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Do Asset-Light Strategies Compromise Information Transparency in Hotels?

Abstract

This study examines the impact of asset-light strategies on informed trading in the hotel industry, focusing on how intangible assets influence information asymmetry in financial markets. The empirical application uses a sample of 36,667 observations from U.S. hotel firms and analyzes whether the reliance on intangible resources increases the likelihood of informed trading in options markets. Findings suggest that asset-light models, characterized by reduced ownership of physical assets, increase information asymmetry because of the difficulty of valuing intangible assets, leading to greater opportunities for informed trading, particularly by sophisticated investors. The study contributes to the literature on resource-based view, signaling theory, and information asymmetry by emphasizing the transparency challenges hotels face in conveying the value of intangible assets. From these results, managers should adopt innovative signaling strategies to mitigate risks associated with information asymmetry and optimize their asset-light approach.

Keywords: asset-light model; stock options; hotel's market value; resource-based view; signaling theory; information asymmetry.

1. Introduction

The hotel industry has increasingly adopted an asset-light strategy, wherein companies prioritize managing and franchising operations over owning physical assets (Ji et al., 2024; Seo et al., 2021). This approach enables hotel firms to reduce capital expenditures and scale more rapidly, allowing them to focus on higher-margin revenue streams such as brand management, marketing, and loyalty programs (Bourke et al., 2020). The asset-light strategy aligns with broader industry trends where companies seek to optimize efficiency, improve profitability, and reduce risk by divesting from asset-heavy ownership models (Varadarajan et al., 2021). This structural shift has reconfigured the competitive landscape, with major players in the hotel sector increasingly relying on intangible assets, such as brand equity and customer relationships, as their primary sources of value creation (Ji et al., 2024).

The resource-based view offers a conceptual framework for examining the effects of this strategy. It suggests that companies can secure a competitive advantage by leveraging resources that are “unique, valuable, and inimitable resources” (Barney, 1991; Barney & Arikan, 2001). For hotels employing an asset-light strategy, intangible resources, such as brand reputation, managerial expertise, and customer loyalty, become central to driving profitability (Anguera-Torrell & Nicolau, 2023). Yet unlike physical assets, the value of these intangible assets is often harder to quantify and verify, leading to greater valuation uncertainty for outside investors. This opacity increases the likelihood of information asymmetry in capital markets (Li & Singal, 2019).

Information asymmetry arises when one party in a transaction possesses more or better information than another (Akerlof, 1970), a scenario that is particularly prevalent in firms with asset-light models (Ji et al., 2024). The reliance on intangible assets, which are not easily observable or quantifiable, further exacerbates this asymmetry. In such environments, sophisticated market participants, such as institutional investors or insiders, may use their informational advantages to engage in informed trading, particularly in derivatives markets such as options (Cao, 1999; Ni et al., 2008). Signaling theory further complements this view (Spencer, 1973), suggesting that firms might attempt to diminish information asymmetry by sending signals—such as earnings reports or strategic announcements—to the market (Kim & Nicolau, 2025). However, in the case of asset-light firms, these signals may be misinterpreted or insufficient. The difficulty lies in the nature of intangible resources—brand equity, customer loyalty programs, and management contracts—do not lend themselves to straightforward valuation. Earnings disclosures, for instance, aggregate revenues from multiple business models (franchised, managed, and owned units), masking the relative contribution of intangible assets to firm performance. Likewise, announcements about expansion or rebranding provide limited insight into the long-term financial implications of intangible resources, leaving investors uncertain about their durability and profitability.

These challenges are especially evident in the hotel industry, where institutional and operational characteristics further complicate the valuation of intangible assets. Franchise network complexity is one such feature. Since performance depends not only on the parent firm but also on heterogeneous franchisees operating across diverse markets, outside investors face difficulties evaluating revenue quality (Elsaman, 2022; Emerson, 2021). Brand tier segmentation adds another layer of opacity, as the same hotel group may simultaneously operate economy, midscale, and luxury brands, each with distinct customer bases, operating margins, and risk profiles. However,

financial disclosures typically report aggregate revenues and expenses, blurring these important differences (Li & Singal, 2019). Loyalty programs also present challenges: although they are widely recognized as critical to long-term value creation (Lee et al., 2014), their financial implications depend on customer retention, redemption patterns, and cross-brand usage (Hua et al., 2018). These factors are rarely disclosed in detail, leaving investors uncertain about the sustainability of such programs. Finally, the coexistence of multiple ownership and management models within the same firm generates a patchwork of reporting practices. For example, managed, franchised, and owned properties differ in revenue recognition methods, contractual obligations, and risk exposures, complicating efforts to derive a clear benchmark of firm performance (Mulet-Forteza et al., 2024). Together, these institutional features obscure the true sources of value in asset light hotel firms and intensify the degree of information asymmetry faced by investors. Even when companies attempt to communicate through traditional signals such as earnings calls, expansion announcements, or strategic updates (Kim & Nicolau, 2025), the opacity surrounding intangible resources prevents these signals from fully resolving uncertainty. As a result, asset light hotels tend to remain fertile ground for informed trading, with option markets offering a venue where information advantages are most likely to be capitalized upon.

More broadly, the literature shows that intangible assets exacerbate information asymmetry in general financial contexts (Brown & Martinsson, 2018; Lev et al., 2009). Complementing this perspective, evidence shows that investors price non-financial and environmental attributes (Sheng, 2025). Extending this view, studies highlight that both informational and behavioral frictions contribute to valuation inefficiencies, as market sentiment and investor biases may distort firm pricing (Cashman et al., 2020; Stambaugh et al., 2012). The hotel industry, however, introduces distinct mechanisms that intensify these dynamics. In particular, hotel-specific intangibles, such as franchise network complexity, brand tier segmentation, and loyalty programs (Seo et al., 2021), create valuation challenges that are uniquely complex to resolve using standard financial disclosures. Unlike many other industries, hotel firms often operate across multiple ownership and management models simultaneously (Ji et al., 2024; Sohn et al., 2013), may further compromise transparency.¹ These features render hotel intangibles especially opaque and susceptible to misvaluation by general market participants (Cashman et al., 2023; Kim & Zhang, 2014), reinforcing the relevance of studying the asset-light strategy in this sector. Consequently, both the hospitality and tourism fields can benefit from a more refined understanding of how financial market actors interpret and price these distinctive forms of hospitality capital.

Furthermore, building on emerging evidence that the hotel sector's resilience and performance during crises vary significantly based on internationalization strategies (Jung & Lee, 2025) and customer risk perceptions (Du et al., 2025) it becomes even more critical to understand how asset-light strategies interact with market mechanisms such as informed trading. Against this backdrop, our paper investigates whether the asset light strategy—by amplifying information asymmetry—creates conditions particularly conducive to informed options trading. In doing so, we highlight the broader implications of strategic choices for financial market behavior. Our approach

¹ In this paper, “transparency” refers specifically to the degree of information asymmetry between firm insiders and outside investors. A lower level of transparency (greater opacity) means that outside investors face more difficulty accessing or interpreting value-relevant information, which increases the scope for informed trading. Conversely, higher transparency indicates reduced information asymmetry, where market participants share a more equal access to information.

emphasizes that measures of asset tangibility and capital intensity are not substitutes for traditional information asymmetry proxies such as bid ask spreads or analyst forecast dispersion. Instead, we conceptualize them as structural antecedents that capture deeper, persistent sources of opacity tied to the hotel industry's move toward asset light models. This framing allows us to link corporate strategy with market outcomes in a novel way, extending beyond conventional market-based proxies to explain how strategic resource configurations shape informational frictions and, ultimately, trading dynamics.

2. Informational Transparency, Options Trading, and Asset-Light Strategy in the Hotel Industry

We begin the literature review with a discussion of the broad theoretical foundations that underpin our analysis, namely the resource-based view and signaling theory. We then integrate these two perspectives to develop a conceptual framework that explains how asset-light strategies form informational transparency. Building on this foundation, we turn to the finance literature on options trading, which highlights how informed investors act in markets characterized by information asymmetry. Finally, we contextualize these dynamics within the hotel industry and develop hypotheses that directly link asset-light strategies to informed trading in options markets.

2.1. Resource-Based View

The resource-based view posits that firms achieve and sustain competitive advantage through the possession and deployment of resources that are valuable, rare, inimitable, and non-substitutable (Barney, 1991; Peteraf, 1993). Tangible resources such as property, plant, and equipment traditionally provided hotels with verifiable signals of value and stability, making them relatively transparent to investors. However, the widespread adoption of asset-light strategies in the hotel industry has shifted the focus from tangible to intangible resources, including brand equity, customer loyalty, managerial expertise, and franchise networks. While these intangible resources align with resource-based view's criteria for sustained advantage, their valuation is inherently more complex and opaque, creating challenges for investors and analysts attempting to assess firm performance (Coff, 1999; Lev et al., 2009).

In this sense, the resource-based view provides a compelling perspective for analyzing the asset-light strategy: hotels reduce capital intensity and asset tangibility, but in doing so, they become more dependent on resources whose value is difficult to quantify. This dependence, while potentially strengthening competitive positioning, also introduces informational frictions that can influence trading dynamics in financial markets. As such, resource-based view highlights both the strategic logic of asset-light models and the transparency dilemmas they create for external stakeholders.

2.2. Signaling Theory

Signaling theory complements resource-based view by addressing how firms attempt to reduce information asymmetry through credible communication to the market (Spencer, 1973). In contexts where the value of intangible resources is not directly observable, firms rely on signals such as financial disclosures, earnings announcements, and strategic partnerships to convey their quality and reduce uncertainty. In the hotel industry, however, these signals may not always be effective because intangible resources—such as brand reputation or loyalty programs—are harder

to capture in financial statements, and traditional signals can be misinterpreted or undervalued by investors (Kim & Zhang, 2014).

