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# The Impact of Brand Affiliation on Asset Values: The Case of UK Hotels

**ABSTRACT**

Using the hedonic pricing method, we study more than 400 hotel transactions in the United Kingdom between 2000 and 2015 to determine the impact of brands on hotel market values. We initially find that hotel brands are negatively associated with hotel values in our sample. However, after controlling for endogeneity, we find that brand affiliation produces no significant impact on hotel transaction values. These results suggest that it is the characteristics of branded hotels, rather than the fact of being branded, that determine the transaction values. To the best of our knowledge, this is one of the first studies to examine the impact of brands on hotel values, and the first to account for the role of endogeneity when comparing the transaction value of branded and unbranded hotels.

*Keywords: Real estate, Hotel valuation, Endogeneity, Hedonic model*

## Introduction

Brand is an important value-adding component of corporate real estate management (Lindholm et al., 2006). Across real estate markets and property types, market participants observe a brand and view it as a signal of quality (Benjamin et al., 2006). Past studies have examined the impact of brand name and status on financial performance in the context of shopping centers (Des Rosiers et al., 2009; Des Rosiers 2016; Hardin et al., 2002; Hardin & Carr, 2006; Hardin & Wolverton, 2001; Hardin & Wolverton, 2000), residential brokerages (Benjamin et al., 2007; Locke, 2020) and apartments (Kim, 2019; Zahirovic-Herbert & Chatterjee, 2011). While a significant stream of literature has been developed on the valuation of brand in these real estate asset classes, the extant research examining the impact of brand affiliation on hotel values is very limited. This is an important research gap given the importance this commercial real estate class has placed on brands.

The hotel industry has firmly embraced and accepted the value of branding as an essential component of its marketing strategy (Dev et al., 2009). Hotel owners have also increasingly chosen brand affiliation as an appropriate strategic choice for their properties. The industry's overall percentage of branded hotel rooms, for example, grew by an estimated 10% between 2010 and 2019 (STR, 2019). One reason for this is that past studies find brand affiliation to have a positive effect on hotel operational efficiency (Hua et al., 2020), top line performance (Hanson et al., 2009), and operating profits (Claver-Cortés et al., 2007; Menicucci, 2018; Xiao et al., 2012). As real estate investors, however, hotel owners care not only about their property's operating returns, but also the asset's terminal market value (Manning et al., 2015; Newell & Seabrook, 2006). While the extant literature has extensively studied the impact of brand affiliation on various aspects of operational performance, it has been very limited on brand affiliation's impact on a hotel's market

value (see O'Neill & Xiao, 2006, for a rare exception) despite calls for this (e.g., Lee et al., 2016). In this paper, we specifically examine the impact of brand affiliation on the market values of hotels.

The primary goal of this paper is to determine the valuation impacts of branded hotels in comparison to independent ones. As O'Neill & Mattila (2010) point out, a hotel brand creates a unique identity through a set of hotels whose functional characteristics are not substantially different. A hotel brand's value is thus based, in large part, on guest (and property owner) perceptions of the *uniform* quality across its hotels (O'Neill & Mattila, 2004; O'Neill & Xiao, 2006). As such, a major concern when comparing the performance of branded and independent hotels is that certain types of hotels self-select into a particular brand type. Hotels with similar characteristics thus likely end up selecting (or being selected) to join a specific brand (Turner et. al., 2016). Affiliated hotels may therefore have a number of common characteristics, such as physical facilities, amenities and service quality (O'Neill & Xiao, 2006), that could be of superior or inferior quality to unaffiliated hotels, thereby biasing the results of the hedonic pricing model.

If unaccounted for, any estimate of the valuation differences of the two types of hotels may be overestimated or underestimated. Our control for endogeneity thus aims to isolate the indirect impact of brand on hotel value induced by these potentially common characteristics among affiliated properties. Once that is controlled for, the actual impact of brand affiliation on hotel market values can be assessed more accurately. This paper adds to the current literature on branding in commercial real estate and specifically hotel valuation by using an empirical approach that accounts for unobservable hotel characteristics associated with brand affiliation.

Our research questions are as follows: Does affiliating with a brand impact hotel values? And does the value associated with brand affiliation exist even after controlling for endogeneity? Using the hedonic pricing method, we study more than 400 hotel transactions in the United

Kingdom between 2000 and 2015 to determine the impact of brands on hotel market values. We initially find that hotel brands are negatively associated with hotel values in our sample. Interestingly, this is in line with the industry's conventional wisdom which holds that brand-affiliated hotels sell at a discount to unaffiliated hotels (e.g., Lesser, 2013). This is because brand affiliation is perceived as a type of encumbrance since the brand owner has certain rights over the property which may restrict its transferability and/or diminish its value (Gifis, 1998). We also control for endogeneity because owners of certain kinds of assets (i.e., better or weaker performing hotels, newer or older hotels, etc.) may choose to affiliate their hotels, or be accepted into a specific brand by a parent company, thus creating a biased sample of affiliated hotels (Michael, 2000). We show that, after controlling for endogeneity, brands are not associated with the real estate asset values. This demonstrates that brand affiliation does not in fact negatively impact hotel asset value. Rather, the myriad characteristics of branded hotels, and not the fact that they are branded, are responsible for decreasing the asset value of branded hotels.

The remainder of this paper proceeds as follows: In the next section, we discuss the relevant literature and how our study contributes to it. In this section we also develop our hypotheses. In the third section, we describe the data setting and description and follow with our methods and results in the fourth section. We discuss our findings in the fifth section and then conclude the paper.

## Literature Review

### *Brand Affiliation and commercial real estate*

Benjamin et al. (2006) argue that brand name is an important signal of image for commercial real estate markets such as retail, apartments, residential brokerages and hotels. Brand research in real

estate literature began with Martineau's (1958) study of retail markets. He documents that store personality is an operational force that defines the store in the consumer mind. Research on the importance of image in retail shopping centers, meanwhile, finds that it positively affects store sales levels (Anikeeff, 1996; Brown, 1992; Kirkup & Rafiq, 1994). Hardin & Wolverton (2001) look at how the image dimension of neighbourhood centers affect tenant rental rates. More recently, Des Rosiers et al. (2016) examine the effects of chain affiliation on store rent levels within regional and super-regional shopping centers. They find that in comparison to independent and local chain-affiliated stores, those operating at upper levels of affiliation are charged a rent premium.

Apartments and the real estate brokerage industry were the next CRE sectors to receive attention with studies exploring the impacts of brand on performance. Jud et al. (1994), for example, show that having a brand in real estate brokerage results in a 9% increase in net revenue. Frew & Jud (1986), meanwhile, find that franchise affiliation has a positive effect on brokerage firm sales and house prices, while (Colwell & Marshall, 1986) find that the presence of a franchise positively affects market share of listings and sales for brokerage firms. Richins et al. (1987) also show that franchise affiliation has a positive effect on market performance. Benjamin et al. (2006) meanwhile, find that branded properties achieve gross rents at least 8% higher than unbranded properties with no sacrifice in occupancy. Collectively, these studies demonstrate that brand affiliation positively impacts value in these real estate sectors.

While some researchers have examined brand affiliation's impact on the value of real estate transaction values, only a very few have examined the role of endogeneity induced by self-selection. One sector that has received such attention is in the valuation of brands across residential brokerage firms. Munneke & Yavas (2001), for example, document that brokerage firms affiliated

with a brand do not perform significantly better than unaffiliated ones after controlling for the agent self-selection bias. Similarly, (Locke, 2020) compares the performance of franchised and independent real estate brokerage firms and find that agents self-select into specific real estate brokerage types and firms. These studies demonstrate that failing to account for endogeneity driven by self-selection can lead to substantial bias.

The hotel industry provides an ideal setting for brand valuations studies, and the potential impact of endogeneity caused by self-selection, since it is one of the few sectors where branded and independent entities coexist. In the next section, we summarize the relatively thin literature on brands in the hotel sector.

***Brand Affiliation and Hotel real estate***

Hotel real estate investment volumes more than tripled between 2010 and 2019 to $60 billion (Guichardo et al., 2020), and it is widely recognized as an important asset class within commercial real estate (Blengini & Das, 2021). Investors, however, normally analyze the sector differently from other CRE investment classes due to its distinctive operational complexity and less stable returns (Manning et al., 2015). This complexity and instability stem largely from the fact that lodging properties rent out their rooms daily; the resulting fluctuating occupancies and pricing make hotels far more susceptible to market changes than other CRE asset classes (Newell & Seabrook, 2006).

To reduce the risks outlined above, as well as maintain their hotels' relevance in dynamic markets and optimize their profit potential, owners often decide to affiliate their properties to a brand (Davis & deRoos, 2004; Manning et al., 2015). Brands are an intangible asset that hotels use to provide their customers with advanced and trusted information about the property's characteristics and quality (Kam Fung So & King, 2010). Hotel brands create their distinct identity

by affiliating properties with similar, if not identical, characteristics (O'Neill & Mattila, 2010) The brand establishes a clear sense of uniform quality to potential guests (O'Neill & Mattila, 2004; O'Neill & Xiao, 2006) as hotels with similar characteristics and quality levels tend to affiliate to the same (or similar) brand. In addition, branded hotels benefit from sophisticated parent-company distribution systems to help reach their customers and decrease their reliance on expensive online travel agencies (Gazzoli et al., 2008).

Investors often affiliate their hotels in the belief that it will increase the property's operating income and resulting overall value (O'Neill & Carlbäck, 2011; O'Neill & Xiao, 2006).A few studies, meanwhile, suggest that the positive impact brand affiliation may have on hotel operating income could positively impact the market value of affiliated hotels (O'Neill & Xiao, 2006; Roubi, 2004).

