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Are Move-in Ready Properties More Expensive?*

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Abstract

A large share of residential properties on sale in developing countries is under construction. This is partly due to lengthy periods of construction. But purchasing under-construction properties can be costly and risky because of construction delays and the possibility of stalled construction. Hence, property sellers would expect buyers to pay higher prices for completed or move-in ready properties relative to under-construction ones. Prolonged construction times can also lead to higher resale prices. Buyers with an appetite for risk might purchase new under-construction properties at lower costs and resell these at higher prices, either when construction is complete, or when market prices increase, or both. In this paper, we use residential property listings data from the six largest urban agglomerations (UAs) in India - Bangalore, Chennai, Hyderabad, Kolkata, Mumbai, and Delhi - between 2010-2012 and estimate the sellers' expected premium for move-in ready properties in each UA. Hedonic regressions of listed prices on property attributes reveal that the expected move-in ready premium is statistically significant in Bangalore, Kolkata, Mumbai, and Delhi, and its magnitude varies between 3-14%. At unconditional average property prices, the move-in ready premium is 23-150% of an average household's income in these UAs. We also find that the expected resale premium is significant and varies between 2-16% in three UAs. The resale premium is partly explained by a higher move-in ready premium among resale properties and possible speculative behavior.

JEL Classification: R21, R22, R32

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1 Introduction

A large share of residential properties for sale in developing countries is under construction. Figure 1 shows that 54-78% of listed properties for sale in the six largest urban agglomerations (UAs) in India during 2010-2012 were still under construction. In contrast, move-in ready properties, which includes completed new properties and older resale properties, constituted 22-46% of listed properties for sale in these UAs during the same time.

Properties often resell while still under construction because it takes a long time to build housing in India. Gandhi *et al.* (2021) reports that the average time to complete a housing construction project in Mumbai is 8.5 years. One reason behind extended construction times is the difficulty in obtaining permits in Indian cities. According to a 2009 World Bank report on doing business in India, it takes on average 80 to 258 days to get construction permits in 17 Indian cities.[1] Slower housing construction in Indian cities is also evident from the fact that the long-term housing supply elasticity in urban India is less than a third of the housing supply elasticity in metropolitan statistical areas (MSAs) of the United States (US) (Dutta *et al.*, 2021; Malpezzi and Maclennan, 2001).

Property sellers would expect buyers to pay higher prices for completed or move-in ready properties relative to ones under construction. One reason behind this is the higher costs associated with under-construction property purchases.[2] First-time buyers might be making a *double payment* that includes a mortgage on loans for a down payment and rent payments on their current homes. Such costs are likely to increase with construction delays.

Buyers' risks are also higher in under-construction property purchases. Construction delays and the possibility of stalled construction are the primary sources of such risks. Construction delays occur due to cost overruns and litigations. Developers' lack of experience and poor management skills contribute to cost overruns (Shibani and Arumugam, 2015). Besides, real estate development is also costly in India because developers do not get formal institutional loans on land purchases and interest rates on construction loans are between 16-18% compared to 8-10% on individual home loans.[3] Gandhi *et al.* (2021) finds that litigations in Mumbai can increase the average construction completion time by roughly 20%.

[1]The International Bank released the report for Reconstruction and Development at the World Bank. The report is titled "Doing Business in India 2009" and can be found on the following weblink: https://www.doingbusiness.org/content/dam/doingBusiness/media/Subnational-Reports/DB09-Sub-India.pdf

[2]See this article published on *The Economics Times*, on the relative advantages of move-in ready versus under-construction properties: https://economictimes.indiatimes.com/wealth/real-estate/should-you-buy-a-ready-or-under-construction-or-resale-house/articleshow/67776055.cms

[3]See Gandhi *et al.* (2021) for land financing and construction loans. Home loan rates during 2010-2012 can be found on the State Bank of India's website: https://sbi.co.in/web/interest-rates/interest-rates/old-interest-rates-last-10-years

Prolonged construction times can lead to higher expected resale prices. Buyers with an appetite for risk might purchase new under-construction properties at lower costs and expect to resell these at higher prices, either when construction is complete, or when market prices increase, or both.[4] Lower home loan rates can further incentivize individuals to borrow for cheaper under-construction property purchases and resell relatively expensive move-in ready properties. Developers also have an incentive to eliminate additional interest payments by financing construction using down payments from *early sales* instead of costly loans. Figure 2 shows that a higher share of move-in ready properties are resold while under-construction properties are more likely to be sold new.

In this paper, we use residential property listings data from the six largest urban agglomerations (UAs) in India - Bangalore, Chennai, Hyderabad, Kolkata, Mumbai, and Delhi - between 2010-2012 and estimate the sellers' expected premium for move-in ready properties in each UA. Our key findings are threefold. First, accounting for neighborhood-level characteristics using locality dummies, hedonic regressions of listed prices on property attributes reveal that the expected move-in ready premium is statistically significant in Bangalore, Kolkata, Mumbai, and Delhi, and its magnitude varies between 3-14% in these UAs. Sellers in Bangalore, Mumbai, and Delhi expect 3-6% higher move-in ready premium for resale properties relative to those listed new. In contrast, sellers in Kolkata expect a 10% higher move-in ready premium for new properties compared to resold ones (see section 4.2 and table 5 for details). Second, we find that Bangalore, Kolkata, and Mumbai are characterized by an expected resale premium of 2-16%. The expected move-in ready premium and possible speculative behavior in Mumbai explains part of the expected resale premium. And finally, for the average priced home the expected move-in ready premium is roughly 23-150% of an average household's annual income in these UAs.

