

How Operational and Disclosure Complexity Shapes the Conglomerate Discount

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Abstract

This study examines how firm operational diversification and disclosure complexity jointly drive the conglomerate discount. We disentangle disclosure complexity, which is determined by managerially influenced financial transparency, from accounting complexity, which is a direct informational consequence of operational complexity. We find that operational diversification is consistently associated with significant conglomerate discounts, while disclosure complexity independently reduces firm value and amplifies the magnitude of the discount when diversification is high. These findings suggest that transparent disclosures can mitigate valuation costs, offering important implications for managers seeking effective communication, investors assessing complex firms, and policymakers aiming to enhance disclosure quality and market efficiency.

Keywords: Conglomerate discount; Operational complexity; Disclosure complexity; Investor sentiment; Political uncertainty.

JEL Classification: G12; G32; G34; M12; M41

1. INTRODUCTION

Diversification, in strategic management terms, represents the organizational capabilities and resource configurations that allow a firm to compete across multiple business lines (Matsusaka, 2001). Operational diversification is commonly adopted as a strategic initiative to enhance firm value, often motivated by potential gains such as risk mitigation, market expansion, and improved resource allocation.

However, a large body of empirical research documents the existence of the ‘conglomerate discount’, a phenomenon whereby diversified firms are valued at a discount relative to comparable portfolios of focused firms (e.g., Berger & Ofek, 1995; Laeven and Levine, 2007).¹ The reasons for the apparent discounts have been widely debated in academia, and they can be traced to governance or information issues rather than an inherent structural penalty. In a nutshell, the literature interprets the conglomerate discount as the manifestation of a more general complexity discount.

At the firm level, complexity is a multidimensional construct that can be conceptualized in two main dimensions, operational complexity and information complexity, which overlap in many parts but do not completely coincide. The first dimension, operational complexity, enters through the intrinsic conglomerate setup. As the number of segments or unrelatedness of businesses rises, organizational structures and activities become more complicated, with, for example, unusual joint-venture structures, complex ownership architectures, more segment performance metrics, multi-layered KPIs, frequency of equity-method investments, etc. Managing these complex structures is not easy, leading to issues related to governance and efficiency, such as agency problems, poor internal capital allocation, conflicting visions, and ineffective incentive contracts for managers. These problems have been documented to adversely influence firm performance and, consequently, firm value. Berger and Ofek (1995) show that diversified firms trade at a discount relative to stand-alone firms, attributing this effect to misallocation of resources within internal capital markets. Similarly, Lang and Stulz (1994) find that diversified firms exhibit significantly lower Tobin’s Q ratios than focused firms, arguing that diversification reduces firm value through

¹ Campa and Kedia (2002) provide evidence that the diversification is largely driven by endogeneity—i.e., firms that choose to diversify are already undervalued. Supporting this view, Graham, Lemmon, and Wolf (2002) use within-firm changes around spinoffs and find that the discount persists, suggesting that diversification itself may not erode value. Collectively, these studies underscore the importance of accounting for selection bias and firm heterogeneity in assessing the diversification-value relationship.

managerial inefficiencies and weak investment discipline. Thus, conglomerate discounts increase in operational complexity, which is directly linked to firms' diversification levels.

Firm operational diversification alone may not fully explain why diversified firms are penalized by capital markets. The valuation consequences of operating complexity ultimately depend on how well investors can interpret and process firm information. This leads to the second dimension of complexity, information complexity, which impacts firm valuation through the investor-side information processing channel, and not through the firm-side governance channel as operational complexity does. Higher information frictions for investors translate into lower valuations for firms. Literature has documented that information complexity can depress firm value because the information needed for valuation is hard to access and interpret (Jin, Luca, & Martin, 2022; Bertomeu, 2023; Farzamfar, Foroughi, Bahar, & Ng, 2024). Hund, Monk, and Tice (2010) argue that rational investor uncertainty contributes to the discount, which may decline as investors learn more about firm profitability.

Induced by complicated corporate structures, information complexity is the complexity that gets added to financial statements and segment reporting as firms enter multiple businesses. Complex organizations are more difficult for markets to evaluate (Cohen & Lou, 2012; Hoberg & Phillips, 2018), and accounting practices play a critical role in shaping investor perceptions (Li, 2008). This suggests that informational complexity may serve as a key channel through which operating complexity translates into the conglomerate discount.

However, previous studies on diversified firms report mixed results on whether the conglomerate discount is attributable to information complexity beyond operational complexity. On the one hand, Cheng and Wu (2018) suggest that part of the conglomerate discount is the informational frictions that can be mitigated by enhancing the comparability of financial statements. Similarly, according to Charoenwong, Ding, and Pan (2008), when firms take actions that reduce information asymmetry, such as spinoffs, part or all of the conglomerate discount is eliminated. On the other hand, Clarke, Fee, and Thomas (2004)'s study documents that diversified firms do not have higher information asymmetry than individual focused firms. Other empirical evidence shows that the discount disappears entirely when governance variables are introduced in selection models, implying that information complexity does not have a causal role in the valuations of diversified firms (Hoechle et al., 2012).

Most of these studies use measures for the overall information complexity of firms to examine its effects on conglomerate discounts. We argue that, for diversified organizations, it is important to identify and differentiate the two components that shape their information complexity: accounting complexity and disclosure complexity. Accounting complexity is a natural informational consequence of operational complexity, which is beyond the control of managers once their firms enter multiple business segments. The mere volume of accounting data can be a source of investor confusion, while obscuring segment-level performance. Accounting complexity is demonstrated through the number of financial statements for various divisions and subsidiaries, footnote length and fragmentation, degree of non-GAAP adjustments, segment reconciliations, cross references, and so on. All these complications create weak signals about segment economics and firm-level equity stories for outsiders to price firms' assets. Loughran and McDonald (2024) show that complex financial language impairs market understanding of firm fundamentals. However, Damodaran (2007) argues that, for conglomerates, this accounting uncertainty can be considered a firm-level characteristic that can be diversified away in investor portfolio construction. Indeed, if a firm's diversification level and other fundamentals are already included in the model to explain conglomerate discounts, accounting complexity will not have any additional impact on firm valuations. In other words, firms with similar levels of diversification have similar accounting complexity. This explains why some previous studies find that information risk does not contribute to conglomerate discounts, after controlling for firms' diversification levels.

The second component of information complexity, disclosure complexity, does not originate from the conglomerates' inherent complex organizational structures, but from managers' reporting choices: Managers can exploit conglomerates' complex accounting design and use underlying practices to limit disclosures, unnecessarily elevating firms' information complexity. The techniques range from insufficient segment granularity to opaque allocation of corporate costs, overly aggressive accounting practices, deliberate misrepresentation, or a breach of accounting rules. As an instance, in 2020, GE faced a major SEC penalty for misleading investors about profits and risks in their power and insurance businesses, which involved non-GAAP issues and disclosure failures. This example highlights accounting opacity in conglomerates, the issues that managers can control.

Several contemporary studies indicate that disclosure complexity is not merely incidental but strategically employed by managers. Jin, Luca, and Martin (2021) provide both theoretical and experimental evidence that unnecessary complexity often arises from managerial incentives to “shroud” information, which may benefit managers in the short term but ultimately reduces firm value. Similarly, Bertomeu (2023) models disclosure complexity as a deliberate managerial choice that increases financing costs by heightening misinterpretation. Aghamolla and Smith (2023) add that managers may strategically adjust disclosure complexity to influence investor perceptions, with their effects depending on firm performance and investor sophistication.

Parallel to this, financial statement disclosure complexity has emerged as a key determinant of firm valuations. Opaque disclosures increase information asymmetry and impair investors’ ability to assess firm performance and risk. Lower readability in annual reports is associated with reduced earnings persistence and lower stock returns (Li, 2008). As observed by Durnev, Morck, and Yeung (2004), weak information environments, characterized by low transparency or excessive complexity, are related to greater firm-level mispricing. Collectively, these findings suggest that disclosure complexity can amplify the conglomerate discount by further limiting investors’ ability to disentangle segment-level performance and allocate value appropriately across a firm’s diverse operations. Heterogeneous levels of informational complexity caused by the lack of transparency can explain why some conglomerates trade at steep discounts while others do not, even though they have similar levels of diversification.

Most studies on conglomerates focus on overall information complexity, measured via information asymmetry (Clarke et al., 2004), financial statement comparability (Cheng & Wu, 2018), stock return skewness (Bressan & Weissensteiner, 2021), and text-based complexity (Loughran & McDonald, 2024). These measures of information complexity encompass accounting complexity, which is a direct result of operational complexity caused by diversification levels. Hence, prior academic work leaves open the question of whether and how disclosure complexity influences conglomerate discounts beyond the effects of operational complexity.