Other studies demonstrate that brand affiliation could, in fact, be perceived negatively by many investors because contracts governing the brand (i.e., franchising, licensing, management) cannot be easily terminated upon an asset's sale (Harper, 2016). This means that the new owner must either retain the existing brand and continue to respect the contract's terms until its expiry date, or pay burdensome termination fees, which often renders rebranding (Blengini & Das, 2021) unfeasible. Brand affiliation is thus a form of encumbrance as it limits any purchaser's ability to change not only the hotel's brand, but also its positioning, physical characteristics, and marketing approach. Consequently, this is thought to make the property less desirable for many potential investors, thereby decreasing the number of such investors and the price they would be willing to pay. The lack of clarity about brand affiliation's impact on the value of hotel assets is an important one to resolve.

The value of a particular brand affiliation may be driven by several hotel characteristics or because of how certain hotels self-select themselves to a particular brand. Because of this selection problem, it is difficult to separate the valuation of a particular hotel brand from the hotel characteristics that are common to that brand. While the self-selection process for real estate agents has been discussed and estimated in the commercial real estate literature (Locke, 2020; Munneke & Yavas, 2001), these self-selection considerations have not been addressed in hotel valuation. In this paper, we use empirical methods that mitigate any bias created by this endogeneity.

This paper contributes to the literature in the following ways. First, this paper adds to the literature on the valuation impact of brands on commercial real estate assets. Next, this is one of the first studies to look at the hotel industry in order to directly examine the effect of brand affiliation on transaction values. Third, this study adds to the relatively limited number of empirical commercial real estate studies that have addressed the issue of endogeneity induced by self-selection in the context of brand affiliation (Locke, 2020; Munneke & Yavas, 2001), and is the first in hotel valuation to do so. Fourth, this paper also contributes to the relatively thin literature on spatial dependencies in commercial real estate prices by controlling for locational differences in hotel real estate both at the macro and micro locational level. Fifth, we also include a sample robustness analysis using imputation methods to account for missing data. In conclusion, this study not only builds on previous work on branding in commercial real estate asset classes but also contributes to the small set of studies on hotel valuation using robust empirical methods.

## Data

### *Sample Setting*

We use UK hotel transaction data to investigate the impact of brand affiliation on hotel real estate values. The UK is the largest and most vibrant hotel market in Europe, exemplified by the fact

that half of all European hotel transactions in the first half of 2015 took place in the UK (Gomez Garcia, 2016). For the entirety of 2015, UK transaction volume exceeded 8.1 billion pounds, only 2% less than the previous peak in 2006 (Hickey, 2015) and approximately double the 12-year average between 2007 and 2018 (Goldstein, 2019). Of this, roughly 60% pertained to hotels located in London with the remainder in the regional UK.

Hotel investors in the UK include most, if not all, of the major investor types, including institutional investors, active throughout the world. The global institutional real estate market has been estimated at $10.2 trillion with 28% of these investments in Europe (LaSalle, 2021). Institutional investors diversify their real estate portfolios across equity and debt, and invest in both public (e.g., REITs and CMBS) and private markets (e.g., direct property investments and mortgage loans). They primarily focus on office, retail, industrial and multifamily property types, but have increasingly started to invest in specialty property types such as healthcare, and hotels (IREI, 2022).

In 2015, over 70% of UK hotel acquisitions were undertaken by overseas investors, with private equity as the largest investor class (Hickey, 2015). In 2016, overseas investors fell to second place as UK property companies were the most active buyers, with private individuals following them. According to Real Capital Analytics, international and UK-based REITS are less active in the UK with only a handful of such players active in the mid-2010s. For example, only CDL Hospitality, Landsec and Derwent London transacted hotels in 2015 and each was only involved in a single property. Institutional investors seem to dominate the buyer groups for hotels in Europe. Also, they prefer places catering to domestic leisure tourism and are very well-located. North American institutional investors including REITs were particularly active as they purchased

50% of regional portfolios in the UK in 2015 (Gomez Garcia, 2016).

In the UK hotel market, there is a growing prevalence amongst investors to affiliate their hotels to established chains (Gomez Garcia, 2016). Although the number of chain-affiliated, and hence branded hotels is growing at a relatively constant three to five percent annual growth rate, only 10 percent of UK hotels are affiliated to hotel chains; these are, however, generally the larger hotels as evidenced by the fact that 50 percent of all UK hotel *rooms* are branded (Horwath HTL, 2019).

The UK branded hotels market is dominated by only a few key players, with nearly 75% of such hotels controlled by only 10 companies (Horwath HTL, 2019), including both UK and international brands. For example, the top three hotel management companies in 2015 were all UK-based; Whitbread, Travelodge and IHG controlled 60% of the branded hotels controlled by the top 20 hotel companies. The following three firms – Accor, Hilton and Marriott – are international companies and together controlled less than 15 percent of the hotels belonging to the top 20 hotel companies doing business in the UK (Gomez Garcia, 2016). The top brands in terms of rooms, meanwhile, were Premier Inn, Travelodge, Holiday Inn and Holiday Inn Express, followed by Hilton. With the increasing relevance of branded hotels, both national and international brands, in the UK market, we find this setting to be ideal when studying the impact of brand on property values.

***Sample Description***

The sample period for this study is between 2000 and 2015, reflecting times of both economic growth and decline. Our transaction data comes from CBRE Hotels, a hotel real estate company offering valuation, advisory, brokerage, asset management and development services. CBRE

provides all relevant transaction details, such as property name, sales price, brand, transaction year and operating structure at the time of sale.

Through the property name, we match the CBRE transaction list with our second source, STR, (now part of CoStar) a hotel data provider which tracks the performance of thousands of hotels globally. From STR, we obtain hotel characteristics such as room count, hotel location and market segmentation. The initial transactions dataset provided by CBRE contains 1,904 transactions. However, we exclude transactions that do not include the hotel sales price information in the analyses bringing our sample to 612 transactions. We then match the 612 relevant data points from CBRE with STR data to obtain our variable of interest, *Brand*, and other independent variables capturing hotel characteristics. Since not all the transacted hotels reported by CBRE are found in the STR database, our final sample includes 442 sale transactions.

The complete transaction list with 612 data points has an average sales price of £22,078,282 with a standard deviation of £34,010,888. The final dataset with 442 transactions has an average sales price of £21,447,987 with a standard deviation of £35,794,145. Branded hotels make up 217 data points, or approximately 49.1%, of the final sample consisting of 442 data points, of which 225 are unbranded. This is in line with the complete transaction list of 612 data points, where branded hotels total 311 data points, or approximately 49.2% of the final sample. Table 1 provides the descriptive statistics for the final sample.

----Insert Table 1 here---

We measure our main variable of interest, *brand,* using a dummy variable, with 1 representing a branded hotel and 0 the independent property. We account for hotel facilities such as *restaurant, convention, spa, golf, largest meeting space* and *total meeting space* and also control for the location of the property through variables such as *latitude, longitude, suburban, urban,*

*London* and *UK prime*. We also control for the operating structure at the time of sale (*lease, management contract* and *vacant possession).* Furthermore, we also control for year fixed effects. Table 2 provides the descriptive statistics for the final sample, comparing between branded and unbranded properties.

----Insert Table 2 here---

We control for the property's market positioning using STR's market segmentation, as brand impact on operating performance may depend on a hotel's market segmentation (Carvell et al*.,* 2016). Most of the transacted hotels are upper upscale (140), followed by economy (112), upper midscale (67), upscale (63), luxury (40) and midscale (20). Branded properties have a significantly higher proportion of economy and upper upscale properties, while unbranded properties have a higher proportion of luxury, upscale and upper midscale properties.

To avoid any multicollinearity issues, we run pairwise correlations between our UK variables. Using Pearson's correlation coefficient matrix, we determine that the pairwise correlation coefficients are relatively low. Table 3 provides the correlation coefficients for the sample.

----Insert Table 3 here---

## Methods and Findings

### *Main Model*

We use the hedonic pricing methodology to estimate the marginal transaction price influences of brand transactions on hotel transaction prices. It is the most frequently used econometric technique to identify price determinants in real estate. It is also commonly used to study a brand's effect on a hotel's operating performance (O'Neill et al., 2013; O'Neill & Mattila, 2004; Tsai et al., 2015).

While the literature is rich with hedonic studies for many real estate asset classes (Sirmans et al., 2005), there are only a limited number of studies examining hotel valuation using the hedonic pricing model (Corgel et al., 2015; Roubi & Litteljohn, 2004).

Hedonic models are commonly estimated using ordinary least squares (OLS). The OLS regression is the most used regression form in hedonic studies (Rosen, 1974), and is based on the assumption that all errors are normally distributed. OLS regressions have many key advantages over other non-parametric techniques. Firstly, they are not restricted to a limited number of variables or data points and can handle large datasets. Secondly, regressions reflect the significance, as well as the magnitude, of each of the explanatory variables (Pagourtzi et al., 2003). Thirdly, they are simple models that are easy to implement, but nevertheless generally yield the same results as more complex models (Jadevicius & Huston, 2015).

However, OLS also has several disadvantages. It can perform poorly when some observations have excessively large or small values for the dependent variable compared to the rest of the sample. It also suffers from the major drawback that many real-world systems are not linear. The least squares method can sometimes lead to poor predictions when a subset of the independent variables fed to it are significantly correlated to each other. The OLS estimation method also produces biased estimators in the presence of endogeneity. Technically, endogeneity occurs when a variable, observed or unobserved, that is not included in our models, is related to a variable we incorporated in our model. In our paper, we find the occurrence of endogeneity in *Brand.* We first use OLS to estimate our variables and then we control for the endogeneity induced by *Brand*.

As stated above, we first employ the following OLS model to determine the effect brand had on hotel prices from 2000 to 2015 in the UK.

$$\ln(\text{sale price}) = \beta_0 + \sum \beta_i X_i + \beta_1 \textit{Brand} + \sum \beta_{ti} T_i + u_i \quad (1)$$

where $X_i$ is a (n x k) matrix of traditional structural, site, transaction, and location variables and $T_i$ is a (n x k) matrix of year and quarter variables.