Note that we cannot interpret the coefficient estimates from hedonic regressions of listed prices on property attributes as implicit prices paid for the attributes. The theoretical framework of Rosen (1974), interpreting hedonic coefficient estimates as implicit prices for property attributes, apply when actual transaction data with equilibrium property prices are observed. Using listed prices instead of transaction prices in hedonic regressions induces a measurement error in the dependent variable. Two major factors affecting this measurement error are the amount of time a property is listed on the market and the relative bargaining power of buyers and sellers.[5] Since there is no prior literature on the relationship between listed and sales prices in India, we cannot ascertain the magnitude of the measurement error

[4]New listed properties do not have any prior transaction and could be both move-in ready and under-construction. Besides being complete, move-in ready properties could be both furnished and old.

[5]See Chinloy (1980) for a theoretical discussion of these effects and Sirmans *et al.* (2010) for a meta-analysis of the time-on-market effect on sales prices.

and whether or not it is correlated with the unobserved property attributes. Therefore, we interpret the hedonic coefficient estimates from regressions of listed prices on property attributes as sellers' *expected* implicit prices for the attributes. In other words, the resale and move-in ready premia estimated from our hedonic regressions can be interpreted as premia that sellers expect for these attributes. Hereafter, we use the terms premium and expected premium interchangeably.

Prior work has focused on the presale and forward contract markets — which are similar to under-construction property sales in this paper — in many Asian countries like China, Taiwan, Singapore, and Hong Kong (Chang and Ward, 1993). This literature has predominantly focused on two issues. First, there is a possibility that both buyers and sellers will renege on their contracts; buyers have the option to default, and developers can abandon construction (Chan *et al.*, 2012). And second, under these contracts, moral hazard can lead to inferior construction quality (Chau *et al.*, 2007). To the best of our knowledge, our paper is the first one to provide a monetary value paid for move-in ready properties.

Estimating the move-in ready premium is important for two reasons. First, the estimated move-in ready premium serves as a proxy for the regulatory costs borne by property buyers. Previous literature on the cost of regulation and market frictions in the housing sector has mainly focused on the cost to builders and developers (Gandhi *et al.*, 2021; Glaeser *et al.*, 2005). However, a portion of the tax will also be passed on to property buyers. An estimate of the property sellers' expected premium on move-in ready properties serves as an upper bound for the direct cost of regulation borne by buyers.[6] Second, the move-in ready premium provides us with an estimate of the decrease in housing affordability arising from prolonged construction times. Slower construction implies that the market supply of move-in ready houses is less responsive to changes in prices. Dutta *et al.* (2021) estimates that the long-term housing supply elasticity in urban India is 1.64 compared to 6-13 in US MSAs estimated by Malpezzi and Maclennan (2001). The slower supply response effectively drives up the price of move-in ready homes. As mentioned earlier, resellers might also increase the price of move-in ready properties by purchasing cheaper under-construction homes and reselling these when construction is complete. A higher move-in ready premium among resale properties suggests that buyers purchasing properties with the intention of reselling in the future might be exacerbating the affordability constraints on other buyers.

The literature related to resale property premia can be divided into two major components. A portion of this literature focuses on the capitalization of additional improvements to

[6]This is an upper bound due to two reasons. First, sellers have an incentive to list a property at the highest price possible to maximize their gains. And second, regulatory constraints are just one among several reasons for construction delays.

existing buildings in resale values.[7] Another section of this literature estimates the premium paid for the age of a property. Age serves as a good proxy for several property characteristics that change over time. These characteristics include depreciation, neighborhood effects, and improvements to the structure (Coulson and McMillen, 2008; Coulson *et al.*, 2019). However, the listing data used in this paper does not report the age of properties. This limits our ability to explain the resale premium completely. We find that even after accounting for the confounding effects of neighborhood characteristics, the move-in ready premium, and possible speculative behavior, a statistically significant coefficient on the resale dummy remains in three UAs. The resale dummy may very well be correlated with omitted variables such as the age of a property.

This paper is organized as follows. In the next section, we discuss the data used for analysis. In section 3, we discuss the composition and property markets of the six Indian UAs studied in this paper. Section 4 presents the empirical model and results for the estimation of the expected move-in ready and the resale premia. We provide concluding remarks in section 5.

2 Data

We gather raw listed property data on 11 Indian cities from the property listing website Magicbricks. These cities are mapped to Census-designated urban agglomerations (UAs). Bangalore, Chennai, Hyderabad, Kolkata, and Mumbai are mapped to Bangalore UA, Chennai UA, Hyderabad UA, Kolkata UA, and Mumbai UA. However, we redefine the official boundaries of Delhi UA to include, besides New Delhi, the adjoining areas of Ghaziabad UA, Gurgaon UA, the municipal corporation of Faridabad, and the towns of Noida and Greater Noida (see section 3 for details on UA boundaries).

The raw data contain details on 5.98 million residential and commercial properties listed between January, 2007-October, 2012. Among these were 1.37 million residential properties for sale.[8] Residential properties include multistory apartments, builder floor apartments, independent houses, and villas.[9] We exclude data before 2010 from the analysis when information on move-in ready and under-construction properties were not available.

[7]For example, see Bruegge *et al.* (2016) for recent evidence on the effect of energy efficiency in resale home values and He and Wu (2016) for capitalization of construction improvements in resale values.

[8]This number is reached after removing duplicate observations and inconsistent observations with erroneous data like negative or zero price values.

[9]Builder floor and multistory apartments are categorized as apartments, and independent houses and villas form the category of independent houses. For details on these property types, visit this link to the Magicbricks website: https://content.magicbricks.com/property-news/top-differences-between-builder-floor-flat-apartment/82924.html

The data on residential properties contain details on the listed price, listing date, and a collection of hedonic attributes. These hedonic attributes include the number of bedrooms and bathrooms, built-up area or square footage, locality of the property, whether the property was resale or new, and whether the property was move-in ready or under-construction.[10] New listed properties are defined as those that are on sale for the first time. Resale properties have at least one prior transaction. Both under-construction and move-in ready properties can be listed as new and resale based on these definitions.