This limitation has important implications for the asset-light strategy. If signals fail to fully reflect the value of intangible resources, information asymmetry persists, creating opportunities for informed trading, particularly in options markets. Options traders, often considered more sophisticated and better informed (Easley et al., 1998; Johnson & So, 2012), may exploit this asymmetry by acting on private or superior information. Signaling theory thus provides a critical complement to resource-based view: while the latter explains the strategic importance of intangible resources, the former illustrates the difficulties hotels face in communicating their value effectively to external stakeholders.

2.3. Integrating resource-based view and signaling theory

Resource-based view and signaling theory provide a comprehensive framework for understanding how asset-light strategies affect informational transparency. The resource-based view explains why intangible resources have become central to hotel performance, while signaling theory clarifies why these resources may not be adequately conveyed to the market. While the general relationship between information asymmetry and informed trading is well established, it has not been examined through proxies that are directly tied to the *strategic shift* in the hotel industry from asset-heavy to asset-light models. Asset tangibility and capital intensity capture this shift in ways that are not only theoretically grounded but also empirically observable, making them uniquely suited for identifying how business model transformations shape market transparency in hotels. This integration leads directly to our hypotheses: if intangible assets are strategically valuable but less transparent, then asset-light strategies will increase information asymmetry, prompting more informed trading in options markets. Conversely, hotels with higher asset tangibility and capital intensity are expected to experience reduced asymmetry, leading to lower levels of informed options trading.

2.4. Options Trading and Informational Flow

A large stream of finance literature shows that option traders are informed and that their transactions convey information about the underlying asset. Starting with Black (1975), researchers argue that, due to the higher leverage that the options market offers, informed traders may choose to use the options market as an alternative trading venue to exploit their informational advantage. Later, Ross (1976) further shows that derivatives trading can transmit information under asymmetric conditions. Over the decades, studies confirm the role of options in price discovery. For example, Easley et al. (1998) provide empirical evidence that options foster informed trading, while Cao (1999) finds options particularly appealing to investors with private information. Ni et al. (2008) show that informed traders use options to capitalize on volatility. Further, Pan and Poteshman (2006), Johnson and So (2012), Cashman et al. (2022b), Cashman, Harrison and Sheng (2025), Nimalendran et al. (2024), and Cashman, Harrison, Scheick, et al. (2025) show that option trading volume predicts future price changes, suggesting that options trading helps reduce information asymmetry. Sheng (2022) additionally highlights that the predictive power of options trading depends on stock-specific characteristics, while Cashman et al. (2024) find that innovations in annual reports impact options trading activity, highlighting another channel for informed trading. Furthermore, research by Roll et al. (2010) and Cashman et al. (2023) link active options trading to enhanced firm value, driven by greater informational

efficiency. This literature establishes a clear consensus that options markets provide a venue where informed traders act on private knowledge, and their trading conveys information about firm fundamentals. Importantly, active option trading does not create transparency in itself but rather reflects how informed traders exploit information asymmetry. In this way, option activity offers indirect yet powerful evidence of the informational frictions facing a firm.

To measure options trading activity, a substantial body of research focuses on the intensity of options trading volume. Studies show that option volume fluctuations anticipate stock market changes. For example, Cao et al. (2005) demonstrate that discrepancies in options trading activity serve as reliable indicators of future stock price movements. Pan and Poteshman (2006) use put-call ratios to show a negative relation with next-day returns. Along this line, Choy and Wei (2012) employ the ratio of option volume to open interest and find that shifts in option volume predict stock returns around earnings announcements. More recent work introduces the “relative option volume” (O/S)—option volume relative to stock volume—as a key metric. Roll et al. (2010) find O/S is systematically linked to firm attributes. Empirical analyses by Cashman et al. (2021), Cashman, Harrison, Scheick, et al. (2025) and Johnson and So (2012) show that higher O/S predicts future stock price declines, while Ge et al. (2016) attribute this to leverage effects, and Kim et al. (2017) provide evidence that investor sentiment affects such O/S-return relations. In this paper, we follow the most recent literature by using the relative option-to-stock volume ratio to measure the intensity of options trading activities in the hotel industry.

2.5. Asset Light Business Strategy in the Hotel Industry

Examining options trading activity in the hotel industry, particularly with the rise of the asset-light strategy (Seo et al., 2021), offer a unique opportunity to assess whether this business model enhances or diminishes informational transparency. While the asset-light strategy is primarily designed to improve operational efficiency and expand firm value (Sohn et al., 2013), its implications for capital markets remain less clear. By shifting from asset-heavy ownership toward brand management, franchising, and fee-based services (Ji et al., 2024; Seo et al., 2021), hotel firms fundamentally alter the nature of the resources on which they rely. This structural change not only reconfigures operating models but also transforms the type of information available to investors, raising important questions about how markets process signals from these firms.

As mentioned in the previous section, the finance literature establishes that options markets play a central role in price discovery and that options trading often reflects the actions of informed investors exploiting information asymmetries. In this context, examining how options traders incorporate signals about intangible assets—such as brand value, customer loyalty, and managerial expertise—into their decisions provides critical insight into whether the market is able to value asset-light strategies effectively. Yet, despite the centrality of these issues to hotel firms, the tourism and hospitality literature has largely overlooked the intersection of strategic business models and market-based informational frictions. Prior work has examined related themes such as resilience (Suder et al., 2025) and corporate culture (Phung & Nguyen, 2025), but no study has systematically analyzed how the adoption of an asset-light strategy shapes informational transparency in financial markets. Addressing this gap, our study investigates whether asset-light hotel firms, by amplifying reliance on hard-to-value intangibles, create conditions that foster informed trading in the options market.

Building on this, investor sentiment is also closely tied to informational transparency in such markets, which directly shapes how options trading unfolds (Choy & Wei, 2012; Johnson & So, 2012). If the asset-light strategy compromises transparency, then hotel firms may face greater levels of informed trading, which in turn may increase their cost of capital and suppress valuation. This makes transparency not only a financial reporting concern but also a strategic determinant of investor trust and market credibility (Akyildirim et al., 2025). To evaluate this link, we examine informational frictions through the lens of options markets, where trading activity is widely considered a proxy for informed participation. This approach enables us to test whether the asset-light strategy contributes to market inefficiency, where prices reflect available information less accurately and less promptly.

To investigate these dynamics empirically, it is necessary to clarify how asset light strategies are implemented and measured in the hotel industry. Hotels typically adopt such models in two main ways: by divesting existing properties to reduce fixed asset holdings or by limiting new investment in property, plant, and equipment. The literature highlights two common measures that capture the degree of this orientation: asset tangibility, which indicates dependence on physical holdings, and capital intensity, which reflects ongoing fixed investment (Li & Singal, 2019; Märklin & Bianchi, 2022; Sohn et al., 2013). These measures are not generic financial ratios but strategically significant variables that reflect the defining transformation of the hotel sector. Both measures thus operationalize the asset-light strategy in ways that connect corporate strategy to market transparency. By linking these proxies to informed options trading, our study adds incremental contribution: it demonstrates how the shift in asset structure alters financial market behavior, an insight that has not been systematically documented in prior research.

2.6. Hypothesis Development

By framing asset tangibility and capital intensity as strategic rather than generic proxies, we highlight their distinctive explanatory value in the hotel industry context. They do not simply restate the well-documented association between information asymmetry and informed trading; instead, they show how observable changes in hotel asset structures translate into measurable differences in market dynamics. This industry-specific connection is what allows our hypotheses to extend existing knowledge and provide incremental contribution.

To situate this argument within the broader literature, prior studies have shown that the type and quality of information disclosed by firms significantly influence options trading activity. For example, Cashman et al. (2024) provide evidence that a REIT firm's annual report plays a significant role in influencing options trading activity. Their findings suggest that annual reports are used as an important channel through which option traders acquire important information, ultimately shaping their trading decisions. Extending this logic to the hotel sector, the fundamental shift from asset heavy to asset light strategy may dramatically influence the identifiable information that annual reports could provide, making option traders more likely informed and leading to more options trading activities. This is because, tangible assets generally suffer from fewer information asymmetries than intangible assets (Brown & Martinsson, 2018), where tangible assets are easier to be evaluated by investors as compared to intangible assets. Thus, hotels with

fewer tangible assets may be more informationally opaque than asset-heavy firms, even though asset-light models aim for greater efficiency through brand management, franchising, and fee-based services. In such cases, sophisticated investors are more likely to gain a relative informational advantage in a less transparent environment, making options markets a key venue for exploiting that advantage.

On the other hand, the hotel industry is often subject to high volatility due to factors such as tourism trends, economic cycles, and geopolitical events (Du et al., 2025; Jung & Lee, 2025; Phung & Nguyen, 2025; Suder et al., 2025). When volatility stems from macroeconomic or sector-specific shocks, options may be used mainly as hedging instruments by less informed traders. In such cases, option activity may reflect risk management rather than the exploitation of private information. This would suggest that the informational role of options trading in hotels may differ from industries where informed trading is more prevalent. If this mechanism holds, hotel options trading would not predict future stock returns, and hotels with more tangible assets could even exhibit higher option intensity as investors hedge against asset-related risks.

Building on these theoretical and empirical foundations, we therefore pose two central research questions: 1) Is options trading in the hotel industry informed? 2) Do asset-light strategies increase information asymmetry? These questions guide our hypotheses below by linking firm-level strategy to option market behavior, with H1 addressing the first research question and H2 and H3 addressing the second.