In this study, we clarify how disclosure complexity operates as a distinct component of information complexity in diversified firms and how it systematically conditions market valuations. Rather than introducing a new source of the conglomerate discount, we examine whether variation in disclosure opacity, beyond that mechanically implied by firm scope, amplifies valuation discounts when operating diversification is high.

To explore this, we construct a measure for disclosure complexity based on operational complexity and information complexity. For operational complexity, we use the widely known measure of diversification, the Herfindahl-Hirschman Index (HHI), because operational complexity reflects a firm's diversification level. For information complexity, we use Loughran and McDonald (2024)'s text-based measure of complexity using firms' 10K filings, capturing firms' overall complexity portrayed in their official information. Since part of information complexity is determined by their level of diversification and other fundamentals, we disentangle these mechanical factors by regressing information complexity on firms' HHI diversification, size, age, and leverage, and using the residuals of this regression as our measure for disclosure complexity. Our new variable, Unreadability, captures the part of information complexity that is unnecessarily created by managerial influence on firms' transparency in accounting disclosures. For conglomerate discounts, we use BO excess value, following Berger and Ofek (1995) method for estimating the conglomerate discount, which is the ratio of a firm's total capital to its imputed standalone value.

We hypothesize that diversification creates valuation penalties through organizational complexity, while disclosure complexity deepens conglomerate discounts by exacerbating unnecessary information asymmetry and misinterpretation. Our sample includes 22,020 firm-year observations of publicly traded U.S. firms (excluding financial institutions and firms from regulated industries) from 1990 to 2024. For empirical tests, we run ordinary least squares (OLS) regressions to see if HHI diversification and Unreadability have significant impact on BO excess value. We also employ the double machine learning method in combination with causal forests to capture how the effect of unreadability on the conglomerate discount varies across firms with different levels of diversification.

Our OLS regression results show that higher diversification levels and higher disclosure complexity significantly contribute to a greater valuation discount. Both coefficients load significantly at the 1 percent statistical level. The magnitudes are economically meaningful: for instance, a one-standard-deviation increase in Unreadability corresponds to a 0.043-point decline in BO Excess Value, equivalent to roughly 5% of one standard deviation of firm value. In addition, our causal machine learning tests reveal that the impact of unreadability on valuations is not uniform but more pronounced among highly diversified firms. Overall, our study concludes that disclosure complexity can amplify the information frictions already present in diversified firms

due to their operational complexity and deepen the conglomerate discount. In other words, corporate managers can help less the conglomerate discount through better disclosure and storytelling.

We further examine how broader market forces, including investor sentiment and political uncertainty, shape the conglomerate discount. Our analysis shows that both investor sentiment and political uncertainty significantly impact firm valuations only in the subsample of firms with high unreadability. As disclosures are unclear, non-fundamental factors can exert their influence. Specifically, higher sentiment is associated with higher excess values when unreadability is high; however, high sentiment does not offset the conglomerate discount among these firms. Similarly, political uncertainty raises excess value only in the subsample of high-readability firms. More importantly, the interaction between diversification and political uncertainty also loads significantly and positively, suggesting that conglomerate discounts narrow for high-unreadability firms when political environments are uncertain. In such high information processing cost environments, diversified firms can probably show advantages of large production scales and organic internal capital markets. Overall, both sentiment and policy risk compound valuation penalties only when disclosures are unreadable, underscoring the central role of disclosure clarity in shaping how external forces affect diversified firms.

Throughout the paper, we interpret disclosure complexity as the component of information complexity that is not mechanically driven by firm size, diversification breadth, or other structural characteristics. Importantly, this measure should not be interpreted as a pure proxy for intentional managerial obfuscation. Instead, it captures variation in disclosure clarity that reflects discretionary reporting practices, organizational processes, and communication choices that differ across firms even with similar operating complexity. This distinction allows us to examine how non-mechanical disclosure opacity conditions the valuation effects of diversification, without requiring strong assumptions about managerial intent.

Our paper contributes to several strands of the literature. First, we refine the understanding of the determinants of the conglomerate discount. Prior studies typically examine organizational complexity or information complexity in isolation, even though both arise from the complex structure of diversified firms and may overlap, leading to mixed empirical conclusions. We distinguish disclosure complexity from accounting complexity and treat the former as a first-order characteristic that can independently shape conglomerate discounts beyond operational complexity.

Methodologically, we develop a residualized unreadability measure that isolates the component of information complexity not mechanically driven by firm size, diversification breadth, age, or leverage. This approach allows us to separate managerially influenced disclosure opacity from accounting complexity that arises naturally from firm fundamentals (Farzamfar, Mazouz, & Mohamed, 2024). We show that unreadability explains a meaningful portion of the gap between market value and the imputed value of stand-alone segments, highlighting the role of disclosure opacity in shaping the valuation of diversified firms.

Second, we develop a theoretical framework in which the information-risk penalty is endogenously determined by both operating complexity and disclosure complexity. The model delivers a clear cross-partial prediction: improvements in disclosure transparency generate the largest valuation gains for diversified firms, while unreadability disproportionately penalizes them. Consistent with this mechanism, we document heterogeneous valuation effects of unreadability using a causal machine-learning framework, complementing the growing emphasis on conditional heterogeneity in accounting and finance research (Wager & Athey, 2018; Bertomeu, 2023; Chernozhukov et al., 2018). While the average effect of unreadability is modest, its negative impact is significantly amplified among highly diversified firms.

Finally, we extend the literature on market forces and firm valuation by showing that investor sentiment and political uncertainty affect conglomerate discounts primarily when disclosures are opaque. Building on prior work on sentiment (Baker & Wurgler, 2007) and policy uncertainty (Gulen & Ion, 2016; Julio & Yook, 2012), our findings suggest that the valuation consequences of diversification depend critically on disclosure readability, which conditions how external forces are incorporated into prices.

The remainder of the paper proceeds as follows. Section 2 details our theoretical framework. Section 3 provides the sample, variables, methodology, and summary statistics. Section 4 discusses the main empirical results. Section 5 presents further analysis. Section 6 concludes the paper.

2. THEORETICAL BACKGROUND: WHY POOR READABILITY HURTS DIVERSIFIED FIRMS MORE

From an information economics perspective, investors extract firm value signals from noisy disclosures (Akerlof, 1970; Grossman & Stiglitz, 1980). In multi-segment firms, operating

complexity increases the dimensionality of information that must be processed, compounding valuation uncertainty (Bushman, Chen, Engel, & Smith, 2004). Simultaneously, financial statement transparency plays a key role in shaping how effectively investors can interpret disclosures (Li, 2008; Miller, 2010). A lack of transparency in disclosures increases information noise and widens the gap between firm fundamentals and investors' perception of value.

Recent accounting research formalizes this link by demonstrating that low textual readability (e.g., Loughran & McDonald, 2024; Bonsall, Leone, Miller, & Rennekamp, 2017) and organizational complexity (e.g., Hoitash & Hoitash, 2018) serve as multipliers of information complexity. When both diversification and disclosure opacity are present, investors face compounded difficulties in extracting firm fundamentals, which amplifies the valuation penalty. This intuition parallels the notion of “conglomerate opacity” (Kedia & Rajgopal, 2011), where investors require greater discounts in complex firms due to heightened uncertainty about segment-specific cash flows.

Thus, the joint influence of operating complexity and disclosure complexity is consistent with broader theories of valuation under uncertainty. In a signal-extraction model with risk-averse investors, noisier information increases perceived risk and triggers a higher risk premium. Our framework extends this intuition by allowing the risk penalty coefficient (λ) to be endogenously determined by both organizational features (i.e., diversification, segment structure) and disclosure attributes (i.e., clarity, readability). This approach provides a theoretical rationale for why diversification and unreadability not only individually lower firm value but also jointly magnify the conglomerate discount.

We develop a theoretical framework to explain why both operating complexity and disclosure complexity increase a firm's conglomerate discount, and why poor transparency in disclosures disproportionately reduces the market value of diversified firms. The model is built on an additive signal-extraction setup, where investors face informational frictions in valuing multi-segment firms (Grossman & Stiglitz, 1980; Cohen & Lou, 2012).