The data contain information on 25 more house attributes, such as the presence of elevator, water storage, gymnasiums, and air conditioning. The reporting on each of these attributes is unfortunately incomplete. We therefore place attributes into frequency of reporting bins — the five attributes that are reported most frequently are placed into one bin, the five that are reported second most frequently into another, and so forth. These bins translate into five dummy variables, which are then assigned to each property based on whether at least one attribute within a bin is reported. The composition of bins and details on the cutoff frequency for each bin can be found in table 1.

We use the reported locality names of each property to generate geographical coordinates for each listed property. The locality names are colloquial references to neighborhoods without well-defined geographical or administrative boundaries like postal codes. These localities are somewhat analogous to Census tracts in the United States in terms of the covered geographical area and population, albeit with a lot of variation both within and across UAs. A detailed discussion of the area, population, and composition of localities by each UA can be found in section 3 and table 3. Since these localities are informal references to a broad neighborhood, we cannot extract the exact geocodes for a property listed in a locality. Instead, we use the Google Maps API to retrieve the geographical coordinates for the centroid of each locality. All properties in a locality are assigned the geocodes of the centroid of the locality.[11] The generated geocodes for each property are then used to calculate the minimum geodesic distance of a property to a Central Business District (CBD) and a Secondary Business District (SBD).[12] We use the distance of a property to the closest Business District as a covariate in the hedonic regressions.

[10] Plot area and carpet area were also reported for some properties, but these were omitted due to missing data. 80% and 97% of observations did not report plot area and carpet area, respectively. For reported values, carpet area has a correlation of roughly 0.2 with the built-up area.

[11] 3.1% of properties either did not report a locality or the locality reported could not be mapped using the Google API.

[12] The choice of a CBD and SBD in a UA is based on experience, knowledge on prime real estate submarkets within UAs, and prior academic literature. The corresponding CBDs chosen for Bangalore, Chennai, Hyderabad, Kolkata, Mumbai, and Delhi are MG Road, Parry's Corner, Nampally, Dalhousie, Nariman Point, and Connaught Place. The respective SBDs are Koramangla, T. Nagar, Hi-Tech City, Sector V, Bandra-Kurla Complex, and Gurugram.

The reported listing price in the data is inflation-adjusted to 2001 values using the industrial worker consumer price index (CPI) series for each UA.[13] The real price (referred to interchangeably as both the price and the real price) values contain many outliers. We identified outliers from the unconditional distribution of the absolute price and the price per square feet of built-up area, per bedroom, and per bathroom, by each UA. We first remove the top and bottom five percentile values of per square feet, per bedroom, and per bathroom prices. In the remaining sample that satisfied this cutoff, we truncated the absolute price and built-up area values at the top and bottom five percentile values. We did not truncate the values for bedrooms and bathrooms any further because these were already top-coded to 10 in the raw data. The final data for analysis contain 242,991 residential properties on sale in the six UAs, combined, listed during January 2010-October 2012. Detailed summary statistics for all property attributes and listed prices can be found in table 2.

3 Background

Our sample data include listed properties from 11 cities in India that are mapped to the six largest urban agglomerations (UAs). In this section, we first provide some details on the composition and nature of these UAs. Then we discuss some stylized facts on the residential property markets in the six UAs.

3.1 Urban Agglomerations and Localities

The Census of India defines an urban agglomeration (UA) as "a continuous urban spread constituting a town and its adjoining outgrowths, or two or more physically contiguous towns together with or without outgrowths of such towns." In other words, urban agglomerations (UAs) are conurbations composed of one or more municipalities, towns, and adjoining areas. In 2011, there were 298 UAs with a population of 100,000 or more across India. Forty-seven of these had a population of at least one million people (Census of India, 2011).

The cities of Bangalore, Chennai, Hyderabad, Kolkata, and Mumbai are mapped to Bangalore UA, Chennai UA, Hyderabad UA, Kolkata UA, and Mumbai UA, respectively. In addition to the National Capital Territory (NCT) of Delhi, the surrounding areas of Ghaziabad UA, Gurgaon UA, the municipal corporation of Faridabad, and the Census towns of Noida and Greater Noida form part of one large urban cluster.[14] Even though the Census

[13] Except for Ghaziabad and Faridabad, all cities in Delhi UA have the same reported CPI. We use separate CPI values reported for Ghaziabad and Faridabad for properties listed in these cities.

[14] Census towns are areas without an urban administrative body, but with urban-like features — a population of 5,000 or more, a population density of at least 400 persons per sq. Km. and with at least 75% of

of India does not recognize these five cities as part of the Delhi UA, these regions are very well-connected to each other through extensive road networks and the Delhi metro. We will treat the redefined Delhi UA, which includes the areas listed above, as one labor and housing market.[15]

The UAs comprising our listing data are the six most populous in India. Table 1 shows the population of each UA. Hyderabad is the least populous, with about eight million persons, and Mumbai the most populous with more than 18 million persons. Except for Bangalore, the other five UAs in our sample draw urban areas from multiple districts — administrative divisions similar to counties in the United States. Table 3 shows the number of districts comprising each UA.[16]

Sellers of each listed property report the colloquially used locality name as a reference to the neighborhood in which a property is located. Table 3 indicates that there is substantial heterogeneity in the number and density of localities across UAs. Assuming that localities are evenly spread over a UA, the average area per locality is roughly 1.5-2 square kilometers in Delhi and Bangalore, but more than seven square kilometers in Mumbai. The density of properties per locality is also the highest in Mumbai. This is partly because Mumbai has very few reported localities. We use reported locality names to generate lat-long coordinates for each property. The generated geocodes are then used to calculate the distance to the closest Business District.