Specifically, to examine these research questions, we first follow the recent literature by using option-to-stock volume ratio to measure the intensity of options trading activities, where the literature generally finds that option to stock volume ratios negatively forecast future stock returns (Blau et al., 2014; Cashman, Harrison, Scheick, et al., 2025; Cashman et al., 2021; Johnson & So, 2012; Sheng, 2022). This measure is particularly relevant because options markets, favored for their leverage and efficient incorporation of private information—as demonstrated in a general context by (Ge et al., 2016), are ideal for informed trading. When investors anticipate price declines but face equity market frictions such as short-sale constraints, they often substitute into options, embedding forward-looking information not yet reflected in stock prices. If the same mechanism applies in hotels, then hotel options trading activity should contain predictive content.

² Accordingly, we state our Hypothesis 1 as follows:

H1: Option-to-stock volume ratio negatively predicts the next-day stock returns in the hotel industry.

² We recognize that option markets encompass heterogeneous positions—calls versus puts, opening versus closing trades, and buy versus sell directions—each of which can, in principle, convey distinct signals. Ideally, disaggregating option volume along these dimensions would provide richer insights into the informational role of options. However, our dataset from OptionMetrics does not contain reliable identifiers for trade direction (buy vs. sell) or order initiation (opening vs. closing), making such decomposition infeasible in our setting. In light of this limitation, we follow a large body of prior research that aggregates option activity into the option-to-stock volume ratio (O/S) as a reduced-form proxy for informed trading (Blau et al., 2014; Cashman, Harrison, Scheick, et al., 2025; Cashman et al., 2021; Johnson & So, 2012). Prior evidence shows that O/S effectively captures the net informational content of option markets despite the underlying heterogeneity.

Having established the role of informed trading in hotel options markets, we next turn to the second question regarding asset-light strategies. The asset-light strategy fundamentally alters the nature of a hotel's assets, shifting emphasis from physical properties to brand management, franchising, and fee-based revenue models (Ji et al., 2024; Seo et al., 2021). This shift may have important informational implications. When firms hold more tangible assets, investors can benchmark value against property holdings, which serve as transparent and verifiable signals of financial stability (Brown & Martinsson, 2018). By contrast, reduced tangibility forces investors to rely on intangibles such as brand reputation, management contracts, or loyalty programs, which are likely harder to value and therefore potentially heighten information asymmetry. In this setting, options trading activity may become more prominent in asset light hotel firms, where informed traders capitalize on private knowledge of the hotel's financial health and strategic positioning.

As mentioned in Section 2.5, hotels adopt asset light strategies in two main ways: by divesting existing properties to lower fixed asset holdings or by limiting investments in new property, plant, and equipment (PPE). Following the literature, we employ two measures to gauge the extent of an asset-light strategy. The first, asset tangibility, reflects the share of a hotel's total assets accounted for by PPE and provides insight into the long term effects of shifting away from physical holdings. The second, capital intensity, measures the proportion of total assets allocated to capital expenditures, thereby indicating the hotel's yearly commitment to fixed asset investment.³

In the hotel industry, firms that remain asset heavy by investing in physical properties may signal stronger and more observable commitments, which may help reduce valuation uncertainty and limit the scope for informed trading. Similarly, hotels with high capital intensity reflect a continued reliance on physical assets rather than intangible drivers, thereby reducing information opacity. Under these conditions, option trading is less likely to intensify, since investors have less incentive to process and price information not already conveyed through conventional disclosures (Seo et al., 2021). From this perspective, we expect a negative relation between asset tangibility (capital intensity) and the option to stock volume ratio.⁴

H2a: Asset tangibility is negatively related to option-to-stock volume ratio in the hotel industry.

H2b: Capital intensity is negatively related to option to stock volume ratio in the hotel industry.

³ Given the rising popularity of the asset-light strategy in the hotel industry, both "asset tangibility and capital intensity" have been shown to decline over time, as documented in the asset-light literature (Li & Singal, 2019; Märklin & Bianchi, 2022; Sohn et al., 2013).

⁴ Asset tangibility and capital intensity are not intended as replacements for established market-based proxies of information asymmetry. Conventional measures such as bid-ask spreads and analyst forecast dispersion capture the immediate manifestations of asymmetry in trading environments. By contrast, asset tangibility and capital intensity represent structural antecedents that arise from the hotel industry's transition from asset-heavy to asset-light models. Our theoretical motivation for including these measures is rooted in the unique institutional and strategic context of the hotel sector. Unlike spreads or forecast dispersion, which reflect market conditions at a point in time, asset tangibility and capital intensity capture deeper and more persistent sources of informational opacity tied to a firm's strategic asset structure. In this sense, they complement, rather than duplicate, standard proxies by linking hotel firms' long-term resource decisions directly to the frictions observed in financial markets. By focusing on these structural characteristics, we highlight how the asset-light strategy generates enduring information frictions that shape option market behavior, thereby bridging corporate strategy with financial market outcomes in a way that conventional microstructure measures alone cannot.

While option to stock volume ratios capture the intensity of informed trading, they may not fully account for how market participants price uncertainty. To complement this measure, we also examine implied volatility as an alternative indicator of options trading activity. Higher trading intensity is often associated with higher implied volatility (Nandi, 2000), and prior research shows that financial reporting opacity is positively related to implied volatility (Kim & Zhang, 2014). Conversely, when firms improve the precision of their core earnings information, systematic risk and return volatility decline (Dempsey et al., 2015), highlighting how greater informational clarity stabilizes investor expectations. In the context of hotel firms, a larger share of intangible assets reduces transparency, potentially leading to more options trading and elevated implied volatility. This is particularly relevant given the rapid adoption of asset light strategies in the hotel industry (Li & Singal, 2019; Rogers et al., 2024; Sohn et al., 2013).

By contrast, tangible assets provide collateral value and verifiable benchmarks that mitigate uncertainty, while capital intensive investments in physical properties serve as credible commitments of long-term stability, thereby lowering investors' perception of risk. Asset light firms, which rely more heavily on brand reputation, management contracts, and loyalty programs, lack these stabilizing signals and expose investors to greater ambiguity, potentially resulting in higher implied volatility. If asset light strategies increase informational opacity, we therefore expect lower asset tangibility and capital intensity to be associated with higher implied volatility. Accordingly, we hypothesize that asset tangibility (capital intensity) is negatively related to implied volatility in the hotel sector:

H3a: Asset tangibility is negatively related to implied volatility in the hotel industry.

H3b: Capital intensity is negatively related to implied volatility in the hotel industry.

Together these hypotheses implement the logic set out by our research questions. If options trading in hotels is informed, O/S should forecast next day returns. If asset light strategies heighten opacity, then lower asset tangibility and lower capital intensity should be associated with more intense options trading and with higher implied volatility. These allow us to separate informed trading from hedging motivated activity and to link firm level strategic choices to measurable market outcomes.

3. Data and Methods

3.1. Sample Construction

Our financial and share price data are sourced from multiple databases, including Compustat (quarterly), Thomson Reuters CDA/Spectrum Institutional Holdings dataset (SEC Form 13F), IBES, and the Center for Research in Security Prices (CRSP). To ensure industry relevance, we identify hotel firms using the Standard Industrial Classification (SIC) code 7011, which corresponds to Hotels and Motels. The OptionMetrics Ivy DB U.S. database provides our daily option trading data from January 1996 to June 2021.⁵ To ensure data reliability, we exclude hotel

⁵ Due to data availability, our options data sample spans from January 1996 to June 2021. Additionally, the property tax data from the Lincoln Institute of Land Policy is available only through 2022. Therefore, we set June 2021 as the endpoint for our sample period to ensure consistency across datasets.

firms with negative bid or ask prices and remove data points where the bid-ask spread is negative. We then merge our option data with financial data and remove observations with missing values, the final sample yields 36,667 firm-day observations with 24 unique publicly traded hotel firms.

We focus specifically on U.S. listed hotel firms because the U.S. hosts the world’s most mature and liquid options market, characterized by deep trading volume, strong regulatory frameworks, and broad investor participation. In comparison, options markets in other countries tend to be less developed, with lower liquidity, fewer listed securities, and varying market structures that could influence trading behavior and the informational role of options (The WFE Statistics Team, 2024).⁶ By concentrating on the U.S. market, we are able to examine the relation between asset-light strategies, intangible assets, and market behavior in a setting that minimizes confounding effects from less mature markets.

Figure 1 presents the percentage of publicly traded hotel firms that had exchange-traded options available from January 1996 to June 2021. Over this 24.5-year span, the proportion of hotels with listed options showed an upward trajectory, rising from approximately 20% in 2001 to nearly 50% by mid-2021, with an overall average of 37.42%. This trend is consistent with and extends previous findings by Cashman et al. (2023), who documented a sharp increase in the proportion of real estate investment trusts (REITs) with exchange-traded options, rising from approximately 10% in 2000 to nearly 90% by 2015.⁷ Notably, both REITs and hotels experienced a significant expansion in options coverage beginning around 2000.

3.2.Key Variable Construction

To systematically present our measures, we group key variables into three categories: (i) options trading activity, (ii) raw and abnormal stock returns, and (iii) asset-light strategy and related controls.