First, assume a firm operates n business segments. Each segment $j \in \{1, \dots, n\}$ has the present value of its expected future cash flows, denoted by R_j . However, investors can only observe the value along with noise:

$$\tilde{R}_j = R_j + \varepsilon_j, \quad \varepsilon_j \sim N(0, \sigma^2)$$

where σ^2 captures information noise stemming from poor financial statement readability. Investors

form expectations under risk aversion. The perceived value of the firm is:

$$V^{adj} = \sum_{j=1}^n E[\tilde{R}_j] - \lambda \cdot \text{Var}\left(\sum_{j=1}^n \tilde{R}_j\right) = \sum_{j=1}^n R_j - \lambda n \sigma^2$$

where λ is a risk penalty coefficient representing sensitivity to valuation uncertainty. For risk-averse investors, λ should be positive ($\lambda > 0$), since greater information noise makes it harder to accurately assess firm fundamentals (Easley & O'Hara, 2004). This heightened uncertainty leads risk-averse investors to apply a larger discount to expected cash flows, thereby reducing firm valuation.

Critically, we posit that the penalty coefficient λ endogenously depends on both the firm's disclosure complexity and diversification level:

$$\lambda = \lambda(c, \phi(s))$$

where c represents financial statement transparency, with higher values of c indicating better readability; and $\phi(s)$ denotes the firm's operating complexity, modeled as a function of structural attributes s , which may include the number of business segments, relative segment weights, product or market diversification, and other organizational features. We assume the following partial derivatives:

$$\frac{\partial \lambda}{\partial c} < 0 \text{ and } \frac{\partial \lambda}{\partial \phi(s)} > 0$$

That is, firms with financial statements transparency face lower valuation penalties, while firms with greater operating complexity face higher penalties. When financial disclosures are opaque (low c), and the firm is operationally complex (high $\phi(s)$), these effects interact multiplicatively to increase the perceived valuation risk. Thus, the valuation discount due to informational frictions becomes:

$$\text{Discount} = \lambda(c, \phi(s)) \cdot n \cdot \sigma^2$$

Since we assume $\partial \lambda / \partial c < 0$ and $\partial \lambda / (\partial \phi(s)) > 0$, the cross-partial derivative of the discount function with respect to c and $\phi(s)$ is:

$$\frac{\partial^2 \text{Discount}}{\partial c \partial \phi(s)} = \frac{\partial^2 \lambda(c, \phi(s))}{\partial c \partial \phi(s)} \cdot n \cdot \sigma^2 < 0$$

This implies a complementarity between poor readability and high operational complexity. The marginal benefit of improving readability is greater when the firm is highly diversified. Conversely, the valuation penalty from unreadability is disproportionately larger for firms with greater

operating complexity. Specifically, when the firm is not diversified ($n=1$), the conglomerate discount becomes:

$$Discount = \lambda(c, \phi(s)) \cdot \sigma^2$$

If $\phi(s) \approx 0$ (i.e., operating complexity is minimal), then:

$$\frac{\partial \lambda}{\partial c} \approx 0$$

In other words, the sensitivity of the penalty to financial unreadability is small when the firm is simple and undiversified.

Together, the model provides a theoretical rationale for the empirical finding that both types of firm complexity, operating complexity and disclosure complexity, contribute to valuation discounts. In particular, the interaction between these two dimensions intensifies the negative impact: unreadable financial disclosures impose a disproportionately larger valuation penalty on firms with greater operating diversification, such as those with numerous or unrelated business segments. This reinforces the critical importance of maintaining transparent and accessible financial disclosures, especially for firms engaged in complex, multi-segment operations where information asymmetry is inherently higher (Kedia & Rajgopal, 2011; Bushman et al., 2004).

The central implication of the framework is not that disclosure complexity uniformly reduces firm value, but that its valuation consequences depend on operating structure. When firms are focused, investors can often infer fundamentals even from opaque disclosures because cash-flow sources are concentrated. In contrast, for diversified firms, disclosure opacity compounds already high information-processing costs, leading to a disproportionately larger valuation penalty. Accordingly, the empirical analysis focuses on whether the effect of disclosure complexity on firm value is small on average but significantly amplified among firms with greater operating diversification.

3. SAMPLE, VARIABLES, AND METHODOLOGY

3.1 Data and Preliminary Sampling

We obtain firm-level financial data from Compustat and equity market data from CRSP, covering all firm-year observations from 1990 to 2024. We exclude all the firm-year observations with missing values and firms in regulated industries, banks, and financial institutions; that is, firms with primary Standard Industrial Classification (SIC) codes 4900 to 4999 and SIC codes 6000 to 6999. We winsorize continuous variables at their 1st and 99th percentiles to reduce the influence of

outliers.

3.2 Variables

3.2.1 Conglomerate Discount

As our conglomerate discount measure, we calculate the excess value following the methodology proposed by Berger and Ofek (1995), who compare the sum of the imputed stand-alone values of the segments of diversified companies to the actual values of those companies. We first estimate the imputed standalone value of each business segment using industry-specific valuation multiples. Then we calculate the implied value of each segment as follows:

$$Segment\ Value_{j,i,t} = Sales_{j,i,t} \times Median\left(\frac{EV}{Sales}\right)_{j,t}$$

where $Median\left(\frac{EV}{Sales}\right)_{j,t}$ is the median enterprise value-to-sales ratio of all single-segment firms in the same SIC industry segment j in year t . Financials (SIC 6000–6999) and Utilities (SIC 4900–4999) segments are excluded because their capital structures are not comparable. Additionally, only firms with sales exceeding \$20 million and whose segment sales are within 1% of consolidated sales are included. The total imputed value for the whole firm is obtained by summing across all segments within each firm:

$$Imputed\ Value_{i,t} = \sum_{j=1}^{N_{i,t}} Segment\ Value_{j,i,t}$$

Next, we calculate the BO Excess Value, which is the log ratio of the observed total capital to the imputed standalone value:

$$BO\ Excess\ Value_{i,t} = \log\left(\frac{Total\ Capital_{i,t}}{Imputed\ Value_{i,t}}\right)$$

where $Total\ Capital_{i,t}$ is the sum of the firm's market value of common equity and book value of debt. The smaller the BO Excess Value, the lower the firm's total capital relative to its imputed value, which indicates the firm is traded at a larger discount relative to the sum of its segments' standalone value.²

² As a robustness check, we compute an alternative conglomerate discount measure based on Lamont and Polk (2002). Unlike the Berger–Ofek sales-multiple approach, which is largely insensitive to cross-industry differences in expected growth, the Lamont–Polk method uses market-to-book ratios that incorporate the market's assessment of both growth and risk. More specifically, for each industry j and year t , we compute

3.2.2 Operational Complexity

We measure a firm's operational complexity by its level of diversification based on the Herfindahl-Hirschman Index (HHI). The HHI is a continuous measure that reflects the relative distribution of sales across segments.

$$HHI_{i,t} = \sum_{j=1}^{N_{i,t}} \left(\frac{Sales_{j,i,t}}{\sum_{j=1}^{N_{i,t}} Sales_{j,i,t}} \right)^2$$

where $HHI_{i,t}$ refers to the HHI index for firm i in year t . $Sales_{j,i,t}$ is the sales of segment j , and $N_{i,t}$ is the number of segments. The segments are defined by the unique SIC codes. A higher HHI indicates greater concentration of revenue in fewer segments. Thus, we transform the HHI into a more intuitive measure for diversification by computing its complement, the HHI Diversification:

$$HHI \text{ Diversification}_{i,t} = 1 - HHI_{i,t}$$

This index increases as segment-level sales become more evenly distributed. It provides a normalized scale from 0 to 1, where higher values correspond to greater diversification.

3.2.3 Information Complexity

Our proxy for information complexity is the measure developed by Loughran and McDonald (2024), which has been widely adopted in literature, such as Chatjuthamard et al. (2022) and Hoitash and Hoitash (2022). The authors argue that many existing proxies of complexity, such as the number of business/geographic segments, readability indices, or firm size, are one-dimensional, sample-limited, or conceptually misaligned. To address these limitations, they developed a textual measure of complexity using firms' 10-K filings. They begin with a broad set of candidate words associated with complex activities, including mergers, derivatives, international operations, and accounting revaluations. Through a penalized regression framework, they identify and retain only those words that consistently correlate with higher complexity across multiple validation settings, resulting in a refined lexicon. The complexity score is then calculated as:

the median market-to-book ratio among single-segment firms, median $M/B_{j,t}$, requiring at least five pure-play matches. A diversified firm's imputed market-to-book ratio is then constructed as Imputed $M/B_{i,t} = \sum_{j=1}^{N_{i,t}} w_{i,j,t} \text{median } M/B_{j,t}$. Where $w_{i,j,t}$ is the j segment's share of the firm i in year t , and $N_{i,t}$ is the number of segments for firm i in year t . Finally, the firm's LP Excess Value is computed as the log value of the firm's M/B ratio over its imputed M/B ratio: $LP \text{ Excess Value}_{i,t} = \log \left(\frac{M/B_{i,t}}{\text{Imputed } M/B_{i,t}} \right)$. Our references remain unchanged when we employ the alternative conglomerate discount measure.