This study employs traditional hedonic variables to control for physical, location, and market conditions. A unique field is used in the dataset to identify the variable of primary interest, *Brand*, which reflects the brand affiliation of the property at the time of sale. It is measured using a dummy variable (1=*Brand*). Consistent with the hedonic pricing literature (Sirmans et al., 2005), a natural logarithmic transformation of hotel sales price (property transaction value in British pounds) is used as the dependent variable. Roubi & Litteljohn (2004) also find that among various functional forms employed, the semi-logarithmic form provides the best fit for hotel transactions data. Logarithmic specification not only helps to minimize the problem of heteroscedasticity but also allows coefficients to be interpreted as the percentage change in the price-per-unit change for each characteristic. Following prior hedonic studies in the hospitality literature, along with the variable of interest, *Brand,* a substantial number of other independent variables are used as controls (Corgel et al., 2015). Please see Appendix A for details on the control variables used in this study. We first run our main regression model with the natural log of sale price as the dependent variable, and the results of this analysis are presented as column 1 in Table 4. We find evidence that branded hotels sell at a discount compared to unaffiliated hotels. With an adjusted r-squared of 0.65, the results reveal a negative coefficient of -0.1365 which is significant at the 1% level for *Brand*. The coefficients of other control variables are in the expected direction, and the errors are well dispersed and mostly normally distributed.

To test for normality of errors, we run two analyses. We first run k-density tests. Kernel density estimates of residuals follow normal distribution indicating probability density function

of normally distributed observations. Our results shown in Figure 1 indicate our OLS errors are normally distributed. We also check the normal probability plot of the residuals. As shown in Figure 2, we find that the relationship is approximately linear with almost all observations very close to the line.

----Insert Figures 1 and 2 here---

A prior study on brand's impact on hotel values (O'Neill & Xiao, 2006) uses a non-parametric test ANCOVA to examine if brands contribute to hotel values. Using sale price as the response variable in the model, where brand is one of the predictors, along with NOI, ADR, occupancy rate, and number of rooms they show the significant effect of brand on price. Their study only shows evidence that Brand accounts for a considerable increase in $R^2$ over the control variables but does not document the direction or magnitude of this contribution. We are one of the first to document the marginal contribution of brand on hotel selling price.

***Model controlling for Endogeneity of Brand due to Self-selection by Hotels***

Endogeneity caused by selection bias is a serious threat to internal validity (Schwab, 2006; Shadish et al., 2001). Specifically, this occurs when there are pre-existing differences between groups experiencing different levels of some variable X, and these differences, rather than the differences in X, account for the differences in some outcome Y (Schwab, 2006). This endogeneity can thus pose serious threats to the interpretation of statistical results because there are many ways groups may differ. Ultimately, these differences could produce several problems in subsequent statistical analyses, including both bias and suppression effects (Schwab, 2006).

We propose that endogeneity caused by hotels self-selecting to specific brands is a critical issue when considering the effects of brands on hotel values. Das et al. (2018) find that brand name is priced in some cases but not in all situations. They also attribute the lack of statistical

significance in brands to the fact that brands are closely related to several other tangible attributes typically associated with the brand. We believe that hotels do not choose to brand randomly; rather, a hotel may have a specific brand affiliation because (a) certain hotels choose to select themselves into specific brands, and/or (b) brands affiliate themselves with hotels that possess specific characteristics (Turner et. al., 2016). Both decisions are based partially on endogenous or exogenous factors related to the branding decisions and may also relate to the outcome variables such as hotel market values that are typically examined when considering the effects of branded hotels.

If left unconsidered, this endogeneity may occlude our understanding of the effects associated with hotel branding, thus inhibiting the ability of research to determine a study's most appropriate coefficients as well as the significance of its independent variables. For example, if hotel brands only select into brand hotels that perform well, statistical analysis of branding may erroneously lead to the conclusion that branding leads to higher performance. Conversely, if only hotels experiencing performance problems choose to become branded, then a simplistic analysis could show that hotel branding may be associated with lower hotel performance. For example, perhaps inferior properties are unable to join brands because they do not meet their standards (Turner et. al, 2016), thereby implying that affiliated hotels may perform better, not necessarily because of the brand but because of the quality of the brand's member hotels (i.e., the affiliated hotels are stronger). To fully understand the effect of branding, it is critical to consider and control for the effects of the factors associated with the branding decision.

There is a possibility, therefore, that transaction prices and the brand indicator variable in equation (1) are jointly determined. Therefore, *Brand* may be endogenous in the price equation and may not sufficiently control for possible latent characteristics of branded properties. For

example, if branded properties have an "unknown" premium (stigma) attached to them, then OLS would overestimate (underestimate) the effect of *Brand* variable. We first test if Brand is endogenous. We first report Wooldridge's (1995) score.[1] test of exogeneity. This test measures whether *Brand* is endogenous. The p-value on Wooldridge's robustness score of 0.000 indicates that *Brand* is endogenous with selling price, and therefore the OLS estimators are inconsistent. Consequently, we estimate the price equation using two-stage least square (2SLS) instrumental variable estimators.

We create a dichotomous variable –*Brand* – that is equal to 1 if the hotel is branded and is equal to 0 otherwise. The estimation of a two-equation system, which is the continuous price and the probit treatment effect equations, corrects for the endogeneity caused by the latent characteristics associated with *Brand*. To control for endogeneity, we use two stage least square estimations where a first stage probit model is used to determine *Brand,* and then the predicted values of *Brand* from the first stage regression are used in the main equation to determine hotel values.

The probit model takes the following form:

$$\text{Brand} = \beta 0 + \sum \beta \, Xi + \beta \text{Chain Management} + \beta \text{Franchise} + \sum \beta_{ti} \, T_i + u_i \qquad (2)$$

where Xi is a (n x k) matrix of traditional structural, site, transaction, and location variables, $T_i$ is a (n x k) matrix of year and quarter variables, and Chain Management and Franchise are the instrumental variables.

The instrumental variables for the *Brand* variable are chosen with utmost care. We use Chain Management and Franchise as instrumental variables. The various chain scales attract

1 The Wooldridge (1995) score test accounts that our models use heteroscedasticity-robust standard errors.

customers with different consumer behaviours. The higher chain scales attract less price-sensitive customers, who tend to care less about the price discounts that brands can bring, such as through loyalty programs and corporate discounts (Carvell et al., 2016). Luxury hotels are also often quite established and often do not need a brand to increase their visibility and occupancy (Manning et al., 2015), whereas hotels on the lower end of the chain scale generally need a brand to boost their visibility and to communicate their offerings to potential guests (Carvell, et al., 2016). Therefore, hotels at the lower end of the chain scale may be more likely than hotels at the upper end to self-select to a brand to profit from brand affiliation. Also, O'Neill, Hanson & Mattila (2008) find that franchise fees correlate with rooms revenue, depending on the market segmentation. They document that depending on the positioning of the hotel and the guests' purchasing power, the extent to which franchise fees influences brand varies significantly. We therefore use *Chain Management* and *Franchise* as instrumental variables to determine *Brand* in our first stage regressions. We then conduct the Sargan's over-identification test (Sargan, 1958) and find both the instruments to be valid. The Sargan over-identification test is not rejected at the 10% significance level with a test statistic of 5.482. We also conduct Montiel Olea and Pflueger (2013)'s weak instrument test. We compute the F-statistics of our two-stage regression model to be 40.57 that rejects the null of weak instruments. Our chosen instruments are therefore strong and valid.

We run a probit model to determine the influence of all other independent variables, such as hotel characteristics and location, on *Brand*. Our estimation of the probit equation includes all the independent variables in the price equation (except the *Brand* dummy variable) and the following variables: *Chain Management* and *Franchise*.

From the results of the probit model, we estimate the predicted values for *Brand* for each observation and include that, as an independent variable instead of *Brand* in the price equation. To determine the effect of *Brand* on hotel prices after controlling for endogeneity, we employ the model below:

$$\ln(\text{sale price}) = \beta 0 + \sum \beta \, Xi + \beta \, \text{Brand(predicted)} + \sum \beta_{ti} \, T_i + u_i \quad (3)$$

where Xi is a (n x k) matrix of traditional structural, site, transaction, and location variables, $T_i$ is a (n x k) matrix of year and quarter variables and brand(predicted) is the fitted values after the probit regression.

The results of our model controlling for endogeneity are presented as column 2 of Table 4. With an adjusted r-squared of 0.660, the model controlling for endogeneity gives us an insignificant coefficient for *Brand*. Thus, we find evidence that after controlling for endogeneity induced by *Brand*, brand affiliation does not significantly impact hotel market value. This implies that the discount associated with brand vanishes after controlling for latent characteristics associated with a brand affiliation.

----Insert Table 4 here---

***Impact of Brand on Hotel Asset Values across Segments***

Beracha et al. (2018) suggest that the hotel property market is segmented and show that hotel properties are not drawn from a single property population. These findings indicate the notion that aggregate property-type pricing models may provide biased estimators. Therefore, in this section of analyses, we examine if the results that we find for the impact of brand on hotel valuation persists across chain scale segments and location-based market segments. At first, we compare the impact of brand on hotel values across different types of chain scale (Luxury/Upscale brands and

Midscale/Economy brands) and then we compare the impact across different locational sub-markets (London, UK Prime and Other markets).