3.2.1. Options Trading Activity

Following Roll et al. (2010), we employ the option-to-stock volume ratio (O/S) and its dollar-denominated counterpart (dO/S) as measures of firm-level options trading activity. Prior studies indicate that O/S ratios often exhibit skewness, but applying a natural logarithm transformation improves their suitability for linear regression analysis (Cashman et al., 2021; Sheng, 2022). Consequently, we utilize the logged values of O/S and dO/S throughout this study and, for simplicity, refer to this adjusted measure as the “relative option-to-stock volume ratio”. These are defined as follows:

$$OPVOL/SHR_{i,t} = Ln \left(\frac{OPVOL_{i,t} \times 100}{\# \text{ of Share Outstanding}_{i,t}} \right), \quad (1)$$

⁶ <https://www.investopedia.com/articles/active-trading/030215/us-options-market-regulations.asp>

⁷ Cashman et al. (2023) also show that the share of non-REIT firms with options exhibited steady growth during the period studied in this analysis.

$$dOPVOL/SHR_{i,t} = \text{Ln} \left(\frac{(Obid_{i,t} + Oask_{i,t})}{2} \times \frac{OPVOL_{i,t} \times 100}{\# \text{ of Share Outstanding}_{i,t}} \right), \quad (2)$$

$$EQVOL/SHR_{i,t} = \text{Ln} \left(\frac{EQVOL_{i,t}}{\# \text{ of Share Outstanding}_{i,t}} \right), \quad (3)$$

$$\text{LN}(O/S_{i,t}) = OPVOL/SHR_{i,t} - EQVOL/SHR_{i,t}. \quad (5)$$

$$\text{LN}(dO/S_{i,t}) = dOPVOL/SHR_{i,t} - EQVOL/SHR_{i,t}. \quad (6)$$

$OPVOL_{i,t}$ ($dOPVOL_{i,t}$) denotes the relative (dollar) option volume for hotel i on day t , $Obid_{i,t}$ ($Oask_{i,t}$) are the end-of-day best bid and ask option prices for hotel i , $\# \text{ of Shares Outstanding}_{i,t}$ indicates the number of shares outstanding for hotel i on day t and $EQVOL_{i,t}$ denotes the total stock trading volume. Since each option contract represents 100 shares, we adjust option volumes by multiplying by 100 to ensure comparability with equity trading volumes. Figure 2 displays the yearly volume of option trading throughout the sample period, illustrating trends and variations in trading activity across the analyzed timeframe. On average, hotel firms in our dataset exhibit an annual options trading volume of 73,897 contracts, equivalent to approximately 7.39 million shares per hotel.

As indicated in hypothesis development section, we also use implied volatility as an alternative measure of options trading activity. Specifically,

$$IMPVOL_{i,t} = \frac{\sum IMPVOL_{i,t,m}}{\# \text{ of Contract}_{i,t}}, \quad (7)$$

$IMPVOL_{i,t}$ refers to the implied volatility for hotel i on day t , $\# \text{ of Contract}_{i,t}$ indicates the number of option contract trades for hotel i on day t , and $IMPVOL_{i,t,m}$ represents the implied volatility for hotel i at the end of day t for contract m , where the implied volatility is calculated via binomial interpolation.⁸

3.1.1. Raw and Abnormal Stock Returns

To capture broader market movements, we consider not only the raw daily stock returns ($RET_{i,t}$) of hotel firms but also the abnormal returns derived from the CAPM market model (Mkt_AR_{t+1}), the Fama-French three-factor model ($FF3_AR_{t+1}$), and the Fama-French four-factor model, which includes the momentum factor ($FF4_AR_{t+1}$), as a robustness check.

Specifically, we estimate expected returns ($\widehat{RET}_{i,t}$) using the CAPM market model, applying a rolling window of the past 256 trading days (with a minimum of 128 trading days of available data). The CRSP value-weighted return index ($RET_{m,t}$) is used to represent market returns, while the one-month Treasury bill rate serves as the risk-free rate (rf_t). The abnormal returns ($AR_{i,t}$) are

⁸ The implied volatility for each option contract is obtained directly from the data vendor OptionMetrics, which calculates implied volatility using binomial interpolation.

then calculated as the difference between a hotel's actual raw daily stock returns ($RET_{i,t}$) and its expected returns. Mathematically, this can be expressed as follows:

$$AR_{i,t} = RET_{i,t} - \widehat{RET}_{i,t}, \quad (8)$$

$$\text{where: } \widehat{RET}_{i,t} = \alpha_i + rf_t + \widehat{\beta}_i(RET_{m,t} - rf_t). \quad (9)$$

The existing literature has well shown that small-cap and value stocks tend to outperform large-cap and growth stocks (Fama & French, 1993). Additionally, the literature (Carhart, 1997) has also demonstrated that stocks with strong past performance tend to continue outperforming in the near term. As such, to incorporate additional risk factors beyond market returns to estimate abnormal returns, we follow a similar estimation approach and extend the analysis beyond the CAPM-based abnormal returns by also employing the Fama-French three-factor model ($FF3_AR_{t+1}$) and the Fama-French three-factor model plus the momentum factor ($FF4_AR_{t+1}$). The expected returns for these models are calculated using the following estimation methods.

$$\widehat{RET}_{i,t} = \alpha_i + rf_t + \widehat{\beta}_{1i}(RET_{m,t} - rf_t) + \widehat{\beta}_{2i}SMB_t + \widehat{\beta}_{3i}HML_t, \quad (10)$$

$$\widehat{RET}_{i,t} = \alpha_i + rf_t + \widehat{\beta}_{1i}(RET_{m,t} - rf_t) + \widehat{\beta}_{2i}SMB_t + \widehat{\beta}_{3i}HML_t + \widehat{\beta}_{4i}UMD_t, \quad (11)$$

where SMB_t , HML_t , and UMD_t represent the Small Minus Big, High Minus Low, and Up Minus Down factors, respectively.⁹

3.1.2. Asset Light Strategy and Control Variables

As discussed in detail in the hypothesis development section, we measure the degree of asset-light strategy among hotel firms through two metrics: asset tangibility ($TangAssets$) and capital intensity ($TangCAPEX$). Asset tangibility is defined as a ratio of the hotel's PPE to total assets, whereas the capital intensity is calculated as capital expenditures over total assets.

To ensure robust inference, this study includes several control variables for multivariate analysis. Building on the literature (Cashman et al., 2021; Johnson & So, 2012; Roll et al., 2009, 2010), when conducting stock return predictability analysis (i.e. research question 1), we include current daily stock returns (RET), hotel size ($SIZE$), Amihud's (2002) stock illiquidity measure ($ILLIQ$), institutional ownership ($INSTOWN$), earnings announcement date (EPS_Dates), and stock turnover ($Turnover$). When conducting analysis for the second research question, we further control for hotel and option characteristics documented in the literature (Roll et al., 2009), such as option spreads ($Ospread$) and option delta ($DELTA$), number of analysts ($ANALYSTS$), analyst's dispersion ($ANALYSTS_DISP$), and stock volume ($EQVOL$) in our multivariate analysis. Given Sohn et al. (2013) indicate that expanding fee-based business and reducing fixed asset intensity positively impact hotel value, we further include hotel value ($TobinQ$) as a control variable to account for potential confounding effects when analyzing the impact of an asset-light strategy on hotel firms' options trading activities.

Specifically, $SIZE$ is defined as the hotel's total assets (in millions of dollars) from the hotel's most recent "quarterly earnings announcement". $ILLIQ$ is defined as daily ratio of the absolute hotel's daily stock return over that day's dollar trading volume. $INSTOWN$ is the percentage of shares

⁹ The factor information is obtained from <https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/index.html>.

outstanding held by institutions in the most recent quarter. *EPS_Dates* is a binary indicator that equals one if an earnings announcement occurs on a given day or within the following four days. This variable is designed to capture whether informed trading activity in the options market increases in the days leading up to an earnings announcement. If options traders anticipate and react to earnings disclosures, we expect *EPS_Dates* to be positively correlated with relative option-to-stock volume ratios. *Turnover* is defined as stock volume scaled by number of shares outstanding. *Ospread* serves as a direct proxy for trading costs within the options market. It is calculated as the average bid-ask spread, standardized by dividing it by the midpoint price, across all option contracts traded. *DELTA* measures the option price sensitivity to changes in the underlying stock price. For call options, a higher delta reflects greater responsiveness to changes in the stock price. Similarly, for put options, the delta also indicates sensitivity, but with the sign reversed to account for the inverse relationship between the option and the underlying asset. *ANALYSTS* shows the number of analysts providing EPS estimates in a particular quarter, while *ANALYSTS_DISP* is defined as the standard deviation across their one-year ahead earnings forecasts. *EQVOL* is the daily stock trading volume. *TobinQ* is calculated as the sum of the market value of equity and the book value of debt, divided by the book value of total assets.

3.2.Descriptive statistics

Table 1 presents descriptive statistics for key dependent and independent variables from January 1996 to June 2021. To aid interpretation, option volume measures are reported in raw form rather than log transformations. The mean O/S is 0.109, indicating hotel option volume averages 11% of hotel stock trading volume, consistent with Blau et al. (2014), who report 14% for all common stocks. The average daily stock return (RET) is 0.01%, with a median of -7.2%, suggesting hotel stocks underperformed relative to non-hotel stocks, where Blau et al. (2014) find a mean of 6% and median of 0% for the 1996–2012 period. In terms of asset tangibility (*TangAssets*), fixed assets account, on average, for 71% of hotel firms' total assets for our sample period, higher than the 52% reported by Li and Singal (2019). For capital intensity (*TangCAPEX*), capital expenditures account, on average, for 5.1% of hotel firms' total assets for our sample period, aligning with Li and Singal (2019) who reports a 5%.