We should note two important points here. First, since these localities are neighborhoods without any official spatial boundary, we do not know the exact spatial extent of a given locality. This means that the consistency and spread of localities are mostly unknown. Second, localities are mapped to GIS boundaries of districts comprising a UA, and not the UA itself.[17] This implies that some properties may be listed in areas very close to a UA but not strictly within the confines of the Census-designated area of a UA. However, these

the male workforce employed in non-agricultural activities. Most UAs are composed of both statutory and Census towns.

[15]Note that this redefined Delhi UA is distinct from the National Capital Region (NCR), which besides the included regions, also incorporates parts of several other districts from Haryana and Rajasthan. For details, see the following link: http://ncrpb.nic.in/ncrconstituent.html.

[16]Bangalore consists of areas from just the Bangalore district; Chennai consists of the Chennai district and parts of Thiruvallur and Kancheepuram; Hyderabad consists of the Hyderabad district and parts of Rangareddy and Medak; Kolkata consists of the Kolkata district, and parts of Hugli, Haora, and the North and South Twenty-Four Parganas; Mumbai consists of the Mumbai and Mumbai Suburban districts and parts of Thane; Delhi consists of the nine districts in the NCT of Delhi, and parts of Gurgaon, Faridabad, Ghaziabad, and Gautam Buddha Nagar districts.

[17]Urban agglomerations are not coterminous with districts. This is especially true of suburban regions. For instance, some parts of the Thane district are included in the Mumbai UA by the Census of India. But we do not have shapefiles to distinguish parts of Thane that are inside and outside the peripheries of the Census-defined Mumbai UA.

problems are unlikely to cause major issues in our empirical model since the localities are only used to calculate the distance to CBD/SBD and as dummy variables to account for neighborhood-specific characteristics.

3.2 Property Markets by UAs

There is substantial variation in the distribution of prices across the six UAs. While Bangalore, Chennai, Hyderabad, and Kolkata are somewhat similar, with listed prices between 2-2.6 million INR, Delhi and Mumbai are at least twice as expensive (see table 2). With unconditional average prices above seven million INR in 2001 values, Mumbai is more than three times as expensive as Kolkata. Both Delhi and Mumbai also has a higher dispersion of prices (see table 2). This suggests that there is substantial variation even within the property markets of Delhi and Mumbai. And finally, the number of observations and the share of resale properties is noticeably higher in Delhi and Mumbai, compared to the other UAs (see table 2 and figure 1). Assuming that the property listing website was equally used across property types in all UAs during 2010-2012, this would indicate that Delhi and Mumbai's markets were relatively thicker.

We also observe that, with the exception of Delhi and Kolkata, all UAs experienced a fall in listed prices after 2007. The sharpest decline in prices can be seen in Bangalore and Hyderabad, where prices fell by 40-50% (as seen in the log difference of prices in figure 3), before experiencing a partial recovery. Chennai experienced a secular decline in prices, of roughly 30%, over the entire period. This suggests that sellers in these UAs perhaps reacted to the global financial crisis during this time. While prices in Delhi and Kolkata have remained almost flat, Mumbai has had an upward trend with some degree of volatility. Overall, prices in Mumbai increased by almost 50% between 2007 and 2012.

Table 2 shows that 83-97% of listed properties in these UAs are apartments. It is unclear whether such a high share of apartments represent the existing housing stock in these UAs. It could be that these shares reflect relatively new housing stock, as confirmed by the higher share of under-construction properties (seen in figure 1).

4 Empirical Results

The key hypothesis in this paper is that sellers expect a premium on move-in ready properties. Individual buyers can also capitalize on lower individual home loan rates and prolonged construction times to purchase cheaper new under-construction properties and resell such properties when construction is complete, or market prices are increasing, or both. Hence,

sellers might also list resale properties at higher prices relative to new ones. Higher move-in ready values can exacerbate affordability constraints. In this section, we first provide the estimation framework and results for the move-in ready premium. Next, we estimate the capitalization of the move-in ready premium and local market price appreciation in resale values. Finally, we discuss the affordability implications of the move-in ready premium.

4.1 The Move-in Ready and Resale Premia

In order to estimate the expected move-in ready and resale premia, we use the property listing data, described in section 2. We run hedonic regressions of log listed price on a collection of property attributes. Hedonic attributes include, among other things, a dummy variable representing move-in ready properties, and another dummy for resale properties. The base categories for move-in ready and resale are under-construction and new properties respectively. The following hedonic regression is run for each UA:

$$\log(Price_i) = \alpha_0 + \alpha_1 Resale_i + \alpha_2 Ready_i + \alpha_3 X + \delta_d + \gamma_t + \delta_d \times \gamma_t + \epsilon \tag{1}$$

Resale and *Ready* are dummy variables equal to one if property i is resale and move-in ready, respectively. $Price_i$ is the listed price of property i. X is a vector of additional hedonic attributes that include the number of bedrooms and bathrooms, built-up area or square footage, a dummy for independent house, minimum geodesic distance to a CBD or an SBD, and dummy variables for five categorical attribute bins representing the presence of 25 additional amenities. We also include district dummies δ_d, monthly dummies γ_t, and their interactions $\delta_d \times \gamma_t$. These additional dummy variables capture district and month specific unobserved heterogeneity within a UA. As mentioned earlier, instead of referring to the coefficients of *Resale* and *Ready* as the resale and move-in ready premia, we interpret these as the expected resale and expected move-in ready premia.

