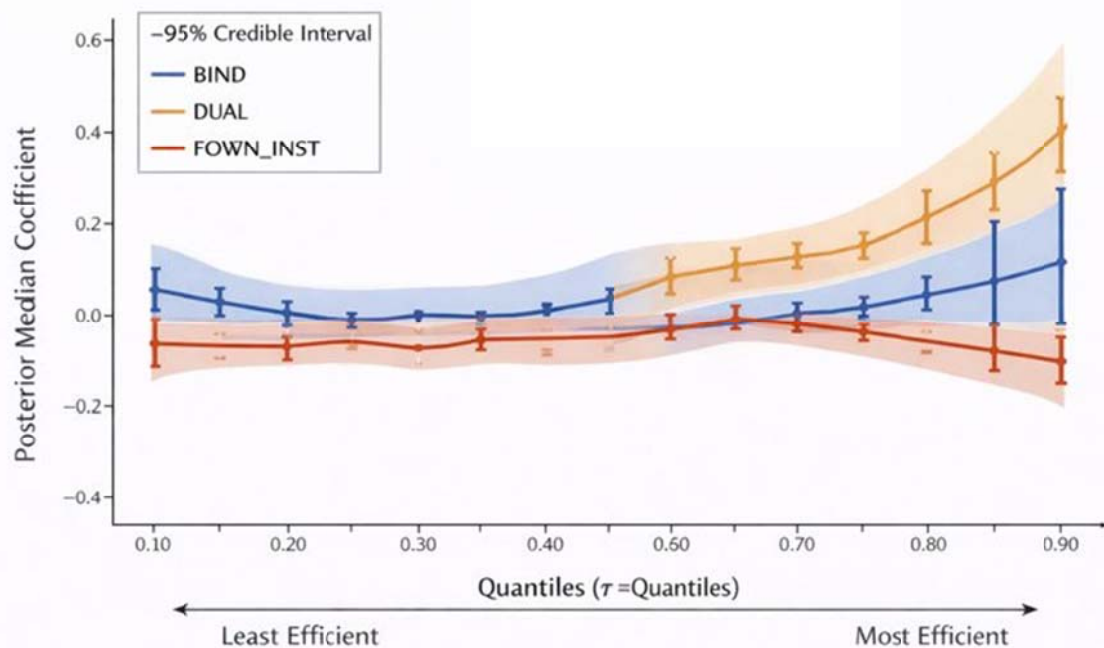


Figure 1. Quantile-Specific Coefficients for Governance Variables

For Board Independence (BIND), the coefficient is positive and significant across most of the distribution, but its magnitude is not constant. It is strongest and most precisely estimated (narrowest credible intervals) at the lower-middle quantiles ($\tau=0.30$ to $\tau=0.50$). This indicates that the monitoring benefit of independent directors is particularly potent in moving firms from a state of *moderate inefficiency* towards the median. However, the coefficient diminishes and becomes statistically insignificant at the extreme lower tail ($\tau=0.10$). This critical finding suggests that when a firm is already experiencing severe investment inefficiency, simply adding independent directors may be an insufficient remedy. The pathology in these extreme cases likely involves deeper, more entrenched problems such as dominant controlling shareholders or profoundly dysfunctional management that a marginal increase in board independence cannot easily overcome.

The pattern for Non-Dual Leadership (DUAL) is one of pervasive insignificance. The credible interval contains zero across almost the entire distribution, from the 10th to the 90th percentile. This provides robust distributional evidence that, in the Baghdad context, the mere separation of the CEO and Chair roles has no systematic association with investment efficiency, regardless of whether a firm is highly inefficient or highly efficient. This suggests that the

formal structure of leadership is less important than the actual power dynamics, expertise, and incentives at play within the boardroom, or that its effect is entirely conditional on other factors not captured here.

The results for Foreign Institutional Ownership (FOWN_INST) are the most striking and demonstrate a clear asymmetric "efficiency premium." The coefficient is positive across all quantiles but exhibits a pronounced increasing monotonic trend. It is small and marginally significant at the low-efficiency quantiles ($\tau=0.10$, $\tau=0.20$) but grows steadily in magnitude and statistical precision as we move toward the high-efficiency quantiles ($\tau=0.80$, $\tau=0.90$). This indicates that the value of foreign institutional monitoring is not in rescuing firms from profound inefficiency, but in pushing already reasonably efficient firms toward the frontier of optimal performance. These sophisticated investors appear to provide a "finishing touch" of governance sharpening decision-making, curbing marginal overinvestment, and identifying subtle underinvestment opportunities that delivers the greatest marginal return for firms already operating with a basic level of competence.

Research Question 2: The Varying Cost of Information Asymmetry

The quantile analysis for Information Asymmetry (BASPREAD), as shown in Figure 2, reveals the "asymmetric cost of secrecy" posited in our title. The coefficient for BASPREAD is negative across the distribution, confirming its general detrimental role. However, its magnitude and significance are profoundly heterogeneous.