First, we examine if chain scale types affect the impact of brand on hotel values by comparing the effect for both luxury/upper scale brands and midscale/economy brands. In our primary database, STR, chain scale segments are grouped primarily according to actual average room rates. The chain scale segments available on STR are Luxury, Upper Upscale, Upscale, Upper Midscale, Midscale and Economy. We classify Luxury, Upper Upscale, Upscale, Upper Midscale into one category, Luxury/Upscale, and classify Midscale and Economy as another category, Economy/Midscale. We find that the impact of brand is negative and significant in both categories in the main model. These statistically significant negative discounts vanish after controlling for endogeneity for luxury/upscale brands while they persist for economy/midscale brands. This suggests that investors in the Economy/Midscale segments seem to value "*Brand*" negatively after controlling for various characteristics associated with the brand. This phenomenon is absent in the Luxury/Upscale segment. Table 5 shows results of two stage models across chain scale segments.

----Insert Table 5 here---

Second, we also examine if the impact of brand on hotel valuation varies across locations. Bourassa et al. (2003) show that submarket areas matter in hedonic models. Aroul et al. (2020) find that property market segments with more competition among buyers have different distress transaction discounts. Relevant literature from corporate finance also suggests that assets with limited alternative use tend to appeal to fewer buyers and are therefore less valuable (Shleifer & Vishny, 1992).

Prior literature on commercial real estate markets have usually assumed a homogenous single market, implying that the prices of these commercial real estate attributes remain spatially constant across the entire market. There are few studies that have questioned this common presumption. Commercial real estate studies on locational submarkets have drawn from the housing literature on submarkets and extend the same logic of the existence of submarkets in the office market. Dunse & Jones (2002) test for and confirm the presence of submarkets in Glasgow, a typical UK provincial city. Nitsch (2006) builds a parsimonious hedonic model and demonstrates the impact of location on office rents in Munich, Germany. Nappi-Choulet et al. (2007) applies the hedonic method to analyse the office transaction prices for two distinct submarkets: central Paris and its immediate suburbs. White & Ke (2014) study the intra-metropolitan rental dynamics in two distinct office submarkets, Puxi and Pudong in central Shanghai.

All else equal, one can expect that brand-related discounts vary, given different expectations that can impact the supply and demand for hotel real estate in various market segments. We test this by examining the impact of brands in three market sub-segments in our sample: London, UK Prime and Other locations in the UK. We find that the results (negative brand discounts in the main model and no discount after controlling for endogeneity) hold strongly in all markets except the London submarket. In the London submarket, we find that the negative significant relationship between brand and values holds, but the impact of brand does not completely vanish after controlling for endogeneity. This can be partially attributed to the importance of brand for institutional investors predominant in the London hotel market as compared to the other markets. Institutional investors operating at the national or regional framework seem to rely on brand name as a signal while smaller, constrained investors cannot sustain the costs of scale and the fixed costs of marketing that establish and support a brand

(Benjamin et al., 2006). The results of the two stage models for these three submarkets are shown in Table 6.

----Insert Table 6 here---

***Robustness Analyses***

*Micro-Location Analysis using Spatial Models*

Location is a crucial aspect for commercial real estate investment especially for institutional investors who determine their portfolio distribution based on locational attributes (Malpezzi and Shilling, 2000). Studies generally have focused on controlling for location at the submarket or city level (Ling et al., 2018; Chinloy et al., 2013a,b) using dummy variables. Others use continuous location-based variables like employment base (Corgel et al., 2015), population and land supply elasticity (Beracha et al., 2018) or per capital income (Blal and Graf, 2013; Corgel, 2007). Das et al. (2020), meanwhile, develop a more differentiated approach to account for locational differences in hotel real estate.

They use geographic information system (GIS) to derive their locational variables and document that locational differences contribute to hotel valuation. They also argue that the more granular the locational attributes are the more robust the estimation is. Corgel et al. (2015) also document macro-locational variables to have a weak explanatory power for the U.S. hotel markets. We similarly acknowledge that the literature on hotel brands is further distinguished by including more spatial components (Su and Reynolds, 2019; Soler and Gemar, 2018). As suggested by Das et al. (2020), we develop a spatial regression model to control for micro-locational differences. This allows us to control for potential confounding effects resulting from property-specific

characteristics. Prior literature has also documented that the usage of spatial models could address endogeneity caused by omitted variables (Freybote et al., 2016; Sun et al., 2005).

Spatial models extract and use information from spatially adjacent observations and account for the interdependencies. To do that, we include a nxn spatial weight matrix W that assigns weights to different spatial lags of the dependent variable, sales price. The matrix consists of Euclidean distances between hotels using their geographic coordinates, latitude and longitude. We first compute each hotel sales transaction in our sample's distances from its (n-1) neighbours and then calculate the inverse of these Euclidean distances. These are used in the weight matrix to reflect the decreasing impact with distance. Our spatial lag model, which accounts for spatial interdependencies in the sales transaction prices is shown in the following equation.

$$\ln(\text{sale price}) = \rho W \ln(\text{sale price}) + \sum \beta X_i + \beta \text{ Brand} + \sum \beta_{ti} T_i + u_i \quad \text{------(4)}$$

We document a positive value for ρ statistically significant at the 10% level implying that the prices of the hotels are moderately influenced by sales prices of neighbouring assets. We also examine using a spatial autoregression model with error correction as well. The spatial autoregression model with error correction specification is an enhancement to (4) by also accounting for spatial dependencies in the error term, $u_i$ which is specified as

$$u_i = \lambda W u_i + \acute{\omega}_i \quad \text{------ (5)}$$

where λ is the spatial error coefficient and $\acute{\omega}_i$ is the error. We find that λ is insignificant in our models implying there is no need to account for error correction in the spatial model.

Therefore, in this section, we run our main tests (OLS and 2SLS) using maximum likelihood estimation regressions based on spatial autoregression models without error correction. Table 7 presents the results of our spatial autoregressive model that accounts for spatial dependencies in hotel transaction prices. The first column shows the results from the one stage

spatial regression using a maximum likelihood method. We find that *Brand* is significant and negative in this model similar to the results from OLS. The second column shows the results from the spatial autoregressive instrumental variables model that controls for endogeneity by *Brand*. After accounting for *Brand* endogeneity, we find the coefficients on *Brand* drops its significance. As our spatial autoregressive models are based on maximum likelihood estimators, they do not report the $R^2$ of the model.[2].

----Insert Table 7 here---

*Sample Robustness Analysis*

Missing data causes a major challenge for empirical analysis. If the reasons causing missing data depend neither on observed nor missing data, then data is said to be missing completely at random (MCAR). The data we use for transactions is collected by the research team of CBRE Hotels. They compile this database on a continuous basis, sourcing information from industry journals, articles, external databases and through utilizing the company's relationships with stakeholders. In our study, we lose more than 2/3$^{rd}$ of the observations from the initial database of 1,904 CBRE Hotels transactions since they do not contain sales price information. We do not foresee any significantly systematic reason for some transaction prices to be missing and believe that the mechanism is mostly not dependent on observed or missing data and are indeed random. In situations of MCAR data, it is shown that incomplete datasets are representative of the entire

[2] We acknowledge that there are significant disadvantages of using spatial autoregressive models for our sample due to our sample size limitations A rule of thumb recommended by Congalton (2004) is to use a minimum of 50 samples for each location in the weight matrix. However, he also recommends to further increase this to 75–100 when the study area is large, which is the case for this study. Our overall sample includes only 442 observations, with significantly lower number of observations than the recommended for each location.

dataset with no potential bias (Stead and Wheat, 2020). Therefore, in our analysis we use listwise deletion and the observed dataset includes 443 observations with all variables.

Little and Rubin (2002) raises concerns of using listwise deletion if the missing data is most likely not missing completely at random. If the mechanism causing missing data may depend on observed data or on the missing data, multiple imputation techniques can be used to produce unbiased results. They have been broadly used in economics as a robust statistical method to include data where some observations have missing values for some variables including dependent variable (Stead and Wheat, 2020).

To eliminate a potential biased estimation due to non-random missing or observed data, in this section we conduct a robustness analysis using estimated price values[3] to examine if our results hold in these conditions as well. In our case, the presence of missing values is not restricted to a single variable. We have most of the missing data for one variable – selling price but there are other important hotel characteristics variables like square footage, number of rooms that are missing too in a few observations. Since we have a monotonic missing data pattern, we impute the missing data sequentially by independent univariate imputation models.

Therefore, we use univariate imputation models[4] where we regress the variables with missing values on all covariates, and then simulate new parameters from their joint posterior distribution under an uninformative prior and predict values D times (Schenker and Taylor, 1996). We now have imputed values for several missing independent variables and the dependent variable. The results of our main models using predicted values for selling price from imputation methods are shown in Table 8.

[3] We thank our anonymous referee for the suggestion.

[4] The results hold when we make the assumption of arbitrary missing data pattern and use multiple imputation by chained equations (MICE) as proposed by van Buuren, Boshuizen, and Knook (1999).

----Insert Table 8 here---

With an adjusted R-squared of 0.51, the OLS model gives us a negative coefficient of 0.147 significant at the 5% level for *Brand*. As expected from the main results, we find that after controlling for endogeneity, we have an insignificant coefficient for *Brand*. Although the coefficient on Brand in the first OLS model has changed from almost 14% to about 15% discount, the main findings of *Brand* discounts losing statistical significance after controlling for endogeneity still hold. This demonstrates that employing listwise deletion to use a significantly reduced dataset in our analyses potentially did not bias the empirical finding and the missing data is mostly missing completely at random.

**Discussions and Managerial Implications**

We examine the impact of brand on hotel transaction values and find that brand affiliation has a significant negative impact on hotel transaction prices. This initial discount on transaction value for brand affiliation potentially reflects our overall understanding of investor behaviour regarding brand encumbrance. While brands may improve hotel operating performance (Kim et al., 2003; O'Neill & Mattila, 2006; Prasad & Dev, 2000; Xiao et al., 2012), it appears that the restrictions imposed by the brand can outweigh these benefits for many investors who prefer properties with fewer restrictions. For example, opportunistic investors often hold the assets for a shorter time to capitalize on the exit value, and as such are less concerned with the operating performance of the property (Davis & deRoos, 2004; Poretti & Das, 2020). Thus, investors often attribute greater value to unencumbered properties because they are seen as a 'blank slate,' giving the new investors increased flexibility with the asset, which is in line with conventional wisdom (Lesser, 2013).