With respect to option and hotel characteristics, daily average option spread (*Ospread*) in our sample is significantly larger than the average reported in literature for common stocks while implied volatility (*IMPVOL*) is very in line with the prior literature.¹⁰ The higher average *Ospread* observed in our sample suggests that hotel options are generally less liquid compared to options on common stocks. The average option deltas (*DELTA*) in our sample align with those reported in the literature. For example, Roll et al. (2010) present an average delta of 0.48 in their sample. This indicates that the sensitivity to changes in the underlying stock price is similar for hotels as compared to other firms. Regarding hotel size, the hotel firms in our sample have an average total asset value exceeding \$7.5 billion, with a median of \$5.3 billion. The average value of assets is in line with the literature.¹¹ For the rest of the firm characteristic variables, the averages in our sample are fairly consistent with prior studies (Cashman et al., 2023; Cashman et al., 2024; Johnson & So,

¹⁰ Roll et al. (2010) report an average *Ospread* of 0.21% and an average *IMPVOL* of 0.5 for all common stocks with options during the period from 1996 to 2007.

¹¹ Li and Singal (2019) reports an average size of 7.49 billion for their sample.

2012; Sheng, 2022).¹² This descriptive evidence provides context for our regression analyses. In the following section, we formally test whether hotel option activity predicts stock returns (H1) and whether asset tangibility and capital intensity influence both option trading intensity (H2) and implied volatility (H3).

4. Empirical Design and Results

We begin our empirical analysis by examining whether and the extent to which hotel option trading activity predicts subsequent stock performance. Following Johnson and So (2012), Ge et al. (2016), Cashman et al. (2021) and Cashman et al. (2022b), Cashman et al. (2021), and Cashman, Harrison, Scheick, et al. (2025), we utilize panel regression models, where we regress next day daily stock returns on our variables of interest as well as the full set of return determinants outlined previously. We also include quarterly time and firm fixed effects to further control for other unobserved time trends and firm-specific attributes.¹³ The results, presented in Table 2, show that in columns (1) and (2), both O/S and dO/S are negatively and significantly associated with the next day's raw stock returns. These significant negative coefficients suggest that hotel options trading activity can predict the underlying stock's performance. However, this negative relationship may reflect broader market movements. To address this concern, columns (3) and (4) replicate the baseline results, replacing raw stock returns with CAPM market model-based abnormal returns, Mkt_AR_{t+1} , where we continue to find that both O/S and dO/S negatively and significantly predict next-day abnormal stock returns.¹⁴ This suggests that options trading activity for hotels is also informed.

To provide further evidence, in Panel B, we incorporate additional risk factors beyond market returns to estimate abnormal returns. In columns (1) and (2), we replicate the baseline results from Panel A by replacing raw returns with abnormal returns based on the Fama-French three-factor model. Similarly, in columns (3) and (4), we extend the analysis by using the Fama-French three-factor model plus the momentum factor to estimate abnormal returns. The findings are highly consistent with those in Panel A of Table 2. In all columns of Panel B, both O/S and dO/S remain negatively and significantly associated with next-day abnormal returns.

Overall, the results of Table 2 suggest that options trading activity is a strong predictor of subsequent returns for hotel firms, in line with Hypothesis 1 that option-to-stock volume ratio negatively predicts the next day stock returns in the hotel industry. This result is also consistent with prior research (Johnson & So, 2012), which find that high relative option-to-stock ratios signal bad news. This further leads to our second hypothesis that hotels with a more asset-heavy strategy (which may indicate lower information asymmetry) exhibit less intense options trading activity.

¹² For example, Roll et al. (2010) report an average of 10.9 analysts and an average institutional ownership of 64.2% for common stocks, whereas Cashman et al. (2021), Cashman et al. (2022b), and Cashman et al. (2022a) report an average *INSTOWN* of 80% and above for REIT firms.

¹³ Results are qualitatively similar if we replace year-quarter fixed effects with daily fixed effects. The results are presented in Appendix A of the supplementary file.

¹⁴ The slightly lower number of observations is due to data availability after applying the filter that requires a rolling window of the past 256 trading days, with at least 128 trading days of available data.

Hence, in our next analysis, we utilize a panel regression model that includes our full set of option volume determinants documented in the literature (Roll et al., 2010), as well as the variables used in the return predictability analysis. Below is the general model specification:

$$Y_{i,t} = \alpha + \sum \beta_n X_{i,t}^n + \gamma_i + \delta_t + \epsilon_{i,t}, \quad (12)$$

Where $Y_{i,t}$ refers to either log transformed *O/S* ratio or *dO/S* ratio for hotel i on day t . $X_{i,t}^n$ refers to a vector of variables, including $TangAssets_{i,t}$, $TangCAPEX_{i,t}$, $Ospread_{i,t}$, $IMPVOL_{i,t}$, $DELTA_{i,t}$, $SIZE_{i,t}$, $ANALYSTS_{i,t}$, $ANALYSTS_DISP_{i,t}$, $EPS_Dates_{i,t}$, $INSTOWN_{i,t}$, $TobinQ_{i,t}$, $TURNOVER_{i,t}$, and $EQVOL_{i,t}$ for hotel i as of day t , where $TangAssets_{i,t}$ and $TangCAPEX_{i,t}$ are our variables of interest. γ_i (δ_t) represents firm and (year-quarter) fixed effects.¹⁵

As shown in Table 3, the results support both Hypotheses 2a and 2b that “asset tangibility and capital intensity” are negatively related to option to stock volume ratio in the hotel industry. Specifically, increased “asset tangibility and capital intensity” reduce the intensity of options trading, suggesting that higher levels of these factors enhance a hotel’s information transparency, thereby decreasing the likelihood of informed trading by option traders. For other options trading determinants, the results are generally in line with the literature. We show that, similar to other common stocks, larger hotel firms, those with high implied volatility, greater analyst coverage, higher hotel valuation, and those nearing earnings dates tend to experience more options trading activity for hotel firms. Conversely, hotels with higher options transaction costs (i.e., *Ospread*) and higher underlying stock volume tend to have less intense options trading. In an unreported table, we replicate the analysis by replacing year-quarter fixed effects with daily fixed effects to further control for the impact of time trends, and the results remain highly consistent.

To further support our main results, we next test Hypotheses 3a and 3b by using implied volatility (*IMPVOL*) as an alternative metric to measure the intensity of options trading activity, where more intensity of options trading volume increases the level of option implied volatilities (Nandi, 2000) and financial reporting transparency is negatively associated with option implied volatility (Kim & Zhang, 2014). The results are presented in Table 4.¹⁶ We find that, consistent with our main results, both asset tangibility and capital intensity have a negative and significant impact on implied volatility. This result is in line with our expectations for Hypotheses 3a and 3b, that “asset tangibility and capital intensity” are negatively related to implied volatility in the hotel industry. This suggests that while an asset-light strategy is intended to run the business more efficiently, it also compromises information transparency and financial market efficiency for outside investors, making informed trading more likely.

For robustness, we also use two alternative information asymmetry metrics unrelated to the options market. The results strongly support our main findings and, for brevity, are reported in the supplementary file. To mitigate endogeneity concerns, in addition to controlling for firm fixed effect, we use lagged asset tangibility and capital intensity measures throughout the study. Lagging these variables ensures that current information asymmetry does not contemporaneously influence

¹⁵ This closely follows the existing literature (Cashman, Harrison, Scheick, et al., 2025).

¹⁶ We exclude option-related control variables to provide a clearer test, but the findings remain qualitatively similar even when other option characteristics are included in the analysis.

a firm's asset structure. While this approach addresses concerns related to reverse causality and time-invariant omitted variables, the time-varying unobserved factors may still bias the estimates.

To strengthen the causal interpretation between a hotel's asset-light strategy and its information transparency, we finally implement an instrumental variable approach. Specifically, we use two instruments: (1) the property tax revenue from the hotel firm's headquarters city, scaled by city population (*PropTax*), as an instrument for *TangAssets*, and (2) the interaction of the national Construction Producer Price Index (*PPI*) with lagged firm-level asset tangibility as an instrument for *TangCAPEX*. Data on local property tax revenue and *PPI* are sourced from the Lincoln Institute of Land Policy and the Bureau of Labor Statistics, respectively. *PropTax* is plausibly related to local hotel tangible assets and capital expenditures but is unlikely to have a direct link to options trading activity, thus satisfying the exclusion restriction necessary for instrument validity. Similarly, while the *PPI* is a national-level index, its interaction with firm-specific asset tangibility generates variation in input cost exposure that is exogenous to firm-level information asymmetry yet relevant for capital investment decisions. An unreported first-stage F-test rejects the null of weak instruments for both, lending further support to their validity. More detailed discussion of the motivation behind the selected instruments for IV analysis is provided in the supplementary file. Table 5 presents the second-stage results.¹⁷ The coefficients for asset tangibility and capital intensity are negative and statistically significant, suggesting that the main findings remain robust even after addressing potential omitted variable bias.

5. Conclusions

The purpose of this study was to investigate the predictive power of hotel options trading activity on subsequent stock performance and explore whether hotels with a more asset-heavy strategy (which may imply more transparency) experience less intense options trading, especially amid rising investor participation in the options market. We conducted our analysis using a comprehensive panel regression model on a sample of hotel firms over a defined period, encompassing the period from January 1996 to June 2021, and consisting of 36,667 observations. Our findings reveal a significant negative relationship between the relative option-to-stock volume ratios and next-day stock returns, suggesting that increased options trading activity can signal informed trading and potential negative news regarding the underlying hotel stocks. Additionally, we established that higher “asset tangibility and capital intensity” reduce options trading intensity, emphasizing the trade-off between operational efficiency and information transparency within the asset-light strategy employed by hotel firms.