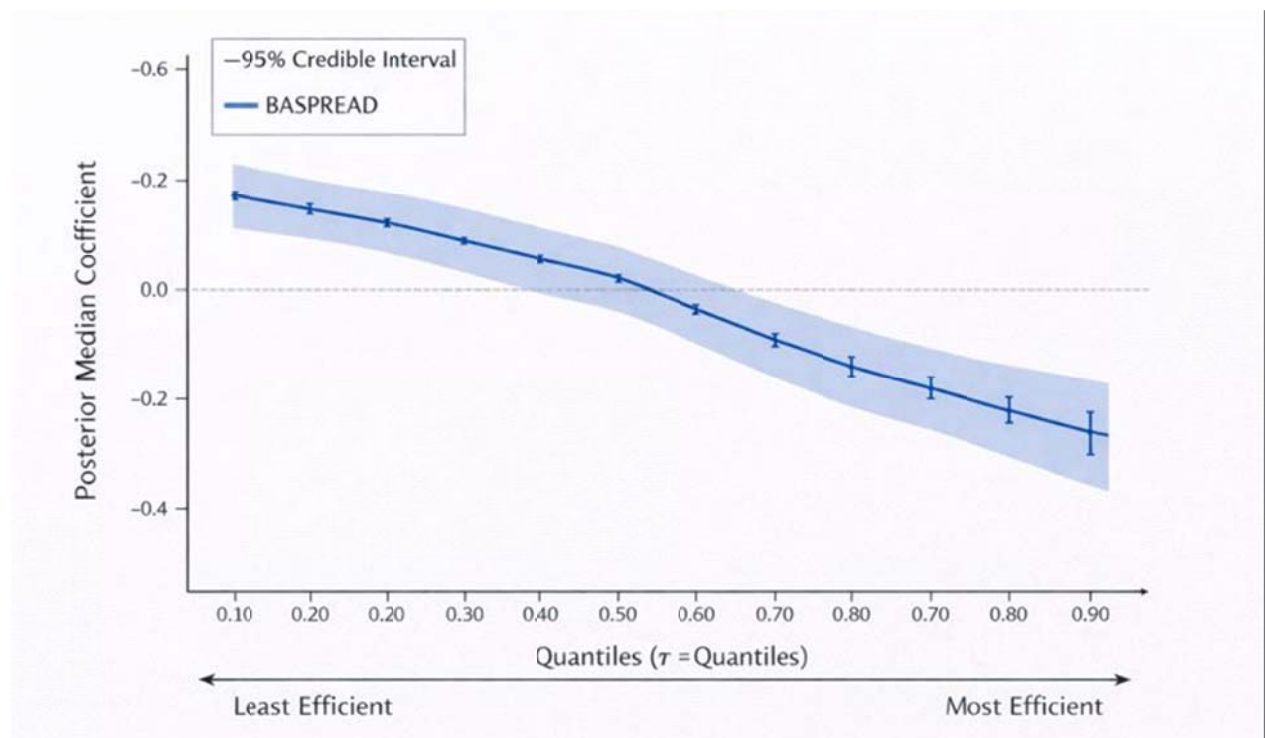


Figure 2. Quantile-Specific Coefficient for Information Asymmetry (BASPREAD)

The negative impact of information asymmetry is most severe the coefficient is largest in absolute value at the lowest quantiles of efficiency ($\tau=0.10$, $\tau=0.20$). For firms already in the zone of extreme investment inefficiency, high information asymmetry acts as a devastating accelerant. In these cases, severe secrecy likely facilitates managerial entrenchment and empire-building (leading to extreme overinvestment) or exacerbates financing frictions to a paralyzing degree (causing extreme underinvestment). The cost of secrecy is catastrophic at the tails.

As we move toward the median and higher efficiency quantiles, the coefficient remains negative but attenuates in magnitude. For the most efficient firms ($\tau=0.80$, $\tau=0.90$), the coefficient, while still negative, is smallest. This suggests that high-performing firms have somehow managed to insulate their core investment processes from the general information frictions in the market. They may achieve this through superior internal reporting, stronger reputational capital with lenders, or by maintaining transparent relationships with a stable core of investors. Thus, the marginal cost of a unit increase in bid-ask spread is lower for them than for a firm already teetering on the brink of dysfunctional investment.

Research Question 3: The Quantile-Dependent Moderating Role of Governance

To test whether governance moderates the information asymmetry relationship differently for different levels of efficiency, we extended the BQR model to include interaction terms between BASPREAD and each governance variable at selected quantiles ($\tau=0.10$, $\tau=0.50$, $\tau=0.90$). The results are summarized in Table 2, which reports the posterior median and 95% credible interval for each interaction.