$$\% \text{ Complexity} = \frac{(\text{Count of selected complexity words})}{(\text{Total words in } 10 - K)} \times 100\%$$

This measure captures the degree to which firms report complicated operations and transactions, reflecting underlying economic and organizational complexity rather than mere verbosity. Because it is grounded in mandatory disclosures and systematically validated, this measure provides a comprehensive and scalable proxy for firm-level information complexity that extends traditional measures of diversification and information asymmetry.³

3.2.4 Constructing a Measure of Disclosure Complexity

Information complexity, as measured by Loughran and McDonald (2024)'s text-based complexity score, contains both accounting complexity and disclosure complexity. Since accounting complexity moves mechanically with firms' diversification level and other fundamentals such as size, age, and leverage, we purge these effects to focus only on disclosure complexity, which encompasses managers' issues with transparency and disclosures. Following the approach of Li (2008) and Bertomeu (2023), we construct a residualized measure of disclosure complexity, *Unreadability*, by regressing information complexity on diversification and other fundamentals, and the residuals from the regression capture the portion of information complexity not explained by operational complexity.

$$\text{Info Complexity}_{i,t} = \beta_1 \text{HHI Diversification}_{i,t} + \beta' \mathbf{X}_{i,t-1} + FEs + \text{Constant} + \varepsilon_{i,t} \quad (1)^4$$

where $\mathbf{X}$ includes the firm level fundamentals, such as size, age, and financial leverage; and FEs contains both firm and year fixed effects. We then standardize the residuals within industry (based on 2-digit SIC) and year to get a measure of unreadability for comparability. This design nets out scale/scope and contemporaneous regulatory waves that drive filing length/structure. It's important to be noted that unreadability should be interpreted as the component of disclosure complexity not mechanically tied to firm scope or scale, rather than a pure measure of intentional obfuscation.

3.2.5 Control Variables

³ We collect the data from <https://sraf.nd.edu/complexity/>.

⁴ As a robustness check, we construct an alternative measure of disclosure complexity by residualizing information complexity on diversification and other firm characteristics without firm fixed effects. This specification allows for cross-sectional variation in disclosure complexity that may be absorbed by firm fixed effects in the baseline construction. Re-estimating our main regressions using this alternative unreadability measure yields coefficients that are directionally consistent and of similar economic magnitude to those reported in the main tables. These results suggest that our findings are not driven by over-residualization from firm fixed effects and do not rely on within-firm variation alone.

To isolate the effect of disclosure complexity on firm conglomerate discount, we control for a comprehensive set of firm characteristics, including firm size (measured by the natural logarithm of total assets), market capitalization (measured as the product of share price and shares outstanding),⁵ tangibility, leverage, and cash holdings to control for variations in financing capacity, capital structure, and liquidity. We also control the firm's earnings performance, profitability, and ROA, which account for differences in earnings performance. Capital expenditure intensity is added to reflect investment activity and growth opportunities, and ROE volatility captures differences in earnings risk. Firm age and a dividend payer indicator are included to account for life-cycle effects and payout policy, respectively.⁶ Finally, we incorporate all model specifications with high-dimensional fixed effects (HDFE), which simultaneously absorb firm and year effects, thereby controlling for unobserved heterogeneity across firms and time. This approach ensures that our results are not driven by firm-specific characteristics or temporal shocks but instead reflect the relationship of interest.⁷

3.3 Methodology

To examine the determinants of the conglomerate discount, we explore a multivariate analysis that includes the main explanatory variables, firms' operational complexity and disclosure complexity, all lagged by one year to mitigate endogeneity concerns. Below is our OLS regression equation:

$$\begin{aligned} BO\ Excess\ Value_{i,t} = & \beta_0 + \beta_1 HHI\ Diversification_{i,t-1} + \beta_2 Unreadability_{i,t-1} \\ & + \beta_3 Size_{i,t-1} + \beta_4 ROA_{i,t-1} + \beta_5 Profitability_{i,t-1} \\ & + \beta_6 Market\ Cap_{i,t-1} + \beta_7 Tangibility_{i,t-1} \\ & + \beta_8 Leverage_{i,t-1} + \beta_9 Cash\ Ratio_{i,t-1} \end{aligned}$$

⁵ The control variables used in our regressions include both firm size (measured by the natural logarithm of total assets) and market capitalization (measured as the product of share price and shares outstanding) as control variables that capture two distinct aspects of firm scale. Firm size reflects the operational and asset-based capacity of a company, capturing effects related to economies of scale, capital structure, and internal resource allocation. In contrast, market capitalization is a forward-looking, market-based valuation that incorporates investor expectations about a firm's growth potential and risk. Including both allows the regression to separately account for internal firm characteristics (via book values) and external investor perceptions (via market values), improving the specification and mitigating omitted variable bias related to firm scale (e.g., Fama and French 1992; Rajan and Zingales, 1995; Lemmon, Roberts, and Zender, 2008).

⁶ All the control variables are winsorized at the top and bottom 1% in the main regressions to reduce the outlier influence and enhance the robustness of the analysis.

⁷ Variable definitions are provided in Table A1 in Appendix A.

$$\begin{aligned}
& + \beta_{10}Capx\ Intensity_{i,t-1} + \beta_{11}RoE\ Volatility_{i,t-1} \\
& + \beta_{12}Log(Age)_{i,t-1} + \beta_{13}Dividend\ Payer_{i,t-1} + \varepsilon_t
\end{aligned} \tag{2}$$

where the *BO Excess Value*_{*i,t*} denotes the conglomerate discount associated with firm *i* in year *t*. A higher BO excess value indicates a smaller discount applied by the market to diversified firms. The independent variable *HHI Diversification*_{*i,t-1*}, represents firms' operational complexity, measured as one minus the Herfindahl–Hirschman Index. *Unreadability*_{*i,t-1*} includes the residuals from the regression of Information Complexity on HHI Diversification, as shown in Equation (1), capturing firms' disclosure complexity, part of information complexity that is not determined by firms' operational complexity, but by managers' strategic decisions.

We estimate our models using high-dimensional fixed effects (HDFE) regression analysis, which simultaneously absorbs firm and year effects. This method is computationally efficient, and yields results identical to traditional fixed-effects regressions with firm and year dummies. For parsimony, we report only the HDFE results, as they produce the same coefficient estimates and inferences. Standard errors are clustered at the firm level.

In addition, we employ the Conditional Average Treatment Effect (CATE) framework, which combines Double Machine Learning with Causal Forests, to move beyond average treatment effects in capturing how the effect of unreadability on the conglomerate discount varies systematically across firms with different characteristics. Specifically, we apply random forests to flexibly model both the treatment and outcome processes and then estimate both the Average Treatment Effect (ATE) and the heterogeneous treatment effects across firms. Treatment effect heterogeneity is further explored using the firm's HHI diversification as a moderating variable. The method employs cross-fitting over 10 folds to orthogonalize covariates, such as firm size, profitability, leverage, and age, from the treatment and outcome models, thus mitigating overfitting and endogeneity. This machine learning-based procedure enables robust inference on both average and conditional treatment effects without relying on restrictive parametric assumptions.

3.4 Summary Statistics

Panel A of Table 1 reports summary statistics for all variables. On average, firms exhibit a conglomerate discount, with BO Excess Value showing a mean of -0.061 , consistent with diversified firms trading at lower valuations than stand-alone peers. The average diversification

level, as reflected in the mean HHI Diversification, is 0.159. Information complexity has a mean score of 0.399. Control variables show that the average firm has assets of \$6.03 (in natural logarithm form), a mean market capitalization of \$3.22 billion, and moderate balance sheet strength. The sample includes many firms with low profits, while capital expenditures average 5.8% of assets. Firms are on average 17.3 years old, and one-third (33.2%) pay dividends. Collectively, these statistics highlight significant variation in diversification, disclosure practices, and financial characteristics, providing a rich setting to examine how operational and informational complexity affect firm value.

Panel B of Table 1 compares descriptive statistics between multi-segment and single-segment firms. The results show a pronounced conglomerate discount among multi-segment firms. Their mean BO Excess Value (-0.137) is significantly lower than those of single-segment firms (-0.013), with differences of -0.124 , confirming that diversification is associated with lower valuations. As expected, the average HHI Diversification is substantially higher for multi-segment firms (0.413), underscoring greater operational complexity relative to single-segment firms. Multi-segment firms also display systematically higher information complexity, as reflected in the higher average textual complexity score, indicating that diversification is accompanied by higher information risk.