Revisiting our two research questions: i) is options trading in the hotel industry informed? Yes, higher option-to-stock volume predicts next-day returns in the direction consistent with informed trading (Hypothesis 1); and ii) do asset-light strategies increase information asymmetry? Yes, lower tangibility/capital intensity is associated with greater options activity and higher uncertainty proxies (e.g., implied volatility), indicating more opacity (Hypotheses 2 and 3). These results link

¹⁷ The smaller number of observations for *TangCAPEX* is due to data availability from the BLS, as the *PPI* series only begins in June 2009.

firm-level strategy to option-market behavior and clarify the mechanisms that connect hotels' asset structures to market information frictions.

5.1. Theoretical implications

Several theoretical implications can be derived from the findings of this study. First, the results underscore the centrality of intangible assets—such as brand equity, customer loyalty, and managerial expertise—in achieving competitive advantage within the hotel industry. Not only are these results in line with the resource-based view's assertion that hotels can secure competitive advantages through resources that are “valuable, rare, inimitable, and non-substitutable”, but they also highlight a tension between the asset-light model and hotel transparency. Specifically, our findings indicate that while asset-light strategies enhance operational efficiency, they may also reduce informational transparency, making it more difficult for investors to assess hotel value. From a resource-based perspective, this reduced transparency suggests that intangible assets play an even more pivotal role in the financial market's assessment of asset-light hotel firms. In traditional asset-heavy models, physical assets provide verifiable signals of hotel value, reducing information asymmetry. However, in asset-light hotels, investors must rely more heavily on intangible resources—such as brand strength and reputation—to evaluate hotel performance. As such, this study contributes to resource-based theory by demonstrating that in environments characterized by high uncertainty and information asymmetry, the effective management and communication of intangible assets become crucial for mitigating adverse financial market effects. Moreover, our results suggest that hotels adopting asset-light strategies must actively cultivate and signal the strength of their intangible assets to investors. This finding is in line with the resource-based view's emphasis on strategic asset management, reinforcing that hotels should not only develop but also convey—in a credible way—the value of their intangible resources. Doing so can help counteract the loss of transparency associated with asset-light strategies, improving market confidence and ultimately enhancing hotel value. In direct relation to research question 2, these results formalize a strategy-to-microstructure pathway in which asset structure forms the investor information environment, which in turn manifests in options-market signals, thereby extending resource-based view to explain how resource tangibility drives information frictions.

Second, our results may also have implications for understanding how markets perceive the value of hotels operating under an asset-light strategy. Accordingly, the resource-based view can be further developed to include the role of investor perceptions and behaviors, highlighting how hotels can signal their resource strengths to diminish information asymmetry. This is consistent with signaling theory, which can be integrated with resource-based view to provide a more comprehensive framework for understanding hotel performance. This integration also speaks to research question 1, so that informed option trading emerges when signals about intangibles are “noisy,” thereby clarifying why options markets become the venue through which private information is impounded into prices (Hypothesis 1), while the extent of opacity is conditioned by asset lightness (Hypotheses 2 and 3).

Third, the findings reinforce the notion that information asymmetry is particularly prominent in hotels that follow the asset-light model, where firms heavily rely on intangible assets. This idea suggests that the information gap between insiders (who possess better knowledge about the hotel's intangible resources) and outsiders (such as investors and analysts) can be enlarged, leading

to increased uncertainty in assessing hotel value. In fact, our findings may indicate that sophisticated market participants exploit the information disadvantage of less informed investors, potentially exacerbating price volatility and market inefficiency. This underlines the necessity for further research into how information asymmetry affects investor decision-making and market dynamics.

Fourth, interestingly, building on the previous point, the findings suggest that institutional investors and other sophisticated market participants are more adept at navigating the complexities of asset-light hotels. This situation could lead to a scenario where informed trading is predominantly driven by these entities, raising concerns about the fairness of market access and the potential for market manipulation. Theoretical frameworks around information asymmetry should, therefore, consider the differentiated impacts of investor sophistication. Importantly, the results suggest that information asymmetry can lead to inefficiencies in the market, particularly for asset-light hotels where the value of intangible assets is less transparent. This challenges the traditional assumptions of market efficiency, indicating that the presence of significant information asymmetry can hinder accurate price discovery and lead to mispricing of securities. This result calls for a reevaluation of the conditions under which market efficiency holds, particularly in sectors relying heavily on intangible assets. This perspective ties both research questions together: the “who” of informed trading (in this case institutions) relates to research question 1, while the “why” (opacity from asset lightness) answers research question 2, thereby motivating a contingent view of efficiency in intangible-intensive industries.

Fifth, our findings suggest that traditional signaling mechanisms—such as earnings reports, strategic announcements, or disclosures—may not effectively mitigate information asymmetry in asset-light hotels. Thus, the reliance on intangible assets, which are less observable and quantifiable, may lead hotel investors to misinterpret these signals, thereby diminishing their intended impact. This result highlights the need for a reevaluation of how signaling theory applies in contexts characterized by high levels of information asymmetry.

Sixth, our study also opens opportunities to connect the informational transparency of asset-light hotels with broader and complementary themes raised in the paper. For example, crisis resilience may condition how effectively hotels communicate the value of their intangible assets during periods of volatility. Similarly, internationalization strategies can add another layer of complexity, as global operations introduce heterogeneous regulatory frameworks, customer bases, and disclosure standards that form informational asymmetry. Customer risk perceptions further interact with these dynamics, since shifts in perceived safety, trust, or reliability can directly influence how signals are interpreted in the market. Although these themes fall outside the empirical scope of the present study, acknowledging them as boundary conditions highlights fruitful avenues for future research and reinforces the broader relevance of our findings.

5.2. Managerial implications

The results also provide several valuable managerial implications for firms in the hotel industry that have adopted an asset-light strategy. First, assuming that hotel managers recognize the importance of intangible assets, such as brand equity, customer relationships, and managerial expertise, they should prioritize the development and communication of these assets to enhance

their competitive advantage in the asset-light model. Unlike traditional asset-heavy models where physical assets are a key source of value, asset-light strategies depend more on the hotel's ability to differentiate itself through these intangible resources. This approach requires a shift in focus toward enhancing brand perception, customer loyalty, and operational excellence. Along these lines, and to maximize the benefits of this approach, managers should invest in brand-building activities, such as innovative marketing campaigns, partnerships, and targeted communications that resonate with key customer segments. Likewise, the development of loyalty programs and the implementation of personalized customer engagement strategies can also help strengthen customer relationships, thereby increasing brand attachment and long-term profitability. Additionally, fostering managerial expertise through training, leadership development, and knowledge-sharing initiatives can enhance the hotel's ability to adapt quickly, further bolstering its competitive advantage. To sum up, since intangible assets are often harder to quantify and less visible than physical ones, it becomes crucial for managers to clearly communicate the value of these assets to both internal stakeholders (employees, management) and external stakeholders (investors, customers). By doing so, hotels can reduce the risks associated with information asymmetry and better convey their strategic vision and long-term value proposition to the market.

Second, in asset-light business models, where hotels rely more on intangible assets such as brand equity and customer loyalty, traditional financial signals such as earnings reports or balance sheets may not fully capture the hotel's value. The findings indicate that conventional signaling mechanisms might be insufficient in these contexts, as they often fail to convey the qualitative aspects of intangible assets, leading to underestimation by investors. This gap creates challenges for management in accurately communicating the hotel's value to external stakeholders, including investors and analysts. To address this situation, managers should adopt innovative signaling strategies that go beyond standard financial disclosures. These could include qualitative narratives that articulate the hotel's strategic vision and highlight the role intangible assets play in its competitive positioning. For instance, hotel companies could provide detailed case studies of successful brand initiatives, showcasing how investments in customer engagement, loyalty programs, or digital marketing have driven long-term value creation. Sharing these real-world examples would help bridge the gap between the intangible nature of the assets and investor understanding. Furthermore, hotel managers can make visual representations of key intangible metrics, such as customer satisfaction scores, brand equity indices, or growth in customer retention rates. These visual tools can be more impactful than raw data alone, offering investors a clearer picture of the hotel's strengths. Additionally, incorporating customer testimonials, third-party endorsements, or market research reports into investor communications can help substantiate claims regarding brand strength and customer loyalty, thereby enhancing credibility and reducing information asymmetry. Overall, by utilizing these tailored signaling mechanisms, hotels can provide investors with a more holistic view of their performance, which is critical for reducing information asymmetry in asset-light models. This will not only improve investor confidence but also help hotels secure better valuations by effectively communicating the value generated by intangible assets.

Third, managers should actively monitor investor sentiment and behavior in response to their signaling efforts. By understanding how different investor groups interpret signals, hotels can refine their communication strategies and tailor their messages to address specific concerns or misconceptions. Moreover, by tracking how different investor groups—such as institutional

investors, retail investors, or analysts—respond to signals related to intangible assets, hotels can identify potential misconceptions. This ongoing feedback can help hotels remain agile in their approach to managing investor relations. For example, hotels could adjust their communication strategies, ensuring that signals reflect the true value of the hotel’s intangible resources more accurately. Accordingly, managers should develop risk management strategies that account for the potential volatility arising from these dynamics, which may involve implementing contingency plans to respond to sudden market shifts or investor reactions that could impact the hotel’s stock performance. For instance, by closely tracking how investors react to various signals—such as earnings reports, brand initiatives, or strategic announcements—managers can identify patterns or trends that might indicate market misperceptions. More specifically, let us suppose that investor sentiment turns negative due to misinterpretation of a signal. In this case, managers should be prepared to swiftly issue clarifications and/or release supplementary communications that address investor concerns so that additional context is provided. Similarly, hotels can use real-time monitoring of sentiment to anticipate the need for risk mitigation strategies, such as hedging against potential market fluctuations or temporarily adjusting public disclosures to manage expectations.