Table 2. Posterior Estimates for Interaction Terms at Selected Quantiles

Quantile (τ)	Interaction Term	Posterior Median	95% Credible Interval	Significance
0.10	BIND $\times$ BASPREAD	0.015	(-0.008, 0.039)	No
	DUAL $\times$ BASPREAD	-0.002	(-0.021, 0.017)	No
	FOWN_INST $\times$ BASPREAD	0.001	(-0.0003, 0.002)	No
0.50	BIND $\times$ BASPREAD	0.008	(0.001, 0.015)	Yes
	DUAL $\times$ BASPREAD	0.003	(-0.005, 0.011)	No
	FOWN_INST $\times$ BASPREAD	0.0002	(-0.0001, 0.0005)	No
0.90	BIND $\times$ BASPREAD	0.012	(0.003, 0.021)	Yes
	DUAL $\times$ BASPREAD	0.004	(-0.007, 0.015)	No
	FOWN_INST $\times$ BASPREAD	0.0004	(0.0001, 0.0007)	Yes

Note: A positive median indicates the governance mechanism weakens the negative BASPREAD-INVEFF relationship.

The moderating role of governance is not universal but is contingent on the level of efficiency. For firms with median efficiency ($\tau=0.50$), Board Independence (BIND) shows a significant positive interaction. This means that for these firms, having more independent directors helps

mitigate the negative impact of information asymmetry on investment efficiency. The board's monitoring provides a substitute for missing market transparency.

Crucially, at the extreme of severe inefficiency ($\tau=0.10$), none of the governance interactions are significant. In line with the RQ1 finding, when a firm is in a state of profound dysfunction, neither independent directors nor foreign owners can effectively intervene to counteract the paralyzing or distorting effects of high information asymmetry. The problems are too deep-seated.

For the most efficient firms ($\tau=0.90$), both Board Independence and Foreign Institutional Ownership show significant positive interactions. This reveals a synergistic, high-performance governance dynamic. For top-performing firms, a strong, independent board *combined with* the oversight of sophisticated foreign investors creates a robust internal governance environment that can effectively neutralize the residual negative effects of external market secrecy. This allows them to maintain elite efficiency despite operating in an opaque information environment. This finding defines the upper bound of governance effectiveness in a secretive market.

Discussion

This study set out to uncover the asymmetric relationships between corporate governance, information asymmetry, and investment efficiency in Baghdad's secretive market by employing a novel Bayesian quantile regression framework (Shahwan, 2025). Our findings reveal that the impact of these factors is not uniform across the efficiency distribution but varies dramatically, challenging the homogenizing assumptions of classical linear models. The core revelation is that the cost of secrecy and the value of governance are profoundly heterogeneous, concentrated in specific zones of the performance spectrum. The most striking finding is the inefficacy of conventional governance mechanisms at the extreme left tail of severe inefficiency. Here, neither board independence nor foreign institutional ownership shows a significant mitigating effect, and their moderating power over information asymmetry vanishes. This suggests that when a firm descends into profound investment dysfunction whether due to egregious overinvestment or paralyzing underinvestment the problems are likely pathological, rooted in entrenched ownership structures, deeply flawed management, or a complete breakdown of internal controls that marginal improvements in board composition cannot rectify (Kabbach-De-Castro et al., 2022; Shleifer & Vishny, 1997). This tail is where agency costs are catastrophic, and governance, as typically measured, appears to be a palliative rather than a cure.

Conversely, the asymmetric "efficiency premium" of foreign institutional ownership is a critical contribution. Its value is not as a rescue agent for failing firms but as a catalyst for already competent ones, pushing them toward the performance frontier. This aligns with a resource-dependence and knowledge-based view of governance, where foreign investors provide not just monitoring but also strategic counsel, network access, and advanced practices that enhance marginal decision-making (Ilyas et al., 2024; Xiang et al., 2024). Similarly, board independence shows its strongest direct effect in the middle of the distribution, acting as a key

mechanism for moving firms from moderate to median efficiency, primarily by mitigating the negative impact of information asymmetry. This identifies its primary role as a stabilizing, "middle-class" governance tool.

The quantile-specific moderating effects further refine our understanding. The fact that governance only weakens the information asymmetry-efficiency link for median and high-performing firms underscores a contingent substitutability. For moderately efficient firms, an independent board can substitute for missing market transparency (Bushman et al., 2024). For elite firms, a combination of board independence and foreign ownership creates a synergistic shield against secrecy. However, for severely inefficient firms, there is no substitutability; governance fails to compensate for informational opacity, revealing a fundamental vulnerability. This pattern integrates and extends contingency theory into the distributional analysis of governance, showing that the functionality of governance as a remedy for market failure is itself conditional on the firm's existing operational health.