The coefficient estimates for equation (1) can be seen in panel(a) of table 4. The expected move-in ready premium is positive and significant in Bangalore, Chennai, Mumbai, and Delhi. The magnitude of this premium varies between 3-21%. We also observe that sellers expect a positive resale premium in all UAs, with a magnitude between 8-15%. However, both the move-in ready and the resale premium could be explained by unobserved neighborhood-specific characteristics, not captured by the observed hedonic attributes and the geodesic distance to CBD/SBD. For the sake of argument, if we imagine the geographical shape of a UA to be a circle, even with the same geodesic distance to the center (or the CBD/SBD), two neighborhoods could be located on two different sides of the circle.

In order to account for the neighborhood specific effect, we also include dummy variables

ϕ_j for localities, in equation (1), which is modified to the new equation, as follows:

$$\log(Price_i) = \beta_0 + \beta_1 Resale_i + \beta_2 Ready_i + \beta_3 X + \delta_d + \gamma_t + \delta_d \times \gamma_t + \phi_j + \epsilon \qquad (2)$$

Using equation (2), we rerun hedonic regressions for each UA. The results for this model are given in panel(b) of table 4. Three noticeable changes have occurred with the inclusion of locality dummies. First, while the expected move-in ready premium has barely changed in Bangalore and Mumbai, its magnitude has reduced to almost a third from 21% to roughly 8% in Delhi. This indicates that neighborhood-specific features drive more than two-thirds of the observed expected move-in ready premium in Delhi. Second, while the significance of this premium in Chennai disappears, Kolkata's estimate turns significant with almost an identical magnitude from the previous specification. This is due to the reduced standard error of the coefficient of the move-in ready dummy in Kolkata. Hyderabad's move-in ready coefficient remains insignificant in all specifications. Third, the expected resale premium practically disappears in Chennai, Hyderabad, and Delhi, indicating that the resale premium's major source in these UAs is neighborhood-specific unobserved characteristics. Even in Bangalore and Mumbai, where the resale premium remains positive and significant, the magnitude of this premium diminished by roughly 2% points after including locality dummies.

4.2 Capitalization of Move-in Ready Premium and Local Price Growth in Resale Values

In this section, we probe deeper into the observed move-in ready and resale premia in two ways. First, we explore whether sellers expect a higher move-in ready premium for resale properties relative to properties that are listed new. By selling houses before they are complete, developers slough off some of their risk to buyers, who then need to be compensated with a premium when they resell. Investigating the price difference between complete and incomplete houses helps us partly trace the sources of the resale premium as well. And second, we estimate the capitalization of district-level price growth in resale property values to test for the possibility of speculative behavior. In other words, we try to look for indications of whether individuals expect a resale premium when market prices are increasing.

It is important to note that, besides the partial effect of the move-in ready premium and speculative behavior, the resale premium can exist due to a number of other reasons. First, new buyers in the market might be skeptical about the build quality and other unobserved factors in a new property, in contrast to properties that have already been occupied before. Second, resale properties could have other hedonic attributes not observed in our data sets. And finally, the age and vintage of a move-in ready property and the time of possible com-

pletion for an under-construction property can also explain part of the difference in resale and new property values (Coulson *et al.*, 2019). However, the absence of data on these variables limits our ability to test additional sources of the resale premium and make stronger inferences.

In order to estimate the expected gains from reselling move-in ready properties, relative to those that are new, we include an interaction of the *Resale* and *Ready* dummies in equation (2). In addition, we also estimate the effect of district-level price growth on resale property values, by including interactions of the *Resale* dummy with the district-level average growth in price over the previous one and two years. The district-level average growth in price, for a given property, is calculated as the difference between the district-level average log price for the listing month and the district-level average log price in the past 12 months for one-year growth, and the past 13-24 months for two-year growth. The new equation is given as follows:

$$\begin{aligned}\log(Price_i) = \rho_0 &+ \rho_1 Resale_i + \rho_2 Ready_i + \rho_3 Resale_i \times Ready_i \\ &+ \rho_4 Z_1 \times Resale_i + \rho_5 Z_2 \times Resale_i + \rho_6 Z_1 + \rho_7 Z_2 \\ &+ \rho_8 X + \delta_d + \gamma_t + \delta_d \times \gamma_t + \phi_j + \epsilon \end{aligned} \tag{3}$$

Here, $Z_1 = V_t - \frac{1}{12}\sum_{T=t-1}^{t-12} V_T$ and $Z_2 = V_t - \frac{1}{12}\sum_{T=t-13}^{t-24} V_T$, where $V_t = \frac{1}{N}\sum_{i=1}^{N}\log(Price_i)$, with N being the number of listed properties in the current month t. In other words, we first obtain the average of log listed price of all the listed properties in a given district for the listing month. Then, to get the one-year price growth, we subtract the district-level average log listed price for the past 12 months, from the calculated current month's average log listed price. For two-year growth in prices, we subtract the district-level average log listed price from 13-24 months before the current listing month. Other symbols are as defined in equation (2). The coefficient ρ_3 for the interaction term $Resale \times Ready$, can be broken down, as follows:

$$\begin{aligned}\rho_3 = &\underbrace{\{E(\log(Price)|Ready = 1, Resale = 1) - E(\log(Price)|Ready = 0, Resale = 1)\}}_{\text{Ready to move premium among resale properties}} \\ &- \underbrace{\{E(\log(Price)|Ready = 1, Resale = 0) - E(\log(Price)|Ready = 0, Resale = 0)\}}_{\text{Ready to move premium among new properties}}\end{aligned} \tag{4}$$

Equation (4) shows that ρ_3 is the additional move-in ready premium expected for resale properties over and above any move-in ready premium expected by new property sellers. A negative ρ_3 would indicate that new property sellers expect a higher move-in ready premium, and a positive ρ_3 would mean that the move-in ready premium is higher for resale properties.