Fourth, alignment of organizational culture with intangible asset management is essential for maximizing value in an asset-light strategy. Hotels that rely on intangible assets must foster a culture that prioritizes these resources—brand equity, customer relationships, and managerial expertise. This involves ensuring employees at all levels understand the significance of intangible assets and their impact on long-term success. Key to this alignment is cross-functional collaboration. Marketing, sales, customer service, and operations teams should work together to integrate brand equity and customer insights into decision-making. By fostering open communication between departments, hotels can reinforce intangible assets such as customer loyalty and brand reputation at every touchpoint, enhancing customer experiences and loyalty. In addition to collaboration, managers should promote a mindset focused on innovation, customer-centricity, and long-term value creation. An innovative culture encourages employees to explore new ways to strengthen intangible assets, whether through customer engagement strategies, loyalty programs, or branding initiatives that differentiate the hotel. In this context, a customer-focused approach ensures decisions are in line with customer needs, bolstering key assets such as loyalty and brand value. Moreover, a long-term focus is also crucial for asset-light success. Since intangible assets require sustained investment, hotels must emphasize long-term over short-term gains. Hotel managers can support this mindset by promoting objectives that prioritize brand building, customer satisfaction, and market leadership, ensuring the hotel remains committed to managing these harder-to-quantify yet vital resources. Ultimately, congruence of organizational culture with intangible asset management creates a cohesive environment where employees actively contribute to asset growth. This cultural alignment strengthens the asset-light strategy, enabling the hotel to maximize competitive advantage and achieve long-term profitability.

Finally, although the sample size in this study is large, it is limited to US-based hotel firms. This geographic focus may restrict the applicability of the findings to other regions, as hotel markets and investor behavior can vary across countries due to different regulatory environments, cultural factors, and market dynamics. As a result, the generalizability of the conclusions to global markets remains limited. Future research could expand the scope by examining asset-light strategies in hotel firms from diverse geographic regions. A comparative analysis of US hotels and hotels in

Europe and Asia would provide valuable insights into how regional differences—such as varying levels of market development, cultural attitudes towards brands, or local regulatory requirements—affect the relationship between asset-light models, intangible assets, and market behavior. This global perspective could enhance the understanding of the asset-light strategy’s effectiveness in different contexts.

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Table 1
Descriptive Statistics

This table presents summary statistics of our option trading measures, returns, and other firm characteristics. RET is daily returns. O/S is the firm's daily relative option to stock volume while dO/S is the firm's daily dollar "relative option to stock volume". TangAssets is asset tangibility defined as a "ratio of the firm's PPE to total assets". TangCAPEX is the capital intensity calculated as capital expenditures over total assets. Ospread is defined as (average option ask price - average option bid price) / [(average option ask price + average option bid price)/2]. IMPVOL is the daily average implied volatility of a firm's traded option contracts. DELTA is the daily average delta of a firm's traded option contracts. ILLIQ is the daily Amihud (2002) illiquidity measure defined as in equation (8). SIZE is defined as the firm's total assets (in millions of dollars) from the firm's most recent "quarterly earnings announcement". ANALYSTS is the number of analysts providing EPS estimates in a particular quarter. EPS_Dates is a binary indicator that takes a value of 1 if a firm has an earnings announcement or within the following four days. ANALYST_DISP is the standard deviation across one-year ahead EPS estimates. INSTOWN is the number of shares held by institutional investors divided by number of shares outstanding. TobinQ is the market value of equity plus the book value of debt divided by the book value of total assets. Turnover is defined as stock volume scaled by number of shares outstanding. EQVOL is the daily stock trading volume.

Variable	N	Mean	1st Pctl	25th Pctl	50th Pctl	75th Pctl	99th Pctl
RET	36667	0.001	-0.072	-0.011	0.000	0.011	0.078
O/S	36667	0.109	0.000	0.005	0.033	0.116	0.848
dO/S	36667	0.289	0.000	0.006	0.050	0.207	2.550
TangAssets	36667	0.711	0.056	0.396	0.765	0.955	1.397
TangCAPEX	36667	0.051	0.000	0.027	0.040	0.062	0.193
Ospread	36667	0.615	0.185	0.427	0.574	0.778	1.284
IMPVOL	36667	0.551	0.261	0.401	0.498	0.649	1.315
DELTA	36667	0.454	0.334	0.428	0.459	0.482	0.590
ILLIQ	36667	0.008	0.000	0.000	0.000	0.002	0.130
SIZE	36667	7515.9	273.9	1089.2	5344.4	9113.0	27216
ANALYSTS	36667	13.5	2.0	7.0	14.0	19.0	30.0
EPS_Dates	36667	0.10	0.010	0.030	0.060	0.120	0.83
ANALYSTS_DISP	36667	0.05	0.000	0.000	0.000	0.000	1.00
INSTOWN	36667	67.121	0.348	49.843	64.384	91.793	100.000
TobinQ	36667	1.873	0.359	0.922	1.277	2.209	8.28
Turnover	36667	0.010	0.000	0.004	0.006	0.011	0.06
EQVOL	36667	2145923	10200	182700	587764	2241200	23242300

Table 2
Return Predictability of Option Trading Volume

This table presents estimates from multivariate regressions of daily returns on relative option volume, controlling for option and firm characteristics. Panel A reports the results for both raw daily returns (RET_{t+1}) and market model based abnormal returns (Mkt_AR_{t+1}), while Panel B reports for both Fama-French three-factor model based abnormal returns ($FF3_AR_{t+1}$) and Fama-French three-factor model plus Carhart momentum factor based abnormal returns ($FF4_AR_{t+1}$). To improve readability, the dependent variables in both panels are multiplied by 100. $LN(O/S)$ is the log transformed firm's daily "relative option to stock volume" while dO/S is the log transformed firm's daily dollar relative option to stock volume. The definitions of other variables are provided in the heading of Table 1. Firm and year-quarter fixed effects are included. Robust standard errors are reported in parentheses. ***, **, and * represent 1%, 5%, and 10% significance levels, respectively.

Panel A: Raw Return and Market Model Based Abnormal Returns

VARIABLES	(1) RET_{t+1}	(2) RET_{t+1}	(3) Mkt_AR_{t+1}	(4) Mkt_AR_{t+1}
LN(O/S)	-0.2717** (0.120)		-0.1765* (0.102)	
LN(dO/S)		-0.1260** (0.058)		-0.0916* (0.048)
RET	1.3715 (1.215)	1.3660 (1.215)	3.6834*** (1.115)	3.6805*** (1.115)
LN(SIZE)	0.0601 (0.052)	0.0643 (0.052)	0.0647 (0.044)	0.0682 (0.044)
ILLIQ	2.3680*** (0.846)	2.3595*** (0.846)	1.6156* (0.890)	1.6112* (0.889)
INSTOWN	-0.0001 (0.001)	-0.0002 (0.001)	0.0001 (0.001)	0.0000 (0.001)
EPS_Dates	0.1675* (0.092)	0.1639* (0.092)	0.1510* (0.087)	0.1491* (0.087)
TURNOVER	2.1996 (2.543)	2.1896 (2.546)	1.6355 (2.386)	1.6204 (2.389)
Constant	0.0983 (0.503)	0.0828 (0.503)	0.0018 (0.468)	-0.0109 (0.468)
Observations	36,667	36,667	36,182	36,182
R-squared	0.011	0.011	0.008	0.008

Panel B: Multiple-Factor Model Based Abnormal Returns

VARIABLES	(1) FF3 AR _{t+1}	(2) FF3 AR _{t+1}	(3) FF4 AR _{t+1}	(4) FF4 AR _{t+1}
LN(O/S)	-0.1844* (0.098)		-0.1763* (0.097)	
LN(dO/S)		-0.0869* (0.045)		-0.0833* (0.045)
RET	3.1360*** (1.057)	3.1324*** (1.056)	1.9915* (1.044)	1.9881* (1.044)
LN(SIZE)	0.0709* (0.042)	0.0737* (0.042)	0.0725* (0.042)	0.0753* (0.042)
ILLIQ	1.2528 (0.865)	1.2471 (0.865)	1.3324 (0.862)	1.3270 (0.862)
INSTOWN	0.0002 (0.001)	0.0001 (0.001)	0.0003 (0.001)	0.0002 (0.001)
EPS_Dates	0.1639* (0.086)	0.1615* (0.086)	0.1518* (0.086)	0.1495* (0.086)
TURNOVER	1.8314 (2.261)	1.8238 (2.263)	1.0908 (2.277)	1.0833 (2.279)
Constant	-0.0566 (0.476)	-0.0670 (0.476)	-0.0577 (0.475)	-0.0677 (0.475)
Observations	36,182	36,182	36,182	36,182
R-squared	0.006	0.006	0.006	0.006

Table 3
Asset Light Strategy and Option Trading Volume

This table presents estimates from multivariate regressions of option trading volume on asset tangibility and/or capital intensity variable, controlling for option and firm characteristics. The definitions of other variables are provided in the heading of Table 1. Firm and year-quarter fixed effects are included. Robust standard errors are reported in parentheses. ***, **, and * represent 1%, 5%, and 10% significance levels, respectively.