However, we found that brand affiliation loses its significance after controlling for endogeneity, implying that after controlling for possible latent characteristics of branded

properties, *brand* no longer adds additional predictive power. Thus, brand encumbrance may not, in fact, negatively impact transaction values in the UK. These results are consistent with previous findings that management encumbrance does not detract value from hotels (Hodari et al., 2017). This study's findings, therefore, call into question the general industry view that brand encumbrance reduces the value of hotel assets (Lesser, 2013; Lesser & Rogovin, 2010). Although there may be investors in the UK that heavily favour unaffiliated hotels, such as private equity firms, brand affiliation does not actually appear to decrease the value of a hotel, despite the conventional wisdom to the contrary. Perhaps this is due to strong demand for branded hotels from other investors, which protects the market value of branded properties from dropping significantly. For example, REITS and institutional investors, who are also important investors in the UK hotel market (Hickey, 2015), often tend to invest with a long-term outlook (Lesser & Rogovin, 2010) and therefore would likely not discount hotels that are encumbered by a brand, especially when the brand is one that the investors believe provides the property with a competitive advantage.

Our findings have several implications for hotel owners, managers, and investors. Hotel owners have, for example, often been reluctant to brand their hotels due to the assumed discounted sales price they would receive upon sale of the asset due to its brand encumbrance. With our findings, however, we can partially alleviate their fears as we find that brand, after controlling for endogeneity, does not in fact negatively impact the value of transacted hotels. For owners this is a critical issue as they are able to benefit from brand-affiliation's purported positive impact on operating performance through higher rates and/or occupancy levels and still command the highest possible sales price despite the brand encumbrance. Therefore, investors who could be concerned about a potential negative impact of brands on their returns should be less concerned about this as a result of this study's findings.

Investors whose investment strategies include debt financing are often required by their lenders to affiliate their hotels to a brand as they see this as adding a significant level of stability and security to the investment. While previously such investors may have balked at this idea due to the perceived notion that a brand would decrease the value of the asset, our findings should help negate this concern. As such, investors who may not have pursued such debt financing, and possibly not invested in a hotel as a result, can now more confidently accept such financing terms in order to execute their acquisition. As part of a hotel investment strategy, therefore, investors can benefit from brand affiliation such as positive impact on operating results, easier access to debt financing, economies of scale in such areas as purchasing and negotiate prices with online travel agencies, without concern about any negative impact on transaction prices.

Hotel management and franchise companies, which own the brands, often find it difficult to affiliate hotels when property owners are concerned about encumbrance's perceived negative impact on their hotels' market value. These management companies could, however, use this study's findings as a way to promote affiliation to their brands because the common perception that brands have a negative impact on market value appears, in fact, to be a misperception Furthermore, in recent years hotel companies have had to shorten the length of their franchise and management agreements in order to offer owners more flexibility to sell their hotels as unencumbered. This has negatively impacted the valuation of hotel companies as their expected future cash flow streams are reduced or perceived as less secure. However, demonstrating to investors that the negative impact of brands on market value is not due to the status of being branded but driven primarily by other hotel characteristics may help them to defend their longer contracts and thereby improve their valuation and reduce any perceived risk by potential investors.

## Concluding Remarks

A hotel owner's decision to affiliate a hotel with a brand can have a fundamentally important impact on its operating performance and value. However, what impact remains an open question. Our study shows that, at first, brand affiliation appears to actually have a negative effect on hotel transaction value, reflecting the conventional wisdom regarding opportunistic investor behaviour toward brand encumbrance. However, after controlling for endogeneity, we determine that brand affiliation does not, in fact, negatively impact hotel asset value. Rather, the characteristics of branded hotels, and not the fact that they are branded, are responsible for decreasing the asset value of branded hotels.

To the best of our knowledge, this is the first study to examine the value of brand in hotels in general and the first to control for endogeneity in studies that examine the valuation of affiliations in any commercial real estate asset type. This is an important contribution to the brand literature because our results demonstrate that lacking this control, results about the benefits and impacts of brands can be skewed and misrepresented. This study also contributes to the broader hotel valuation literature by not only adding to the limited number of hedonic hotel valuation studies but also by demonstrating the importance of controlling for endogeneity imposed by brands.

Our study is limited, since we have not been able to account for different investors as we only had information about general investor behaviour. Different investors prioritize different hotel characteristics (Corgel & deRoos, 1994), such as brand. Although we can make assumptions about the general investors interested in the UK in recent years, we cannot draw conclusions about brand affiliation with regards to specific investors who may have been active in the UK. We recommend that future studies investigate other factors that may influence how—and to what

extent—brand impacts hotel real estate values. For instance, it could be insightful to study the effect of brand on hotel market values across different investor types.

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**Appendix A**

*Control variables:*

1. *Market Segmentation*- (provided by STR) As the impact of brand on hotel operating performance depends on the market segmentation of a hotel (Carvell et al., 2016; Lee et al., 2016), we believe that it may also influence the degree to which brands impact hotel real estate value. We use six dummy variables: economy, midscale, upper midscale, upscale, upper upscale and luxury to proxy for market segmentation. We then group all upper scale and luxury classes as one category and all midscale and economy classes as one category for further analyses.
2. *Hotel Physical Characteristics (provided by STR):*
    a. *Room Count*- This has been found to be the biggest determinant in hotel transaction value (Roubi & Litteljohn, 2004). Due to the skewedness of the hotels' room counts and to reduce error, we applied a natural logarithmic function to the *rooms.*
    b. *Floors*- Physical characteristics of a property have also been known to influence a hotel's transaction value (Roubi & Litteljohn, 2004). Therefore, the number of floors of the transacted property was incorporated.
    c. *Meeting room space*- As another physical characteristic, we included the *largest meeting space,* measured using a natural logarithmic function in order to reduce error.
    d. *Other* - We also introduced five other physical characteristics through the use of dummy variables: the presence (or not) of *restaurant, spa, golf, property serviced apartments* and *boutique.*
3. *Hotel location characteristics* (provided by STR)

a. *London*- London is known to have a unique hotel investment market (Hickey, 2015). We therefore introduced a dummy variable, *London,* to account for transactions having taken place there.

b. *UK Prime*- Properties within UK Prime properties are defined as properties within Birmingham, Leeds, Glasgow, Sheffield, Bradford, Liverpool, Edinburgh or Manchester. The variable is measured through a dummy variable.

c. *Other Locations*- Properties within UK that are not located in London or UK Prime.

d. *Hotel type*- STR categorizes hotels due to their location and thus the following dummy variables were introduced: *suburban, urban*, *airport,* and *interstate.*

e. *Latitude/Longitude*- In order to control for spatial-autocorrelation, we introduced *latitude* and *longitude*.

4. *Hotel Transaction Characteristics* (provided by CBRE)

a. *Management structure at time of sale*- As found by Hodari et al. (2017) management structure at the time of sale influences the transaction value of a property. We incorporated this into our study by using three dummy variables, *management agreement, lease agreement* and *vacant possession.*

b. *Year of Sale*- The year of the transaction is an important factor in determining the sales price of an asset (Lee et al., 2016; O'Neill, 2004; Roubi & Litteljohn, 2004). We therefore introduced 16 dummy variables to reflect the year of each transaction.