If $\rho_3 = 0$, then the move-in ready premium is identical across resale and new properties. Similarly, the coefficients ρ_4 and ρ_5 represent the part of the resale premium explained by the one-year and two-year district-level price growth respectively.

In table 5, we see that, while new property sellers expect 10% higher move-in ready premium than resellers in Kolkata, resale properties entail a 3-6% higher move-in ready premium in Bangalore, Mumbai, and Delhi. Higher capitalization of the move-in ready premium in resale properties in Bangalore, Mumbai, and Delhi, could be due to several reasons. First, as mentioned earlier, households can acquire financing at subsidized rates whereas developers cannot. By selling incomplete houses to households, developers effectively trade in more expensive construction financing for less expensive financing.[18] Second, there could be additional furnishments in move-in ready properties that are resold. Third, there could be location-specific characteristics not captured by locality dummies. Fourth, resale markets may be dominated by a higher presence of real estate agencies and brokers. And finally, resellers might expect a higher valuation of move-in ready properties relative to new property sellers. Similar sources of variation could also explain the relatively higher expected move-in ready premium for new properties in Kolkata.[19] Without further data or analysis, we are unable to make stronger inferences beyond this point.

Table 5 also shows that a portion of the resale premium in Mumbai is explained by the interaction of the two-year price growth term and the resale dummy. Every percentage point growth rate in average prices from two years ago, in Mumbai, is capitalized in resale properties by 0.27% points higher than new properties. In other words, resellers in Mumbai are listing properties at higher values compared to new property sellers when average prices are increasing from two-years before. This suggests the possibility of speculative behavior in Mumbai. However, the interaction of the *Resale* dummy and the two-year price growth term is negative and significant in Bangalore. Every 1% point increase in average prices from two years ago, in Bangalore, is associated with a 0.49% decline in resale property values. This is possibly due to the fact that while the unconditional average price of new properties grew by roughly 5%, resale values grew by only 2% during the same period of time. So, relative to new properties, resale values had a smaller magnitude of average price growth capitalization. Note that the one-year price growth interaction with the resale dummy appears to have no significance in any UA. This means that resale values do not respond to the growth in prices relative to new property values over the past year.

[18] This is even more apparent when we consider that 83-97% of listed properties are apartments. This indicates that new properties are possibly sold by developers, while resale properties are sold by individuals.

[19] Kolkata is infamous for being the slowest UA in India at approving building permits, with approval taking up to 258 days on average. This can increase new property prices due to the regulatory costs incurred by developers.

We also see in table 5, that the move-in ready coefficient is relatively stable even after the inclusion of the additional interaction terms. The move-in ready premium is positive and significant in the same four UAs (as in panel(b) of table 4), with magnitudes varying between 3-12%. However, while Bangalore and Mumbai's move-in ready premium values have changed little with the change in specification, the magnitude of the premium has increased two-fold to 6% in Kolkata and reduced by less than half to 3.4% in Delhi. The increase of this coefficient in Kolkata and the decrease in Delhi can be partly explained by the inclusion of the additional interaction terms. Notwithstanding these interaction terms' inclusion, a statistically significant resale premium of roughly 2-16% remains in Bangalore, Kolkata, and Mumbai.

4.3 Implications for Affordability of Housing

The major takeaways from the presented results in the previous sections are three-fold. First, a relatively stable expected move-in ready premium remains in Bangalore, Kolkata, Mumbai, and Delhi, with a magnitude of roughly 14%, 3%, 11%, and 8% respectively (see table 4). Second, resellers are able to capitalize on the move-in ready premium more than new property sellers in Bangalore, Mumbai, and Delhi. The reverse is observed in Kolkata. And finally, even after accounting for the confounding effects of the move-in ready premium and possible speculative behavior, a large portion of the resale premium may result from unobserved property features like age, furnishments, and other neighborhood characteristics not fully captured by locality dummies. Since we do not have a full understanding of the sources of the resale premium, we focus our attention on the move-in ready premium in the discussion on the affordability of housing in India.

The move-in ready premium is particularly high in Mumbai and Bangalore. At the unconditional mean real price of 7.01 million INR in Mumbai (see table 2), the move-in ready premium translates into a 2001 INR value of roughly 0.77 million. In Bangalore, this value is around 0.33 million INR. Based on a Brookings Institution Report (Parilla *et al.*, 2015), the annual income per household during 2014 in Mumbai was around 0.52 million INR and roughly 0.35 million INR in Bangalore.[20] This implies that the amount of move-in ready premium expected by sellers in Mumbai and Bangalore, respectively, is almost 150%

[20]The report estimated Mumbai's per capita GDP at $1,990. Based on 2014 purchasing power parity (PPP) exchange rates of $1=61 INR, provided by the Eurostat-OECD database, this amounts to an income per capita of around 121,390 INR. The average household size in Mumbai UA is around 4.3 (Census of India, 2011). This gives us an average income of 521,977 INR for a Mumbaikar household. For Bangalore, the per capita GDP was reported to be $1,420. With an average household size of 4, Bangalore's annual household income was 346,480 INR in 2014. The Eurostat database on exchange rate can be found upon visiting their website: https://data.oecd.org/conversion/purchasing-power-parities-ppp.htm

and 98% of the average annual income of a household in these UAs. In Kolkata and Delhi, the corresponding expected move-in ready premium is roughly 23% and 37% of the average annual household income.[21]