VARIABLES	(1) LN(O/S)	(2) LN(dO/S)	(3) LN(O/S)	(4) LN(dO/S)	(5) LN(O/S)	(6) LN(dO/S)
TangAssets	-0.0746*** (0.007)	-0.2117*** (0.014)			-0.0731*** (0.007)	-0.2111*** (0.014)
TangCAPEX			-0.0978*** (0.025)	-0.1137** (0.049)	-0.0672*** (0.025)	-0.0253 (0.050)
Ospread	-0.0445*** (0.004)	-0.0341*** (0.009)	-0.0517*** (0.004)	-0.0528*** (0.009)	-0.0453*** (0.004)	-0.0343*** (0.009)
IMPVOL	0.0136*** (0.005)	0.0793*** (0.010)	0.0193*** (0.005)	0.0954*** (0.011)	0.0137*** (0.005)	0.0794*** (0.010)
DELTA	-0.0134 (0.011)	-0.0411* (0.022)	-0.0142 (0.011)	-0.0397* (0.022)	-0.0149 (0.011)	-0.0417* (0.022)
LN(SIZE)	0.0478*** (0.003)	0.1627*** (0.007)	0.0562*** (0.003)	0.1901*** (0.007)	0.0466*** (0.003)	0.1623*** (0.007)
ANALYSTS	0.0006** (0.000)	0.0018*** (0.000)	0.0009*** (0.000)	0.0028*** (0.000)	0.0006*** (0.000)	0.0018*** (0.000)
ANALYSTS_DISP	0.0022 (0.006)	0.0668*** (0.016)	0.0072 (0.006)	0.0812*** (0.016)	0.0022 (0.006)	0.0668*** (0.016)
EPS_Dates	0.0355*** (0.003)	0.0495*** (0.005)	0.0354*** (0.003)	0.0492*** (0.005)	0.0355*** (0.003)	0.0495*** (0.005)
INSTOWN	0.0000 (0.000)	-0.0005*** (0.000)	0.0001** (0.000)	-0.0003*** (0.000)	0.0000 (0.000)	-0.0005*** (0.000)
TobinQ	0.0183*** (0.001)	0.0664*** (0.003)	0.0166*** (0.001)	0.0620*** (0.003)	0.0181*** (0.001)	0.0663*** (0.003)
TURNOVER	-0.0941 (0.079)	-0.3907*** (0.128)	-0.0451 (0.079)	-0.2392* (0.127)	-0.0981 (0.079)	-0.3922*** (0.128)
LN(EQVOL)	-0.0115*** (0.002)	-0.0241*** (0.003)	-0.0126*** (0.002)	-0.0275*** (0.003)	-0.0114*** (0.002)	-0.0240*** (0.003)
Constant	-0.4087*** (0.053)	-1.8241*** (0.121)	-0.4500*** (0.054)	-1.9673*** (0.121)	-0.3991*** (0.053)	-1.8205*** (0.120)
Observations	36,667	36,667	36,667	36,667	36,667	36,667
R-squared	0.425	0.375	0.423	0.370	0.425	0.375

Table 4
Asset Light Strategy and Implied Volatility

This table presents estimates from multivariate regressions of implied volatility on asset tangibility and/or capital intensity variable, controlling for firm characteristics. Please refer to the variable definitions in the heading of Table 1. Firm and year-quarter fixed effects are included. Robust standard errors are reported in parentheses. ***, **, and * represent 1%, 5%, and 10% significance levels, respectively.

VARIABLES	(1) IMPVOL	(2) IMPVOL	(3) IMPVOL
TangAssets	-0.0716*** (0.006)		-0.0700*** (0.006)
TangCAPEX		-0.0973*** (0.033)	-0.0695** (0.032)
LN(SIZE)	-0.0111*** (0.003)	-0.0032 (0.003)	-0.0124*** (0.003)
ANALYSTS	-0.0019*** (0.000)	-0.0015*** (0.000)	-0.0018*** (0.000)
ANALYSTS_DISP	0.0083 (0.008)	0.0130* (0.008)	0.0083 (0.008)
EPS_Dates	-0.0012 (0.003)	-0.0013 (0.003)	-0.0012 (0.003)
INSTOWN	-0.0000 (0.000)	0.0000 (0.000)	-0.0000 (0.000)
TobinQ	0.0065*** (0.001)	0.0050*** (0.001)	0.0062*** (0.001)
TURNOVER	1.5717*** (0.143)	1.6272*** (0.145)	1.5676*** (0.143)
LN(EQVOL)	-0.0004 (0.002)	-0.0013 (0.002)	-0.0002 (0.002)
Constant	0.4241*** (0.041)	0.3741*** (0.041)	0.4323*** (0.041)
Observations	36,667	36,667	36,667
R-squared	0.721	0.720	0.721

Table 5
Instrumental Variable (IV) Analysis

This table reports the second stage of 2SLS IV analysis for O/S (Panel A) and IMPVOL (Panel B), using hotel headquarters city property tax revenues scaled by city population (PropTax) as the instrument for TangAssets, and PPI as the instrument for TangCAPEX. Please refer other variable definitions in the heading of Table 1. Firm and year-quarter fixed effects are included. Robust standard errors are reported in parentheses. ***, **, and * represent 1%, 5%, and 10% significance levels, respectively.

Panel A:

VARIABLES	(1) LN(O/S)	(2) LN(dO/S)	(3) LN(O/S)	(4) LN(dO/S)
TangAssets	-0.6786*** (0.105)	-1.5411*** (0.212)		
TangCAPEX			-0.0409*** (0.004)	-0.1592*** (0.007)
Ospread	0.0383*** (0.014)	0.1504*** (0.029)	-0.0403*** (0.005)	-0.0776*** (0.010)
IMPVOL	-0.0154** (0.007)	0.0166 (0.015)	0.0071 (0.005)	0.1190*** (0.011)
DELTA	-0.0794*** (0.015)	-0.1901*** (0.030)	-0.1707*** (0.019)	-0.6274*** (0.038)
LN(SIZE)	-0.0157 (0.012)	0.0245 (0.023)	-0.0044 (0.007)	-0.0446*** (0.015)
ANALYSTS	0.0006*** (0.000)	0.0022*** (0.000)	0.0006** (0.000)	0.0040*** (0.001)
ANALYSTS_DISP	-0.0054 (0.006)	0.0526*** (0.017)	-0.0108* (0.006)	-0.0130 (0.017)
EPS_Dates	0.0343*** (0.003)	0.0465*** (0.005)	0.0445*** (0.003)	0.0660*** (0.006)
INSTOWN	-0.0005*** (0.000)	-0.0016*** (0.000)	-0.0001 (0.000)	-0.0012*** (0.000)
TobinQ	0.0312*** (0.003)	0.0947*** (0.006)	0.0036 (0.002)	0.0337*** (0.005)
TURNOVER	-0.8649*** (0.149)	-2.1092*** (0.289)	-0.3289*** (0.059)	-0.7298*** (0.109)
LN(EQVOL)	0.0148*** (0.005)	0.0348*** (0.009)	-0.0061*** (0.001)	-0.0226*** (0.002)
Constant	-0.3876*** (0.055)	-1.8083*** (0.122)	0.2400*** (0.074)	1.0486*** (0.153)
Observations	36,667	36,667	25,175	25,175
R-squared	0.424	0.371	0.503	0.453

Panel B:

VARIABLES	(1) IMPVOL	(2) IMPVOL
TangAssets	-0.2628*** (0.100)	
TangCAPEX		-0.0109*** (0.004)
LN(SIZE)	-0.0242** (0.009)	-0.0240** (0.009)
ANALYSTS	-0.0014*** (0.000)	-0.0008*** (0.000)
ANALYSTS_DISP	0.0007 (0.010)	0.0330*** (0.008)
EPS_Dates	-0.0021 (0.003)	-0.0050 (0.003)
INSTOWN	-0.0002** (0.000)	-0.0005*** (0.000)
TobinQ	0.0109*** (0.002)	-0.0230*** (0.003)
TURNOVER	1.2393*** (0.217)	1.6134*** (0.181)
LN(EQVOL)	0.0089** (0.004)	-0.0002 (0.003)
Constant	0.3593*** (0.041)	1.0415*** (0.083)
Observations	36,667	25,175
R-squared	0.720	0.747

Figure 1
Time Distribution of Hotels with Options Trading Coverage

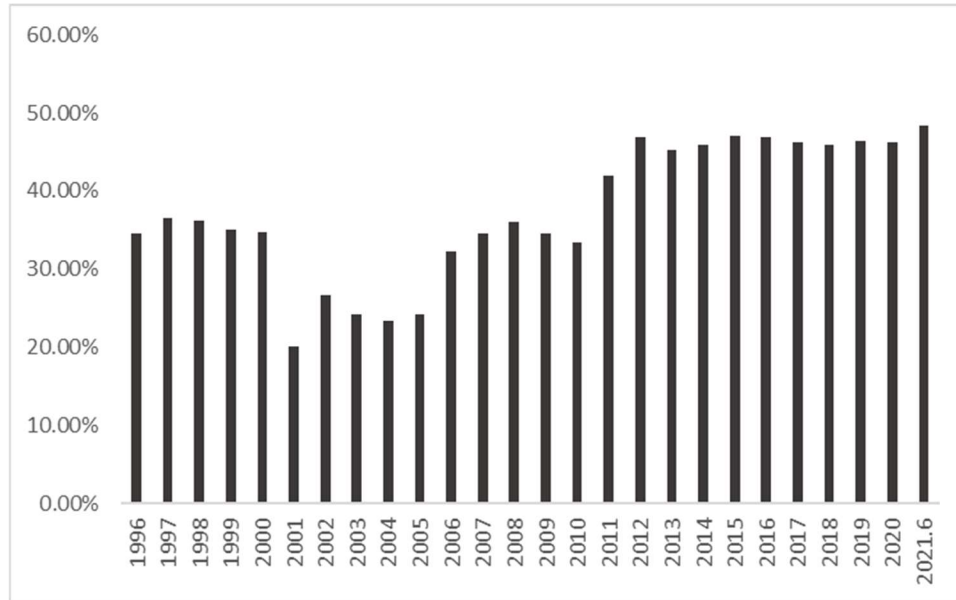


Figure 2
 Hotel Options Trading Volume