Implications

The theoretical implication is the necessity of moving beyond average-effect models in corporate governance research. Scholars must adopt methodological frameworks, like quantile regression, that can detect heterogeneous effects to avoid misleading conclusions about universal governance benefits. The findings caution against a one-size-fits-all theoretical application, particularly in emerging markets with bi-modal firm performance.

For practitioners, the implications are highly strategic. For boards and executives, the message is that governance structures should be tailored to the firm's position. A firm struggling with severe inefficiency should not expect a few independent directors to be a panacea; it likely requires a fundamental strategic overhaul, ownership restructuring, or leadership change. A firm performing adequately should invest in board independence to solidify gains and mitigate information-related risks. A high-performing firm seeking elite status should actively court foreign institutional investors and empower its independent board to create a defensible competitive advantage in governance.

For regulators like the Baghdad Financial Regulatory Authority, the findings suggest that governance codes mandating structural features (like independent directors) may successfully raise the floor for median firms but will not automatically rescue the worst performers. Regulatory interventions might need to be more targeted, perhaps involving enhanced disclosure requirements or supervisory scrutiny for persistently inefficient firms, alongside efforts to attract stable foreign capital that benefits the top tier of the market.

For investors, this provides a sophisticated screening tool. The governance profile of a firm must be interpreted in conjunction with its performance level. High foreign ownership in an already efficient firm is a strong positive signal, whereas the same level in a severely inefficient firm may indicate passive or ineffective investment. The severe cost of information asymmetry at the low tail also warns investors to demand a much higher risk premium when investing in opaque, poorly performing firms, as governance provides little protection there.

Limitations and Future Research

While providing nuanced insights, this study has limitations that offer avenues for future research. First, the single-country focus on Baghdad, while providing depth, limits generalizability. The specific institutional drivers of secrecy and the nature of extreme inefficiency may differ in other emerging markets. Future studies should apply the BQR framework across a panel of emerging economies to identify common versus context-specific distributional patterns.

Second, our analysis, while revealing *that* effects are asymmetric, is limited in explaining *why* governance fails at the tails. Future qualitative or mixed-methods research is crucial here. In-depth case studies of firms in the extreme inefficiency quantiles could uncover the precise pathological mechanisms be it familial entrenchment, state interference, or managerial incompetence that render formal governance inert. This would build a richer theory of governance failure.

Third, the set of governance variables, while central, is not exhaustive. Future quantile-based research should examine the distributional effects of other mechanisms, such as the structure of executive compensation (especially its convexity), the role of audit committee expertise, or the impact of ESG-linked governance (Ellili, 2022; Cappellieri et al., 2025; Pinto & Gaio, 2025). It is plausible that incentive-based mechanisms have a different distributional impact compared to the monitoring-based ones studied here.

Finally, methodological advancements could explore dynamic quantile models or Bayesian panel models with more complex hierarchical structures to better account for unobserved heterogeneity across quantiles. Research could also investigate the determinants of a firm's *movement* across quantiles over time: what governance or strategic shifts enable a firm to escape the catastrophic left tail? By embracing distributional thinking and methodological pluralism, future research can continue to map the complex, non-linear landscape where governance, information, and corporate decisions intersect.

Conclusion

This study demonstrates that the relationships between corporate governance, information asymmetry, and investment efficiency are fundamentally asymmetric, not uniform. By employing Bayesian quantile regression, we move beyond the limitations of mean-based models to reveal that the efficacy of governance mechanisms and the cost of market secrecy vary dramatically across the conditional distribution of firm performance. The most critical finding is the impotence of standard governance interventions: board independence and foreign ownership in rescuing firms from a state of severe investment inefficiency, highlighting that deep-seated pathologies require remedies beyond structural board reforms. Conversely, for firms operating at median or elite levels, these mechanisms provide significant value, with foreign institutional ownership acting as a catalyst toward the performance frontier and independent boards helping mitigate information frictions. This distributional perspective carries significant implications: it calls for a more nuanced, diagnostic approach from scholars who must adopt methodologies capable of detecting heterogeneous effects; it advises corporate

boards and investors to tailor governance expectations and strategies based on a firm's performance tier; and it suggests regulators should complement broad governance codes with targeted interventions for chronically inefficient firms. Acknowledging the limitations of our single-country, quantitative design, future research should test this asymmetric framework across a diverse set of emerging markets to identify universal versus context-specific patterns. Subsequent inquiry should employ mixed methods, particularly qualitative case studies of firms in the extreme inefficiency quantiles, to uncover the precise pathological mechanisms such as entrenched family control or state capture that nullify formal governance. Further, expanding the analysis to other governance levers, like incentive-based compensation or ESG integration, could reveal different distributional impacts. Ultimately, by embracing the complexity revealed through distributional analysis, the field can develop more robust, context-sensitive theories of corporate governance that account for the stark reality that the cost of secrecy and the value of oversight are not the same for all.

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