Additionally, multi-segment firms are, on average, larger, older, and more likely to pay dividends. They are also more profitable, with higher ROA and profitability. However, they hold less cash and exhibit lower capital expenditure intensity and earnings volatility. Multi-segment firms also carry slightly higher leverage and tangibility.

Overall, the evidence highlights notable differences between multi- and single-segment firms. Multi-segment firms are more complex both operationally and informationally, but they trade at a significant valuation discount relative to their more focused peers.

[Insert Table 1 about here]

4. RESULTS AND DISCUSSIONS

4.1 Operational Complexity, Information Complexity, and Conglomerate Discount

To examine the effects of operational complexity and information complexity on the conglomerate discount, we run separate OLS regressions of BO Excess Value on HHI Diversification and on Information Complexity.

[Insert Table 2 about here]

The results in Table 2 show that greater operational complexity and greater information complexity are robustly associated with a larger conglomerate discount. Specifically, both HHI Diversification and Information Complexity load negatively and significantly on BO Excess Value. The magnitudes are also economically meaningful; for instance, a one-standard-deviation increase in the HHI Diversification corresponds to a 0.043-point decline in BO Excess Value, equivalent to roughly 5% of one standard deviation of firm value.

Similarly, a one-standard-deviation increase in Information Complexity reduces BO Excess Value by about 0.045 points, an economically meaningful effect that represents roughly 5% of one standard deviation of firm value. These results are consistent with prior research findings that the conglomerate discount is not merely an organizational consequence of diversification, but information complexity also plays a role in how investors perceive and value complex firms.

The estimates on the control variables are broadly consistent with prior studies of diversification and firm valuation. Profitability, market capitalization, cash holdings, and capital expenditure intensity all enter positively and significantly, suggesting that firms with stronger performance, larger market presence, greater financial flexibility, and higher growth opportunities are rewarded by investors with higher relative valuations. These findings are in line with Lang and Stulz (1994) and Berger and Ofek (1995), who highlight profitability and investment capacity as important determinants of the valuation effects of diversification, as well as more recent evidence from Lins and Servaes (2002) and Custódio (2014). By contrast, firm age enters with a negative coefficient, consistent with Villalonga (2004) and Hund, Monk, and Tice (2010), who show that older firms often face declining growth opportunities and increasing organizational rigidities that erode value. Dividend payers, however, are valued at a premium, consistent with signaling and reduced agency cost arguments emphasized in Denis, Denis, and Sarin (1997).

4.2 Information Complexity and Conglomerate Discount around Diversification Years

To further verify whether firms experience changes in value and informational complexity when they diversify (i.e., when they start entering multiple business segments), we employ a univariate analysis that compares firms' BO excess value and information complexity measures before, during, and after diversification. Specifically, we investigate whether excess value, our proxy for the conglomerate discount, declines in the immediate aftermath of diversification and whether information complexity rise in parallel. Accordingly, we compute the mean and median of BO

excess values and information complexity across the three periods and then test the differences between the pre- and post-diversification years.

[Insert Table 3 about here]⁸

Panel A of Table 3 presents descriptive statistics for excess value and information complexity measured one year prior to diversification (T-1), in the year of diversification (T), and one year after diversification (T+1). The results reveal a sharp decline in excess value following diversification. Specifically, BO Excess Value decreases from 0.023 in the pre-diversification year to -0.172 one year after, suggesting a significant increase in the conglomerate discount.

At the same time, information complexity scores rise significantly from 0.349 before diversification to 0.405 after diversification. These patterns suggest that diversification is accompanied not only by greater operational complexity but also by information complexity.

Panel B of Table 3 confirms that these differences are statistically significant. Information complexity increases, while BO Excess Value declines significantly from the pre- to post-diversification period, reinforcing evidence of higher information frictions and a larger conglomerate discount after diversification.

In summary, these results indicate that diversification events have a dual effect: a deterioration in firm value and a concurrent increase in information complexity. This pattern supports the view that informational risk intensifies around diversification, suggesting that it is an important channel through which diversification translates into a valuation discount (e.g., Cohen & Lou, 2012; Hoberg & Phillips, 2018; Bertomeu, 2023).

4.3 Disclosure Complexity as Part of Information Complexity beyond Operational Complexity Effects

To construct a measure for disclosure complexity, the part of information complexity that is determined by managerially influenced accounting transparency and not by the inherently complex structures of diversified, we regress information complexity on HHI diversification scores and other firms' fundamentals, as shown in Equation (1).

[Insert Table 4 about here]

Table 4 Panel A demonstrates that, as expected, firms' diversification levels have a positive

⁸ This analysis is descriptive and not intended to establish causal effects of diversification.

impact on information complexity scores. For each one-point increase in HHI diversification, the information complexity score rises by 0.035 points, and the correlation is statistically significant at the 1 percent level. Other firm-level fundamentals, including firms' size and leverage, also have statistically significant and positive effects on information complexity. The residuals of this regression are labeled Unreadability, capturing firms' disclosure complexity due to information opacity.

To examine whether the valuation effect of unreadability varies systematically with firms' operating diversification, we implement a two-stage empirical procedure similar to a Fama–MacBeth cross-sectional estimation. In the first stage, we estimate firm-specific unreadability betas by running a separate time-series regression for each firm (by GVKEY), where excess value is regressed on unreadability and the full set of baseline control variables used in the specification in Panel A. These regressions are estimated independently for each firm, and we require at least five firm-year observations to ensure adequate estimation precision. This procedure yields one coefficient for each firm that captures the sensitivity of excess value to changes in unreadability for that specific firm.

In the second stage, we examine whether these firm-specific unreadability betas vary systematically with the firm's degree of operating complexity. For this purpose, we compute the time-series mean of the HHI Diversification for each firm, based on annual segment data. We then regress the firm-specific unreadability betas on HHI Diversification in a series of cross-sectional regressions, using heteroskedasticity-robust standard errors.

The results in Table 4 Panel B display a negative coefficient for HHI diversification, indicating that firms with higher diversification exhibit more negative unreadability betas, or the adverse effect of unreadability on firm value is stronger for firms with greater operational complexity. Consistent with the hypothesis that diversified firms face greater information processing and coordination challenges, which amplify the consequences of disclosure complexity, we provide robust evidence that the valuation penalty associated with unreadability is more pronounced for firms operating in more complex structures.

This two-stage approach allows us to isolate how the economic effect of unreadability differs systematically across firms, rather than assuming a uniform relationship across the sample. A low R^2 of 0.003 in this setting is expected because the second-stage regression explains cross-sectional variation in firm-specific slope estimates, which are inherently noisy. The objective is to

test whether diversification systematically shifts unreadability effects, not to explain the full distribution of betas. In such random-slope frameworks, significance and sign consistency of coefficients, rather than R^2 magnitude, provide meaningful evidence.

4.4 Operational Complexity, Disclosure Complexity, and Conglomerate Discount

To examine the determinants of conglomerate discount, we run the OLS regressions of BO Excess value on both HHI diversification and unreadability, as demonstrated in the baseline Equation (2).

[Insert Table 5 about here]

The empirical results in Table 5 Column (1) show that Unreadability alone enters with a negative and statistically significant coefficient (-0.260), indicating that firms with less transparent disclosures experience a larger conglomerate discount. A one-standard-deviation increase in Unreadability is associated with a decline in BO Excess Value of about 0.043, suggesting that the effect is not only statistically but also economically meaningful. When HHI diversification is introduced in column (2), Unreadability remains negatively associated with excess value, and the magnitude and statistical significance level of the coefficient stay the same.

Overall, these results indicate that disclosure complexity, after purging the effects of scale, scope, and regulation, has an independent and economically meaningful role in explaining the conglomerate discount. The evidence highlights that the informational frictions created by managerially influenced transparency can directly reduce firm value and amplify the valuation penalty of diversification. The evidence supports the argument that the persistence of the conglomerate discount cannot be attributed solely to operating complexity but also to managers' strategic decisions on accounting transparency (or the lack thereof).

4.5 Treatment Effects of Disclosure Complexity Conditional on Operational Complexity

In this section, we employ the Double Machine Learning method in combination with Causal Forests to capture how the effect of unreadability on the conglomerate discount varies systematically across firms with different characteristics. We apply random forests to flexibly model and estimate both the average treatment effects (ATE) and the heterogeneous treatment effects across firms. Treatment effect heterogeneity is further explored using the firm's HHI diversification as a moderating variable. The method employs cross-fitting over 10 folds to orthogonalize covariates, such as firm size, profitability, leverage, and age, from the treatment and

outcome models.