These numbers provide us an approximate estimate for the cost of regulation and inefficiencies due to differences in interest rates on developer and homebuyer loans borne by property buyers. Since construction delays occur due to a number of reasons, these estimates serve as an upper bound for the real cost of regulation passed on to buyers. The policy implications of these are primarily twofold. First, interest rates charged for developer loans and home loans should be adjusted to disincentivize individuals from utilizing the differences in loan costs and prolonged construction times to make additional gains from reselling move-in ready properties. And second, eliminating various regulatory constraints that builders and developers have to navigate can create a more friendly market environment. For example, removing the urban land ceiling constraints in some Indian states can reduce the regulatory burdens borne by developers looking to develop large parcels of land.[22]

5 Conclusion

In this paper, we gathered data on 242,991 residential property listings in six Indian UAs and estimated a move-in ready premium expected by sellers in each UA. We find that a relatively stable expected move-in ready premium of 3-14% exists in Bangalore, Kolkata, Mumbai, and Delhi. We also find that an expected resale premium exists in Bangalore, Kolkata, and Mumbai. Part of this expected resale premium is explained by the expected move-in ready premium. A small portion of the expected resale premium is also explained by possible speculative behavior in Mumbai. In our most complete specification we retain a resale premium of 2-16% in these three UAs.

The major caveat in the empirical estimation here is in the use of listed prices instead of transaction prices in the hedonic regressions. This induces a measurement error that is partly explained by the time for which a property is listed on the market and the relative bargaining power of buyers and sellers. Instead of interpreting the hedonic coefficient estimates as implicit prices paid for property attributes, we interpret these estimates as sellers' *expected* implicit prices for the attributes. And so, the question remains as to whether the expected

[21] These estimates are based on the same calculations done for Mumbai and Bangalore. The reported per capita GDP for Kolkata and Delhi is $1,110 and $3,580, respectively. Based on average household sizes of 4.3 and 4.8, the estimated annual household income for Kolkata and Delhi is 291,153 and 1,048,224 INR, respectively. The corresponding move-in ready premium paid, at the unconditional average price, in these UAs are 0.13 and 0.15 million INR.

[22] The Urban Land (Ceiling and Regulation) Act of 1976 required firms and individuals to sell vacant land beyond a certain size to the government at low prices (Sridhar, 2010).

move-in ready and resale premia actually translate into higher transaction prices for buyers.

We should note a few points about the relationship between listed and transaction prices. First, prior literature has found that listed and transaction prices are highly correlated (Lyons, 2013, 2019). Hence, a large number of transportation studies have used listed prices as proxies for transaction prices (Du and Mulley, 2006; Efthymiou and Antoniou, 2013).[23] Second, past studies suggest that selling mispriced listed properties can take longer, increasing the costs incurred by sellers (Knight, 2002). This would be particularly true for sellers in the Indian market during 2007-2012 when internet-based property listing was still at its nascent stage. Hence, sellers would have had an incentive to lower listed prices and attract potential buyers. And third, even if transaction prices deviated from listed prices, our estimates of the expected move-in ready premium would be pushed downward if the average transaction price of under-construction and move-in ready properties were the same, conditional on other attributes. There is no *a priori* reason for this to happen unless there are hidden negative characteristics specific to move-in ready properties that are absent in under-construction properties, and these characteristics appear only when a buyer inspects the property in person. If that were to happen, the implicit price paid for move-in ready properties relative to under-construction ones would be less than or equal to zero, *ceteris paribus*.

Under-construction properties because of their endemic risk might have lower demand and hence remain listed longer than move-in ready properties. This can possibly be a confounder for the move-in ready premium. Hence, the expected move-in ready premium estimates provided here serve as an upper bound.

[23] See Zhang and Yen (2020) for a meta-analysis of transportation studies using different types of property values.

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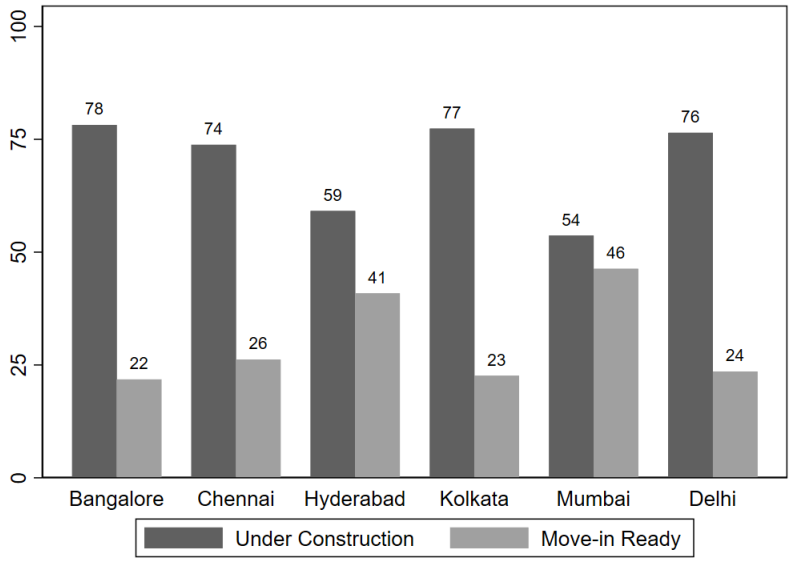
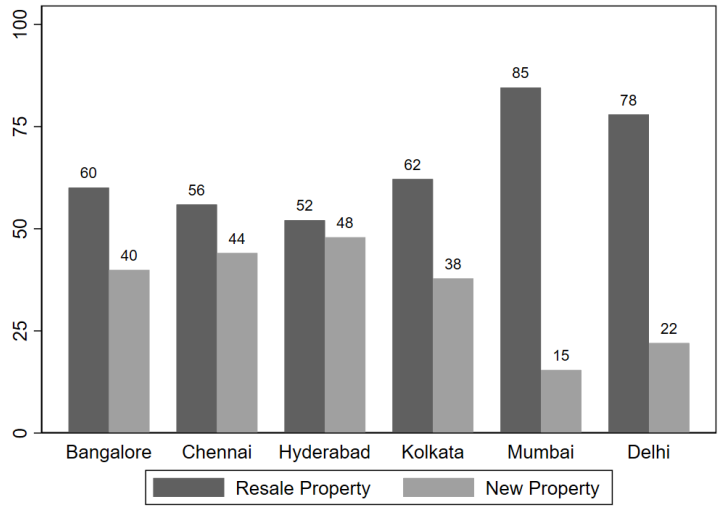
Figure 1: Move-in Ready and Under-construction Properties by UAs