Figure 1: Kernel Density Tests of Residual Normality

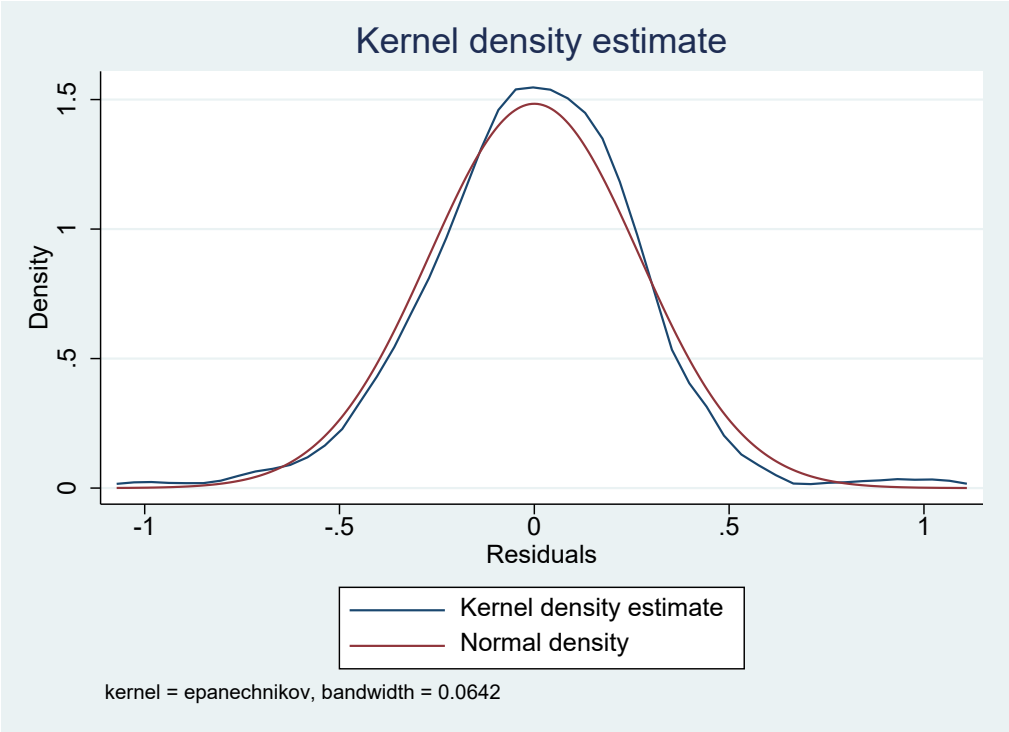


Figure 2: Normal Probability Plot of the Residuals

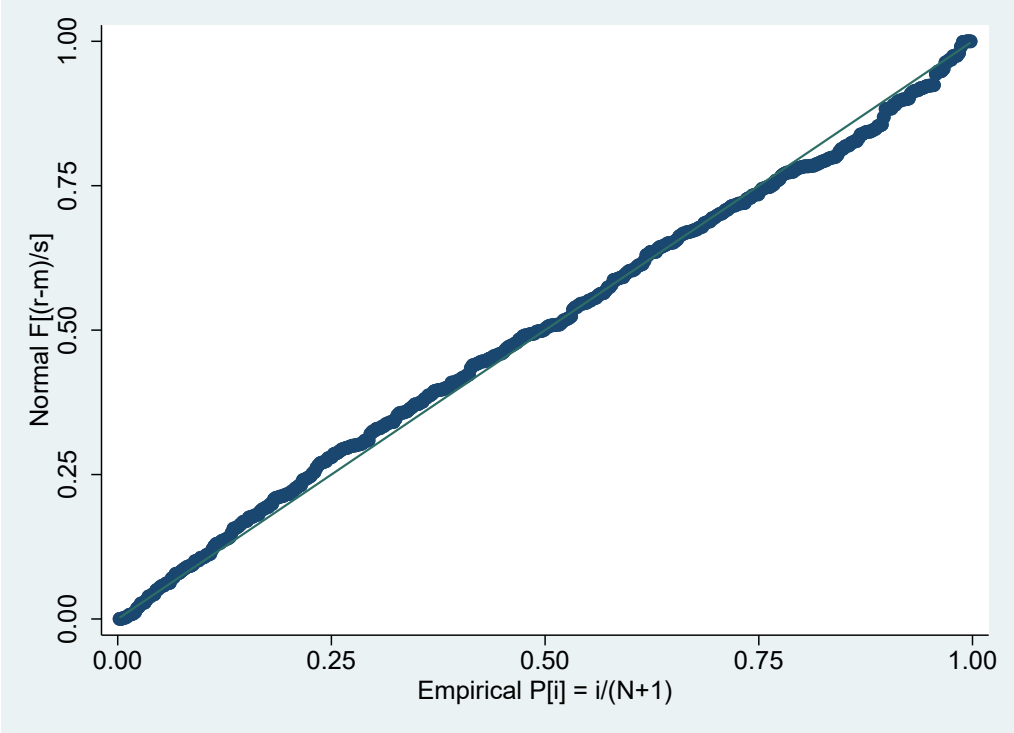

Table 1. Descriptive statistics

| Variable | Mean | Standard Deviation |
|---|---|---|
| *Sale Price* | 21,447,987.40 | 35,794,144.82 |
| *Brand* | 0.49 | 0.50 |
| *Vacant possession* | 0.46 | 0.50 |
| *Management Contract* | 0.17 | 0.38 |
| *Lease* | 0.37 | 0.48 |
| *Luxury* | 0.09 | 0.29 |
| *Upper Upscale* | 0.32 | 0.47 |
| *Upscale* | 0.14 | 0.35 |
| *Upper Midscale* | 0.15 | 0.36 |
| *Midscale* | 0.05 | 0.21 |
| *Economy* | 0.25 | 0.44 |
| *Rooms* | 141.74 | 109.24 |
| *Floors* | 3.15 | 3.63 |
| *Restaurant* | 0.87 | 0.34 |
| *Spa* | 0.24 | 0.42 |
| *Golf* | 0.05 | 0.22 |
| *Boutique* | 0.04 | 0.19 |
| *Property Serviced Apartments* | 0.01 | 0.11 |
| *London* | 0.23 | 0.42 |
| *UK Prime* | 0.18 | 0.39 |
| *Latitude* | 52.50 | 1.59 |
| *Longitude* | -1.45 | 1.39 |
| *Suburban* | 0.43 | 0.50 |
| *Urban* | 0.45 | 0.50 |
| *Airport* | 0.05 | 0.21 |
| *Interstate* | 0.02 | 0.12 |
| *Resort* | 0.02 | 0.13 |
| *Small Town Metro* | 0.04 | 0.20 |
| *2000* | 0.01 | 0.09 |
| *2001* | 0.01 | 0.09 |
| *2002* | 0.01 | 0.09 |
| *2003* | 0.01 | 0.11 |
| *2004* | 0.02 | 0.12 |
| *2005* | 0.04 | 0.19 |
| *2006* | 0.05 | 0.22 |
| *2007* | 0.04 | 0.19 |
| *2008* | 0.02 | 0.13 |
| *2009* | 0.03 | 0.18 |
| *2010* | 0.07 | 0.26 |
| *2011* | 0.17 | 0.37 |
| *2012* | 0.10 | 0.30 |
| *2013* | 0.26 | 0.44 |
| *2014* | 0.16 | 0.37 |
| *2015* | 0.02 | 0.14 |

Table 2. Descriptive statistics for the sample across branded and unbranded properties

| | **Branded** | | **Unbranded** | |
|---|---|---|---|---|
| **Variable** | **Mean** | **Standard Deviation** | **Mean** | **Standard Deviation** |
| *Sale Price* | 23,757,401.06 | 41,655,348.65 | 19,220,686.24 | 28,966,462.22 |
| *Brand* | 1.00 | 0.00 | 0.00 | 0.00 |
| *Vacant possession* | 0.00 | 0.00 | 0.90 | 0.30 |
| *Management Contract* | 0.31 | 0.31 | 0.04 | 0.20 |
| *Lease* | 0.69 | 0.69 | 0.06 | 0.24 |
| *Luxury* | 0.03 | 0.03 | 0.15 | 0.35 |
| *Upper Upscale* | 0.37 | 0.37 | 0.26 | 0.44 |
| *Upscale* | 0.06 | 0.06 | 0.22 | 0.41 |
| *Upper Midscale* | 0.08 | 0.08 | 0.22 | 0.42 |
| *Midscale* | 0.03 | 0.03 | 0.06 | 0.23 |
| *Economy* | 0.42 | 0.42 | 0.09 | 0.29 |
| *Rooms* | 176.67 | 176.67 | 108.05 | 89.99 |
| *Floors* | 3.40 | 3.40 | 2.91 | 2.93 |
| *Restaurant* | 0.84 | 0.84 | 0.90 | 0.30 |
| *Spa* | 0.20 | 0.20 | 0.27 | 0.45 |
| *Golf* | 0.03 | 0.03 | 0.07 | 0.26 |
| *Boutique* | 0.01 | 0.01 | 0.06 | 0.23 |
| *Property Serviced Apts.* | 0.01 | 0.01 | 0.01 | 0.11 |
| *London* | 0.25 | 0.25 | 0.21 | 0.41 |
| *UK Prime* | 0.23 | 0.23 | 0.14 | 0.35 |
| *Latitude* | 52.58 | 52.58 | 52.42 | 1.61 |
| *Longitude* | -1.37 | -1.37 | -1.53 | 1.40 |
| *Suburban* | 0.38 | 0.38 | 0.48 | 0.50 |
| *Urban* | 0.49 | 0.49 | 0.40 | 0.49 |
| *Airport* | 0.06 | 0.06 | 0.04 | 0.19 |
| *Interstate* | 0.02 | 0.02 | 0.01 | 0.09 |
| *Resort* | 0.01 | 0.01 | 0.03 | 0.16 |
| *Small Town Metro* | 0.04 | 0.04 | 0.05 | 0.22 |
| *2000* | 0.00 | 0.00 | 0.02 | 0.13 |
| *2001* | 0.01 | 0.01 | 0.01 | 0.09 |
| *2002* | 0.00 | 0.00 | 0.01 | 0.11 |
| *2003* | 0.00 | 0.00 | 0.02 | 0.13 |
| *2004* | 0.01 | 0.01 | 0.02 | 0.15 |
| *2005* | 0.02 | 0.02 | 0.05 | 0.22 |
| *2006* | 0.03 | 0.03 | 0.07 | 0.26 |
| *2007* | 0.03 | 0.03 | 0.04 | 0.20 |
| *2008* | 0.01 | 0.01 | 0.02 | 0.15 |
| *2009* | 0.03 | 0.03 | 0.03 | 0.17 |
| *2010* | 0.10 | 0.10 | 0.04 | 0.21 |
| *2011* | 0.14 | 0.14 | 0.19 | 0.39 |
| *2012* | 0.06 | 0.06 | 0.14 | 0.35 |
| *2013* | 0.34 | 0.34 | 0.17 | 0.38 |
| *2014* | 0.19 | 0.19 | 0.13 | 0.34 |
| *2015* | 0.02 | 0.02 | 0.02 | 0.15 |