[Insert Table 6 about here]

Panel A of Table 6 reports the results from the causal forest estimation, analyzing how financial statement unreadability affects firms' conglomerate discount (BO Excess Value). The ATE of high unreadability on excess value is economically negligible and statistically insignificant (-0.0012, $p=0.886$), suggesting no average causal impact across the full sample. Nonetheless, the potential outcome mean under low unreadability is significantly negative (-0.139, $p=0.000$), consistent with prior evidence that diversified firms tend to trade at a discount. The test for treatment effect heterogeneity ($\chi^2 = 9.50$, $p = 0.002$) strongly rejects the null of homogeneous effects, prompting further investigation. A linear projection of the firm-level individual treatment effects onto the HHI diversification reveals a significantly negative relationship (-0.094, $p = 0.027$), indicating that the marginal effect of unreadability is significantly stronger in firms with more complex operating structures, where opaque disclosure may compound investors' difficulty in assessing segment performance.

We re-estimate the causal forest model using an alternative measure of excess value (LP Excess Value) in place of the original dependent variable. Panel B of Table 6 indicates that the ATE of high unreadability remains negative (-0.0140) but is statistically insignificant ($p = 0.156$), similar in direction but slightly weaker than in the previous result. Importantly, the point estimate of the ATE is more negative, suggesting a potentially larger economic effect, albeit with more uncertainty.

The treatment-effect heterogeneity test remains statistically significant ($\chi^2= 12.93$, $p = 0.0003$), reinforcing the presence of heterogeneous treatment effects across firms. The linear projection of treatment effects on the HHI Diversification remains negative and marginally significant (-0.097, $p = 0.050$), consistent with the prior result (-0.094, $p = 0.027$). This consistency supports the conclusion that the negative impact of unreadability on firm valuation becomes more pronounced for more diversified firms. In sum, the direction and heterogeneity of the results are broadly consistent with the main findings, strengthening the argument that poor transparency disproportionately harms diversified firms' market valuation.

In sum, the causal machine learning results indicate that, on average, unreadability does not significantly alter the level of the conglomerate discount, as reflected in the insignificant ATE. Nonetheless, firms with low unreadability continue to exhibit a clear and significant discount,

confirming the baseline effect of diversification on firm value. Importantly, the heterogeneity tests reveal that the impact of unreadability is not uniform across firms. The interaction with the HHI diversification shows that the valuation penalty intensifies in firms with broader operational scope, suggesting that disclosure complexity compounds the informational frictions already present in highly diversified firms. In other words, while unreadability may not affect all firms equally, it amplifies the discount in those that are most complex, underscoring the role of disclosure clarity as a conditioning factor in the market’s evaluation of diversification.

5. MARKET FORCE EFFECTS AND DISCLOSURE COMPLEXITY

5.1 Investor Sentiment

Investor sentiment reflects the influence of noise traders, as it conveys optimism or pessimism that extends beyond fundamental factors. Compared with sophisticated investors, noise traders are more likely to be misled by opaque disclosures (Aghamolla & Smith, 2023; De Long et al., 1990), creating a favorable environment for sentiment effects. In this section, we examine whether investor sentiment can moderate the relationship between operational complexity and conglomerate discounts.

We measure investor sentiment by following Baker and Wurgler (2007), who developed a composite index that combines several market-based proxies of speculative demand. Specifically, they include six variables: NYSE trading volume (share turnover), the dividend premium (the relative valuation of dividend-paying vs. non-dividend-paying stocks), the average discount on closed-end funds, the number of IPOs, average first-day IPO returns, and the equity share in new issues. Each proxy reflects periods of optimism or pessimism among investors, with higher values generally indicating stronger sentiment. They extract the first principal component of these six proxies to construct a single sentiment index that captures the common variation across measures.

We begin by splitting our sample into low-unreadability and high-unreadability firms based on the distribution of firm disclosure readability. Specifically, we compute the firm-year distribution of unreadability and classify observations above the sample median as high-unreadability and those below the median as low-unreadability. This median split ensures balanced group sizes, allowing us to compare how disclosure complexity conditions the relationship between diversification and sentiment.

[Insert Table 7 about here]

The results in columns (1) to (2) of Table 7 indicate that in a low-unreadability sample, diversification is negative but insignificant, and investor sentiment itself is not a significant driver of valuation. This suggests that when disclosures are clear, sentiment does not affect conglomerate discounts, consistent with the idea that transparency limits the influence of noise traders. In contrast, in columns (3) to (4), the high-unreadability sample, the results indicate that diversification is significantly negative (-0.210), implying a stronger conglomerate discount. Importantly, investor sentiment is positive and significant, implying that in opaque disclosure environments, market valuations are more sensitive to speculative sentiment. However, the interaction between diversification and sentiment is insignificant, showing that while sentiment lifts valuations overall, it does not offset the discount associated with operational complexity.

These results highlight that investor sentiment exerts influence primarily when disclosure complexity is high, reinforcing the role of transparency in shaping how sentiment translates into firm valuations.

5.2 Political Uncertainty

Similar to investor sentiment, political uncertainty can form a condition for mispricing in the financial markets. Therefore, we examine how political uncertainty affects the relations among firms' operational complexity, disclosure complexity, and firm conglomerate discount.

We measure political uncertainty using the Economic Policy Uncertainty (EPU) index developed by Baker, Bloom, and Davis (2016), which combines newspaper coverage of policy-related uncertainty, the number of federal tax code provisions set to expire, and the dispersion of professional economic forecasts. The EPU index provides a standardized time-series measure of country-level policy uncertainty and has been widely adopted to examine the impact of political risk on firm investment, financial policy, and valuation (e.g., Gulen & Ion, 2016; Kelly, Pastor, & Veronesi, 2016).

Like in the previous section, we split our sample by the median scores of unreadability. In the low-unreadability group of Columns (5) and (6), the coefficients for HHI diversification are negative but statistically insignificant, suggesting that when disclosures are easier to read and understand, the market does not systematically penalize diversified firms. Political uncertainty is also insignificant in this subsample, and so is its interaction with diversification, implying that transparent disclosures help insulate firms from the added valuation frictions associated with

political risk. Notably, in the high-unreadability group of Columns (7) and (8), diversification has a strong and negative association with excess value (-0.210 to -0.396 , both significant), reaffirming that disclosure opacity deepens the conglomerate discount. Political uncertainty enters positively and significantly, though weakly in magnitude (0.003), suggesting that when there is a lack of transparency from corporations, the market gives them higher valuations, probably because they attribute unreadable reports to political uncertainty. More importantly, the interaction term between diversification and political uncertainty, *HHI Diversification*Uncertainty*, is positive and significant (0.002 , $p < 0.01$). These findings highlight that, under opaque disclosure environments, political uncertainty helps reduce the negative impact of operational complexity on firms' excess value. It is possible that because diversified corporations have internal capital market systems that can help navigate through uncertain times. Volatile political environments, coupled with firms' opaque disclosures, make investors put them in more favor.

Overall, our findings show that political uncertainty does not matter much when disclosures are clear, but in high-unreadability settings, it has limited moderating effects in mitigating conglomerate discounts among highly diversified firms.

6. CONCLUSION

Our paper demonstrates that operating complexity and disclosure complexity are jointly central to understanding the conglomerate discount. We develop a signal-extraction framework in which investors value firms based on complex filing reports and apply a risk penalty that endogenously depends on both operational complexity and disclosure transparency. The key theoretical prediction—a negative cross-partial between transparency and diversification—implies that enhancing disclosure clarity generates the greatest valuation gains for highly diversified firms, whereas disclosure opacity disproportionately penalizes complex, multi-segment organizations.

Our empirical results show that, separately, organizational complexity (measured by HHI Diversification) and informational complexity (measured by a textual composite of complexity) have significant and negative effects on firms' excess value. Additionally, we analyze how the conglomerate discount evolves before, during, and after the implementation of firm diversification strategies. Our findings provide evidence that excess value drops after diversification, while information complexity rises, and greater information complexity is associated with a significant conglomerate discount.

To disentangle the part of information complexity that is created by managerially influenced disclosure transparency, we construct a residualized measure of disclosure complexity, Unreadability, that removes variation explained by operational complexity. We find that both diversification and unreadability independently and significantly contribute to lower excess value. We further reveal through a causal machine learning analysis that the average treatment effect of unreadability on value is small overall, but the effect is highly heterogeneous: unreadability amplifies the conglomerate discount when operating complexity is high. Our further analysis indicates that readability moderates the impact of broader market forces. When disclosures are opaque, investor sentiment and policy uncertainty can exert influence on the conglomerate discount and sometimes moderate the relationship between operational complexity and excess value.

Overall, the theory and evidence suggest that the conglomerate discount is not merely an organizational by-product of operating complexity, but also a manifestation of managerial choice on disclosure transparency. These findings carry practical implications. For managers, enhancing transparency through narrative clarity, more granular segment detail, and clean performance bridges from reported profit to organic performance provides a means to mitigate the information costs without sacrificing strategic scope. For investors, incorporating disclosure complexity into the assessment of multi-segment firms can improve estimates of intrinsic value and required returns. For regulators, promoting accessible and transparent disclosures is likely to enhance price discovery, particularly for complex issuers where information asymmetry is most pronounced.

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Table 1. Summary statistics

This table reports descriptive statistics for the main variables. Panel A reports descriptive statistics for the full sample across key variables used in the analysis. Panel B compares descriptive statistics between multi-segment and single-segment firms. The last column reports mean differences between multi-segment and single-segment firms, with statistical significance indicated by *p*-values. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Descriptive statistics for the full sample

Variables	Obs.	Mean	Std. Dev.	Median
BO Excess Value	105,959	-0.061	0.869	0.000
HHI Diversification	105,636	0.159	0.237	0.000
Info Complexity	57,524	0.399	0.165	0.374
Size	105,921	6.031	1.994	5.832
ROA	105,657	-0.014	0.231	0.033
Profitability	105,193	0.041	0.171	0.067
Market Cap	105,637	3.223	9.515	0.339
Tangibility	105,784	0.293	0.248	0.213
Leverage	105,882	0.256	0.245	0.220
Cash Ratio	105,680	0.171	0.198	0.091
Capx Intensity	104,826	0.058	0.065	0.039
ROE Volatility	104,941	0.545	1.304	0.126
Age	105,959	17.329	15.329	12.000
Dividend Payer	105,959	0.332	0.471	0.000

Panel B: Descriptive statistics for multi-segment firms and single-segment firms

Variables	Multi-Segment				Single-Segment				Diff
	Obs.	Mean	Std. Dev.	Median	Obs.	Mean	Std. Dev.	Median	
BO Excess Value	40,960	-0.137	0.915	-0.103	64,999	-0.013	0.835	0.000	-0.124***
HHI Diversification	40,637	0.413	0.204	0.445	.	.	.	.	.
Info Complexity	23,812	0.427	0.174	0.401	33,712	0.380	0.155	0.357	0.047***
Size	40,947	6.755	2.095	6.729	64,974	5.574	1.782	5.394	1.180***
ROA	40,766	0.003	0.195	0.035	64,891	-0.025	0.251	0.031	0.027***
Profitability	40,532	0.057	0.131	0.070	64,661	0.032	0.191	0.065	0.025***
Market Cap	40,762	5.018	12.097	0.680	64,875	2.096	7.225	0.236	2.922***
Tangibility	40,869	0.302	0.231	0.238	64,915	0.287	0.257	0.196	0.016***
Leverage	40,935	0.275	0.221	0.255	64,947	0.245	0.258	0.188	0.030***
Cash Ratio	40,772	0.126	0.148	0.071	64,908	0.200	0.219	0.112	-0.074***
Capx Intensity	40,458	0.053	0.053	0.038	64,368	0.062	0.071	0.039	-0.009***
ROE Volatility	40,706	0.433	1.147	0.098	64,235	0.615	1.390	0.152	-0.182***
Age	40,960	23.110	17.245	19.000	64,999	13.687	12.701	9.000	9.424***
Dividend Payer	40,960	0.466	0.499	0.000	64,999	0.247	0.431	0.000	0.219***

Table 2. Operational complexity, information complexity, and conglomerate discount

This table reports regressions of the conglomerate discount on operational complexity and information complexity. The conglomerate discount is measured by BO Excess Value (Berger & Ofek, 1995). Operational complexity is proxied by one minus the Herfindahl–Hirschman Index (HHI) of segment sales, labeled as HHI Diversification. Information complexity is measured using the Loughran–McDonald text-based complexity index. Control variables are lagged by one year. All specifications include high-dimensional fixed effects (HDFE) that absorb firm and year effects. Robust standard errors clustered at the firm level are reported in parentheses. ***, *, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	BO Excess Value	
	(1)	(2)
HHI Diversification	-0.182*** (0.050)	
Info Complexity		-0.275*** (0.076)
Size_{t-1}	0.001 (0.016)	0.013 (0.021)
ROA_{t-1}	0.182*** (0.045)	0.127** (0.051)
Profitability_{t-1}	0.485*** (0.086)	0.609*** (0.103)
Market Cap_{t-1}	0.007*** (0.001)	0.007*** (0.002)
Tangibility_{t-1}	-0.064 (0.093)	-0.107 (0.127)
Leverage_{t-1}	0.230*** (0.053)	0.233*** (0.068)
Cash Ratio_{t-1}	0.825*** (0.069)	0.940*** (0.084)
Capx Intensity_{t-1}	0.594*** (0.142)	0.875*** (0.183)
ROE Volatility_{t-1}	-0.004 (0.009)	0.000 (0.012)
Log(Age_{t-1})	-0.123*** (0.023)	-0.146*** (0.032)
Dividend Payer_{t-1}	0.080*** (0.022)	0.052* (0.029)
Constant	-0.014 (0.119)	0.021 (0.159)
HDFE	YES	YES
Adj. R²	0.6019	0.620
# of Obs	35,947	22,139

Table 3. Conglomerate discount and information complexity around diversification years

This table reports the evolution of the conglomerate discount and information complexity before diversification (T-1), in the diversification year (T), and after diversification (T+1). Panel A presents the mean and median of firm value and information complexity across the three periods. The conglomerate discount is measured by BO Excess Value (Berger & Ofek, 1995). Information complexity is measured using the Loughran–McDonald text-based complexity index. Panel B reports the mean differences between the pre- and post-diversification periods, along with the corresponding t-statistics. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Summary statistics of conglomerate discount and information complexity

	Mean	Median	Std. Dev.	#of Obs
Before diversification (T-1)				
BO Excess Value	0.023	0.000	0.872	1,756
Info Complexity	0.349	0.324	0.150	1,079
Diversification year (T)				
BO Excess Value	-0.108	-0.075	0.935	3,238
Info Complexity	0.386	0.361	0.158	2,202
After diversification (T+1)				
BO Excess Value	-0.172	-0.098	0.961	2,434
Info Complexity	0.405	0.381	0.164	1,685

Panel B: The mean differences between the pre- and post-diversification periods

	After–Before Diff	t-value
BO Excess Value	-0.194***	-6.707
Complexity	0.056***	9.052

Table 4. Construction of disclosure complexity

This table reports the tests to construct a residualized measure of disclosure complexity, *Unreadability*. Panel A shows an OLS regression of information complexity on operational complexity and other firm-level fundamentals, including size, age, and leverage, all lagged by one year. Information complexity is measured using the Loughran–McDonald text-based complexity index. Operational complexity is proxied by one minus the Herfindahl–Hirschman Index (HHI) of segment sales, labeled as HHI Diversification. Unreadability is the variable that contains residuals from this OLS regression, capturing the part of information complexity that is not created by operational complexity. Panel B shows the second-stage results of a two-stage Fama–MacBeth regression of firm-level unreadability betas on operational complexity. Standard errors clustered at the firm level are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

<i>Panel A: OLS regression of information complexity on operational complexity</i>	
Variables	Information Complexity
HHI Diversification	0.035*** (0.007)
Size_{t-1}	0.011*** (0.002)
Log(Age_{t-1})	-0.004 (0.003)
Leverage_{t-1}	0.095*** (0.007)
Constant	0.618*** (0.118)
Firm Fixed Effects	YES
Year Fixed Effects	YES
R²	0.125
# of Obs	23,251
<i>Panel B: Second-stage Fama–MacBeth regression of unreadability betas on operational complexity</i>	
	Unreadability β
HHI Diversification	-2.617** (1.214)
R²	0.003
# of Obs	1,681

Table 5. Operational complexity, disclosure complexity, and conglomerate discount