Table 3. Correlation Matrix

| | ACTUALSALEPRICE | VacantPosession | ManagementContract | New Lease | Rooms | BRANDEDNEW | Luxury | UpperUpscale | Upscale | UpperMidscale | Midscale | Economy | Latitude | Longitude | Urban | Suburban | Airport | Interstate | Resort | SmallTownMetro | Floors | IndoorCorridors | Restaurant | LargestMeetingSpace | Spa | Golf | AllSuites | London | UK Prime non London |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ACTUALSALEPRICE | 1.00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| VacantPosession | -0.08 | 1.00 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ManagementContract | 0.10 | -0.42 | 1.00 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| New Lease | 0.00 | -0.70 | -0.35 | 1.00 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rooms | 0.50 | -0.29 | 0.24 | 0.11 | 1.00 | | | | | | | | | | | | | | | | | | | | | | | | |
| BRANDEDNEW | 0.06 | -0.90 | 0.36 | 0.65 | 0.31 | 1.00 | | | | | | | | | | | | | | | | | | | | | | | |
| Luxury | 0.24 | 0.19 | -0.04 | -0.16 | -0.10 | -0.20 | 1.00 | | | | | | | | | | | | | | | | | | | | | | |
| UpperUpscale | 0.11 | -0.10 | 0.39 | -0.20 | 0.15 | 0.12 | -0.21 | 1.00 | | | | | | | | | | | | | | | | | | | | | |
| Upscale | 0.00 | 0.15 | -0.12 | -0.06 | 0.04 | -0.22 | -0.13 | -0.28 | 1.00 | | | | | | | | | | | | | | | | | | | | |
| UpperMidscale | -0.12 | 0.22 | -0.03 | -0.21 | -0.01 | -0.20 | -0.13 | -0.29 | -0.17 | 1.00 | | | | | | | | | | | | | | | | | | | |
| Midscale | -0.06 | 0.02 | -0.01 | -0.01 | -0.03 | -0.06 | -0.07 | -0.15 | -0.09 | -0.09 | 1.00 | | | | | | | | | | | | | | | | | | |
| Economy | -0.15 | -0.33 | -0.27 | 0.54 | -0.10 | 0.37 | -0.18 | -0.40 | -0.24 | -0.25 | -0.13 | 1.00 | | | | | | | | | | | | | | | | | |
| Latitude | -0.08 | -0.02 | 0.08 | -0.05 | 0.00 | 0.05 | 0.02 | -0.01 | 0.00 | 0.01 | 0.05 | -0.04 | 1.00 | | | | | | | | | | | | | | | | |
| Longitude | 0.17 | -0.06 | -0.04 | 0.09 | 0.12 | 0.06 | -0.03 | 0.00 | -0.07 | 0.01 | -0.03 | 0.08 | -0.53 | 1.00 | | | | | | | | | | | | | | | |
| Urban | 0.13 | -0.08 | 0.00 | 0.08 | 0.15 | 0.08 | -0.08 | 0.02 | 0.16 | -0.10 | 0.02 | -0.02 | -0.02 | 0.06 | 1.00 | | | | | | | | | | | | | | |
| Suburban | -0.15 | 0.11 | -0.03 | -0.09 | -0.25 | -0.09 | 0.00 | -0.03 | -0.12 | 0.09 | -0.01 | 0.06 | -0.08 | -0.02 | -0.78 | 1.00 | | | | | | | | | | | | | |
| Airport | 0.04 | -0.08 | 0.10 | 0.00 | 0.32 | 0.06 | -0.07 | 0.10 | -0.03 | 0.05 | 0.00 | -0.08 | 0.06 | 0.00 | -0.20 | -0.19 | 1.00 | | | | | | | | | | | | |
| Interstate | -0.03 | -0.04 | -0.01 | 0.05 | -0.02 | 0.06 | 0.02 | -0.01 | -0.05 | 0.00 | -0.03 | 0.05 | -0.05 | 0.06 | -0.11 | -0.11 | -0.03 | 1.00 | | | | | | | | | | | |
| Resort | 0.15 | 0.05 | 0.07 | -0.10 | 0.05 | -0.07 | 0.19 | -0.02 | -0.01 | -0.06 | 0.05 | -0.08 | 0.16 | -0.15 | -0.12 | -0.12 | -0.03 | -0.02 | 1.00 | | | | | | | | | | |
| SmallTownMetro | -0.07 | 0.01 | -0.07 | 0.05 | -0.12 | -0.03 | 0.13 | -0.05 | -0.02 | 0.00 | -0.05 | 0.00 | 0.11 | -0.03 | -0.19 | -0.18 | -0.05 | -0.03 | -0.03 | 1.00 | | | | | | | | | |
| Floors | 0.25 | -0.06 | 0.27 | -0.15 | 0.34 | 0.07 | -0.04 | 0.16 | 0.08 | 0.00 | -0.01 | -0.21 | 0.00 | 0.00 | 0.20 | -0.11 | -0.05 | -0.08 | -0.06 | -0.09 | 1.00 | | | | | | | | |
| IndoorCorridors | 0.14 | 0.08 | -0.07 | -0.03 | 0.09 | -0.08 | 0.13 | -0.06 | 0.05 | 0.12 | 0.02 | -0.17 | 0.07 | -0.03 | 0.04 | -0.04 | -0.02 | -0.06 | 0.03 | 0.03 | 0.35 | 1.00 | | | | | | | |
| Restaurant | 0.10 | 0.06 | 0.14 | -0.17 | 0.14 | -0.09 | 0.05 | 0.19 | 0.14 | 0.01 | 0.02 | -0.37 | 0.05 | -0.13 | -0.06 | 0.01 | 0.09 | -0.11 | 0.05 | 0.05 | 0.13 | 0.14 | 1.00 | | | | | | |
| LargestMeetingSpace | 0.28 | -0.12 | 0.39 | -0.18 | 0.50 | 0.13 | -0.04 | 0.31 | 0.04 | 0.01 | -0.02 | -0.33 | 0.04 | -0.01 | 0.07 | -0.05 | 0.08 | -0.01 | -0.01 | -0.11 | 0.37 | 0.13 | 0.24 | 1.00 | | | | | |
| Spa | 0.09 | 0.08 | 0.13 | -0.18 | 0.05 | -0.09 | 0.31 | 0.21 | -0.04 | -0.03 | -0.10 | -0.32 | 0.03 | -0.06 | -0.11 | 0.02 | 0.03 | 0.02 | 0.16 | 0.07 | 0.01 | 0.10 | 0.20 | 0.16 | 1.00 | | | | |
| Golf | 0.07 | 0.07 | 0.11 | -0.16 | -0.02 | -0.09 | 0.14 | 0.06 | 0.02 | -0.01 | -0.05 | -0.14 | 0.02 | -0.04 | -0.13 | 0.06 | -0.05 | -0.03 | 0.35 | 0.00 | -0.05 | 0.05 | 0.09 | 0.05 | 0.28 | 1.00 | | | |
| AllSuites | 0.11 | 0.03 | 0.02 | -0.04 | -0.05 | -0.05 | 0.07 | 0.07 | -0.06 | -0.06 | 0.05 | -0.05 | -0.01 | 0.07 | 0.10 | -0.06 | -0.03 | -0.02 | -0.02 | -0.03 | 0.00 | 0.01 | -0.18 | -0.05 | 0.00 | -0.03 | 1.00 | | |
| London | 0.34 | -0.04 | -0.08 | 0.11 | 0.14 | 0.05 | 0.05 | -0.03 | -0.01 | -0.14 | -0.02 | 0.13 | -0.35 | 0.52 | 0.30 | -0.19 | -0.10 | -0.03 | -0.07 | -0.12 | 0.13 | 0.02 | -0.17 | -0.04 | -0.15 | -0.13 | 0.15 | 1.00 | |
| UK Prime non London | -0.02 | -0.11 | 0.08 | 0.05 | 0.22 | 0.11 | -0.09 | 0.05 | 0.09 | -0.05 | -0.05 | -0.01 | 0.51 | -0.40 | 0.18 | -0.20 | 0.14 | -0.06 | -0.06 | -0.01 | 0.22 | 0.07 | -0.02 | 0.09 | -0.01 | -0.08 | -0.03 | -0.26 | 1.00 |

Table 4. The impact of *Brand* on hotel values

| VARIABLES | Main Model | Model controlling for Brand Endogeneity |
|---|---|---|
| Brand | -0.1365* | -0.0301 |
| | (-1.68) | (-0.27) |
| Management Contract | 0.1351*** | 0.0381 |
| | (2.05) | (0.75) |
| Vacant Possession | -0.2603** | -0.1107 |
| | (-1.97) | (-1.08) |
| Log Rooms | 0.2934*** | 0.2858*** |
| | (9.76) | (9.18) |
| Lease | 0.0445 | 0.0623 |
| | (0.70) | (0.97) |
| Boutique | 0.0487 | 0.0540 |
| | (0.65) | (0.74) |
| Property Serviced Apartments | 0.4499*** | 0.4419*** |
| | (6.08) | (5.88) |
| Spa | 0.0461 | 0.0470 |
| | (1.27) | (1.35) |
| Golf | 0.1035 | 0.1045 |
| | (1.45) | (1.56) |
| Restaurant | 0.1029** | 0.1048** |
| | (2.26) | (2.41) |
| Suburban | -0.0758** | -0.0755** |
| | (-2.34) | (-2.42) |
| Airport | 0.0208 | 0.0278 |
| | (0.39) | (0.53) |
| Interstate | -0.1166 | -0.1214 |
| | (-0.96) | (-1.04) |
| Resort | 0.0479 | 0.0563 |
| | (0.37) | (0.43) |
| Luxury | 0.2815*** | 0.2725*** |
| | (3.68) | (3.70) |
| UpperUpscale | 0.1044** | 0.0882* |
| | (1.99) | (1.69) |
| UpperMidscale | -0.1146** | -0.1242** |
| | (-2.05) | (-2.32) |
| Midscale | -0.2132*** | -0.2172*** |
| | (-2.86) | (-3.03) |
| Economy | -0.0064 | -0.0202 |
| | (-0.09) | (-0.28) |
| Floors | 0.00596 | 0.00568 |
| | (1.55) | (1.53) |
| London | 0.3485*** | 0.3503*** |
| | (8.13) | (8.48) |

| | | |
|---|---|---|
| UKPrime | -0.0845** | -0.0824** |
| | (-2.33) | (-2.36) |
| Year Controls | Yes | Yes |
| Micro-location Controls | Yes | Yes |
| Constant | 5.3515*** | 5.4226*** |
| | (7.87) | (8.14) |
| Observations | 453 | 453 |
| Adjusted R-squared | 0.66 | 0.65 |