This table reports regressions of the conglomerate discount on operational complexity and disclosure complexity. The conglomerate discount is measured by BO Excess Value (Berger & Ofek, 1995). Operational complexity is proxied by one minus the Herfindahl–Hirschman Index (HHI) of segment sales, labeled as HHI Diversification. Disclosure complexity is measured by unreadability, the residuals from the OLS regression of information complexity on operational complexity and other firm-level fundamentals. Control variables are lagged by one year. All specifications include high-dimensional fixed effects (HDFE) that absorb firm and year effects. Robust standard errors clustered at the firm level are reported in parentheses. ***, *, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Variables	BO Excess Value	
	(1)	(2)
Unreadability	-0.260*** (0.077)	-0.263*** (0.077)
HHI Diversification		-0.173*** (0.064)
Size_{t-1}	0.006 (0.021)	0.010 (0.021)
ROA_{t-1}	0.124** (0.051)	0.123** (0.051)
Profitability_{t-1}	0.622*** (0.103)	0.606*** (0.103)
Market Cap_{t-1}	0.007*** (0.002)	0.007*** (0.002)
Tangibility_{t-1}	-0.100 (0.127)	-0.109 (0.128)
Leverage_{t-1}	0.228*** (0.068)	0.233*** (0.068)
Cash Ratio_{t-1}	0.946*** (0.085)	0.936*** (0.085)
Capx Intensity_{t-1}	0.871*** (0.184)	0.861*** (0.184)
ROE Volatility_{t-1}	0.000 (0.012)	0.000 (0.012)
Log(Age_{t-1})	-0.147*** (0.033)	-0.146*** (0.033)
Dividend Payer_{t-1}	0.053* (0.029)	0.053* (0.029)
Constant	-0.053 (0.157)	-0.005 (0.158)
HDFE	YES	YES
Adj. R²	0.620	0.620
# of Obs	22,020	22,020

Table 6. Treatment effects of disclosure complexity on conglomerate discount

This table reports the treatment effects of disclosure complexity on the conglomerate discount at different levels of operational complexity. The conglomerate discount is measured by BO Excess Value (Berger & Ofek, 1995). Operational complexity is proxied by one minus the Herfindahl–Hirschman Index (HHI) of segment sales, labeled as HHI Diversification. Disclosure complexity is measured by unreadability, the residuals from the OLS regression of information complexity on operational complexity and other firm-level fundamentals. Average treatment effects (ATE) capture the mean impact of high unreadability on BO Excess Value. POmean represents the potential outcome mean for firms with low unreadability. Heterogeneity tests (χ^2) assess whether treatment effects vary across firms, while projection coefficients indicate whether HHI Diversification predicts cross-sectional variation in treatment effects. Standard errors are clustered at the firm level.

Estimate: BO Excess Value	Coefficient	Std. Error	p-value	95% CI Lower	95% CI Upper
Average Treatment Effect (ATE)	-0.001	0.009	0.886	-0.018	0.016
POmean (if high_unread = 0)	-0.139	0.007	0.000	-0.153	-0.124
Heterogeneity test: χ^2	9.500	-	0.002	-	-
Projection: HHI Diversification	-0.094	0.043	0.027	-0.178	-0.011

Table 7. Investor sentiment and political uncertainty

This table reports OLS regressions of the conglomerate discount on investor sentiment and political uncertainty in subsamples of firms with low unreadability and high unreadability. The conglomerate discount is measured by BO Excess Value (Berger & Ofek, 1995). Operational complexity is proxied by one minus the Herfindahl–Hirschman Index (HHI) of segment sales, labeled as HHI Diversification. Investor sentiment is measured by the Baker–Wurgler sentiment composite index. Political uncertainty is measured by the Economic Policy Uncertainty (EPU) index developed by Baker, Bloom, and Davis (2016). Control variables are lagged by one year. All specifications include high-dimensional fixed effects (HDFE) that absorb firm and year effects. Robust standard errors clustered at the firm level are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	BO Excess Value							
	Low-Unreadability		High-Unreadability		Low-Unreadability		High-Unreadability	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
HHI Diversification	-0.082 (0.056)	-0.081 (0.057)	-0.210*** (0.034)	-0.206*** (0.035)	-0.082 (0.056)	-0.137 (0.107)	-0.210*** (0.034)	-0.396*** (0.072)
Investor Sentiment	3.413 (4.211)	3.420 (4.212)	0.222** (0.107)	0.235** (0.108)				
HHI Div.*Sentiment		-0.008 (0.043)		-0.028 (0.031)				
Political Uncertainty					-0.247 (0.305)	-0.249 (0.305)	0.003** (0.001)	0.002 (0.001)
HHI Div.*Uncertainty						0.000 (0.001)		0.002*** (0.001)
Size_{t-1}	0.016 (0.016)	0.015 (0.016)	-0.008 (0.009)	-0.008 (0.009)	0.016 (0.016)	0.016 (0.016)	-0.008 (0.009)	-0.007 (0.009)
ROA_{t-1}	0.080 (0.077)	0.080 (0.077)	0.210*** (0.036)	0.209*** (0.036)	0.080 (0.077)	0.080 (0.077)	0.210*** (0.036)	0.210*** (0.036)
Profitability_{t-1}	0.738*** (0.119)	0.739*** (0.119)	0.385*** (0.065)	0.386*** (0.065)	0.738*** (0.119)	0.739*** (0.119)	0.385*** (0.065)	0.384*** (0.065)
Market Cap_{t-1}	0.006*** (0.002)	0.006*** (0.002)	0.007*** (0.001)	0.007*** (0.001)	0.006*** (0.002)	0.006*** (0.002)	0.007*** (0.001)	0.007*** (0.001)
Tangibility_{t-1}	-0.032 (0.101)	-0.032 (0.101)	-0.064 (0.060)	-0.063 (0.060)	-0.032 (0.101)	-0.030 (0.101)	-0.064 (0.060)	-0.061 (0.060)
Leverage_{t-1}	0.238*** (0.064)	0.238*** (0.064)	0.238*** (0.036)	0.238*** (0.036)	0.238*** (0.064)	0.238*** (0.064)	0.238*** (0.036)	0.239*** (0.036)

Cash Ratio_{t-1}	0.887*** (0.079)	0.887*** (0.079)	0.777*** (0.054)	0.777*** (0.054)	0.887*** (0.079)	0.888*** (0.079)	0.777*** (0.054)	0.777*** (0.054)
Capx Intensity_{t-1}	0.778*** (0.202)	0.777*** (0.202)	0.451*** (0.123)	0.451*** (0.123)	0.778*** (0.202)	0.777*** (0.202)	0.451*** (0.123)	0.448*** (0.123)
ROE Volatility_{t-1}	-0.007 (0.011)	-0.007 (0.011)	-0.002 (0.005)	-0.002 (0.005)	-0.007 (0.011)	-0.007 (0.011)	-0.002 (0.005)	-0.002 (0.005)
Log(Age_{t-1})	-0.142*** (0.026)	-0.142*** (0.026)	-0.113*** (0.015)	-0.113*** (0.015)	-0.142*** (0.026)	-0.142*** (0.026)	-0.113*** (0.015)	-0.113*** (0.015)
Dividend Payer_{t-1}	0.054** (0.025)	0.054** (0.025)	0.084*** (0.017)	0.085*** (0.017)	0.054** (0.025)	0.054** (0.025)	0.084*** (0.017)	0.084*** (0.017)
Constant	-1.042 (0.863)	-1.044 (0.863)	0.044 (0.069)	0.043 (0.069)	33.627 (42.126)	33.886 (42.130)	-0.344 (0.214)	-0.276 (0.215)
HDFE	YES	YES	YES	YES	YES	YES	YES	YES
Adj. R²	0.065	0.065	0.040	0.040	0.031	0.030	0.040	0.041
# of Obs	11,436	11,436	25,585	25,585	11,436	11,436	25,585	25,585

Table A1 Variable Definitions

This table provides definitions and data sources for the variables used in the regression analyses.

Variable	Definition / Measurement	Source
BO Excess Value	Conglomerate discount, measured as the ratio of actual firm value to imputed sum-of-parts value (using median segment multiples), following Berger & Ofek (1995).	Compustat, CRSP
HHI Diversification	Herfindahl index of firm sales across business segments. Higher values = more concentrated.	Compustat Segment Data
Size	Natural log of total assets (in \$ millions). Lagged by one year.	Compustat
ROA	Operating income before depreciation / total assets. Lagged one year.	Compustat
Profitability	EBITDA / total assets. Lagged one year.	Compustat
Market Cap	Natural log of market capitalization (price $\times$ shares outstanding). Lagged one year.	CRSP
Tangibility	Net PPE / total assets. Lagged one year.	Compustat
Leverage	Total debt / total assets. Lagged one year.	Compustat
Cash Ratio	Cash & short-term investments / total assets. Lagged one year.	Compustat
Capex Intensity	Capital expenditures / total assets. Lagged one year.	Compustat
ROE Volatility	Standard deviation of return on equity over prior 5 years. Lagged one year.	Compustat
Log(Age)	Natural log of firm age since first Compustat appearance (IPO or incorporation year).	Compustat, CRSP
Dividend Payer	Indicator = 1 if firm pays common dividends in year t, 0 otherwise.	Compustat