*** p<0.01, ** p<0.05, * p<0.1

Table 5. The impact of *Brand* on hotel values across chain scale segments

| VARIABLES | Luxury and Upscale | Economy and Midscale |
|---|---|---|
| Brand | -0.0842 | -0.0790* |
| | (-0.56) | (-1.69) |
| Management Contract | 0.0166 | 0.5182* |
| | (0.26) | (1.70) |
| Vacant Posession | -0.1864 | -0.6804* |
| | (-1.41) | (-1.74) |
| Log Rooms | 0.2539*** | 0.2202*** |
| | (6.75) | (3.71) |
| New Lease | 0.0725 | 0.1257 |
| | (0.85) | (1.03) |
| Boutique | 0.1056 | |
| | (1.42) | |
| Property Serviced Apartments | 0.6054*** | 0.2960 |
| | (3.06) | (0.86) |
| Spa | 0.1034*** | -0.5401 |
| | (2.70) | (-0.80) |
| Golf | 0.1122 | |
| | (1.33) | |
| Restaurant | 0.1428* | 0.0961* |
| | (1.74) | (1.72) |
| Suburban | -0.0153 | -0.2068*** |
| | (-0.39) | (-4.16) |
| Airport | 0.0653 | 0.2178* |
| | (1.09) | (1.89) |
| Interstate | 0.1474 | -0.3887** |
| | (1.21) | (-2.03) |
| Resort | 0.3072* | -0.5698*** |
| | (1.88) | (-5.14) |
| Floors | 0.0111** | -0.0105 |
| | (2.43) | (-1.36) |
| UKPrime | 0.4556*** | 0.2806*** |
| | (7.44) | (5.37) |
| London | 0.1321*** | 0.0468 |
| | (3.11) | (0.81) |
| Year Controls | Yes | Yes |
| Micro-location Controls | Yes | Yes |
| Constant | 5.1744*** | 7.4316*** |
| | (6.95) | (6.17) |

| | | |
|---|---|---|
| Observations | 320 | 133 |
| R-squared | 0.69 | 0.60 |

*** p<0.01, ** p<0.05, * p<0.1

Table 6. The impact of *Brand* on hotel values across market segments

| VARIABLES | UKPrime | London | Other Locations |
|---|---|---|---|
| Brand | -0.0805 | -0.0376* | 0.21137 |
| | (-0.34) | (-1.76) | (1.17) |
| ManagementContract | 0.1165 | -0.0840 | -0.01486 |
| | (0.98) | (-0.52) | (-0.22) |
| VacantPosession | -0.2477 | -0.2160 | 0.01104 |
| | (-1.22) | (-1.07) | (0.07) |
| LogRooms | 0.4291*** | 0.2710*** | 0.26072*** |
| | (6.67) | (6.11) | (5.46) |
| Boutique | 0.0612 | -0.1186 | -0.20411** |
| | (0.51) | (-0.91) | (-2.51) |
| Property Serviced Apartments | | 0.2980** | |
| | | (2.20) | |
| Spa | 0.23214** | -0.04973 | 0.04113 |
| | (2.00) | (-0.43) | (1.00) |
| Restaurant | 0.06770 | 0.06329 | 0.12543* |
| | (0.56) | (0.79) | (1.92) |
| Suburban | -0.00720 | -0.10207 | -0.03568 |
| | (-0.20) | (-1.36) | (-0.91) |
| Airport | -0.12740* | 0.10447 | 0.06024 |
| | (-1.95) | (0.55) | (0.84) |
| Interstate | -0.02849 | -0.12808 | -0.08059 |
| | (-0.22) | (-1.21) | (-0.49) |
| Luxury | -0.05007 | 0.38745** | 0.19025* |
| | (-0.38) | (2.43) | (1.81) |
| UpperUpscale | 0.10208 | 0.09101 | 0.03590 |
| | (0.48) | (0.87) | (0.47) |
| UpperMidscale | 0.20548 | -0.26969* | -0.14829* |
| | (1.17) | (-1.65) | (-1.90) |
| Midscale | 0.03599 | -0.30820** | -0.28248*** |
| | (0.37) | (-2.28) | (-3.01) |
| Economy | -0.01878 | -0.17607* | -0.04227 |
| | (-0.13) | (-1.75) | (-0.33) |
| Floors | 0.01957 | 0.00452 | 0.00245 |
| | (0.12) | (0.47) | (0.44) |
| NewLease | 0.06124 | -0.02947 | -0.14166 |
| | (0.51) | (-0.24) | (-1.39) |
| Golf | 0.10167 | | 0.10291 |
| | (0.73) | | (1.15) |
| Resort | 0.00420 | | 0.13107 |
| | (0.66) | | (0.74) |

| | | | |
|---|---|---|---|
| Year Controls | Yes | Yes | Yes |
| Micro-location Controls | Yes | Yes | Yes |
| Constant | 5.62957*** | -11.44351 | 6.86171*** |
| | (3.25) | (-0.22) | (8.64) |
| Observations | 85 | 104 | 264 |
| R-squared | 0.82 | 0.64 | 0.59 |

*** p<0.01, ** p<0.05, * p<0.1

Table 7: The Impact of *Brand* on Hotel Values using Spatial Autoregressive Models

| VARIABLES | Main Model | Model controlling for Brand Endogeneity |
|---|---|---|
| Brand | -0.16622** | -0.10332 |
| | (-2.32) | (-0.77) |
| ManagementContract | 0.1700*** | 0.0686 |
| | (34.18) | (0.67) |
| VacantPosession | -0.60854*** | -0.64416*** |
| | (-35.32) | (-32.94) |
| LogRooms | 0.33682*** | 0.33198*** |
| | (14.79) | (13.61) |
| Boutique | 0.20568** | 0.21011** |
| | (2.51) | (2.55) |
| Property Serviced Apartments | 0.63062*** | 0.62773*** |
| | (4.42) | (4.40) |
| Spa | 0.01780 | 0.01753 |
| | (0.46) | (0.45) |
| Golf | 0.04908 | 0.04961 |
| | (1.02) | (1.03) |
| Resort | -0.01358 | -0.02108 |
| | (-0.12) | (-0.19) |
| Restaurant | 0.11389*** | 0.11411*** |
| | (3.60) | (3.60) |
| Suburban | -0.06064 | -0.05701 |
| | (-0.84) | (-0.78) |
| Airport | -0.19901* | -0.20121* |
| | (-1.71) | (-1.73) |
| Interstate | 0.32164*** | 0.31547*** |
| | (4.80) | (4.64) |
| Resort | 0.10541** | 0.09592* |
| | (2.12) | (1.82) |
| Luxury | 0.12979** | 0.13558** |
| | (2.38) | (2.44) |
| UpperUpscale | 0.21569*** | 0.21775*** |
| | (2.76) | (2.78) |
| UpperMidscale | -0.00002 | -0.01329 |
| | (-0.00) | (-0.21) |
| Midscale | -0.01068** | -0.01065** |
| | (-2.36) | (-2.36) |
| Economy | -0.78701*** | -0.77165*** |
| | (-35.19) | (-34.58) |
| Floors | 0.10050 | 0.10182 |
| | (1.40) | (1.41) |

| | | |
|---|---|---|
| UKPrime | -0.02727 | -0.02271 |
| | (-0.23) | (-0.19) |
| London | 0.21002*** | 0.21019*** |
| | (5.43) | (5.43) |
| Year Controls | Yes | Yes |
| Observations | 442 | 442 |

*** p<0.01, ** p<0.05, * p<0.1

Table 8: The Impact of *Brand* on Hotel Values using Predicted Values of Selling Price

| VARIABLES | Main Model | Model controlling for Brand Endogeneity |
|---|---|---|
| Brand | -0.19231* | 0.06918 |
| | (-1.79) | (0.99) |
| Management Contract | 0.18910*** | 0.04983 |
| | (3.43) | (0.60) |
| Vacant Possession | -0.26656*** | -0.15395* |
| | (-5.15) | (-1.92) |
| Log Rooms | 0.32157*** | 0.31066*** |
| | (15.38) | (18.84) |
| Lease | 0.56110*** | 0.30307** |
| | (6.43) | (2.04) |
| Boutique | 0.04404 | 0.07011 |
| | (0.78) | (0.07) |
| Property Serviced Apartments | 0.51545*** | 0.46115*** |
| | (3.98) | (2.63) |
| Spa | 0.41461** | 0.32787** |
| | (2.39) | (1.99) |
| Golf | 0.13012* | 0.13283* |
| | (1.69) | (1.73) |
| Restaurant | 0.06511 | 0.07785 |
| | (1.23) | (1.48) |
| Suburban | -12378*** | -0.11914*** |
| | (-3.61) | (-3.49) |
| Airport | 0.60763*** | 0.61080*** |
| | (4.43) | (4.89) |
| Interstate | 0.32368*** | 0.33109*** |
| | (3.67) | (3.36) |
| Resort | 0.02842 | 0.05173 |
| | (0.22) | (0.41) |
| Luxury | 0.60718*** | 0.64550*** |
| | (5.04) | (5.73) |
| UpperUpscale | 0.12863* | 0.13345* |
| | (1.82) | (1.92) |
| UpperMidscale | 0.02121 | 0.14754* |
| | (0.29) | (1.77) |
| Midscale | 0.49101*** | 0.61885*** |
| | (6.40) | (7.69) |
| Economy | -0.38624*** | -0.27764*** |
| | (-5.25) | (-2.66) |
| Floors | 0.01352*** | 0.01222** |
| | (2.96) | (2.50) |
| London | 1.24880*** | 1.15397*** |
| | (22.11) | (18.62) |

| | | |
|---|---|---|
| UKPrime | 0.38039*** | 0.37450*** |
| | (6.76) | (6.02) |
| Year Controls | Yes | Yes |
| Micro-location Controls | Yes | Yes |
| Constant | 5.3515*** | 5.4226*** |
| | (7.87) | (8.14) |
| Observations | 1904 | 1904 |
| Adjusted R-squared | 0.46 | 0.43 |