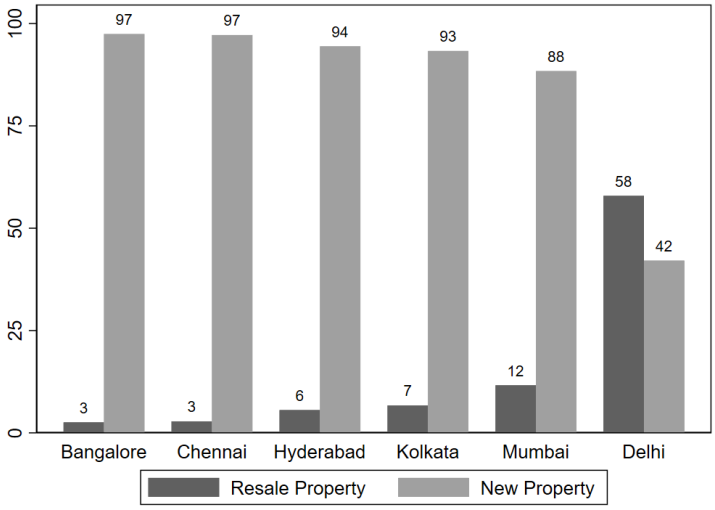


Source: Authors' calculations based on Magicbricks.
Note: Property listings data has been used for six UAs, listed during January, 2010-October, 2012. Each bar indicates the percentage of properties in a UA that are move-in ready and under-construction.

Figure 2: Resale and New Among Move-in Ready and Under-construction Properties



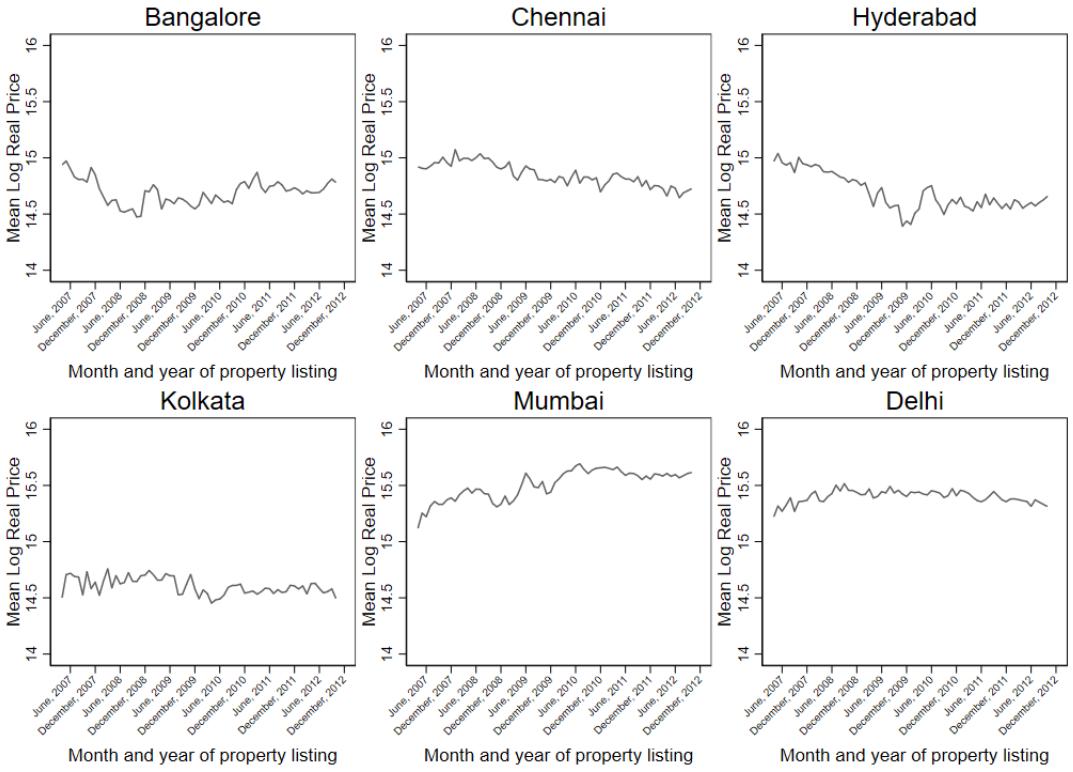
(a) Resale and New among Move-in Ready Properties



(b) Resale and New among Under-construction Properties

Source: Author's calculations based on Magicbricks.
Note: Property listings data has been used for six UAs, listed during January, 2010-October, 2012. Each bar in panel (a) indicates the percentage of properties in a UA that are resale and new for the given sample of move-in ready properties. Each bar in panel (b) indicates the percentage of properties in a UA that are resale and new for the given sample of under-construction properties. All bars are labeled with percentage values.

Figure 3: Monthly Mean Log Property Prices by UAs



Source: Authors' calculations based on Magicbricks.
Note: Property listings data has been used for six UAs, listed during April, 2007-October, 2012. Lines represent the trend of monthly average of log listed prices in a UA.

Table 1: **Categorical Attribute Bins**

Bin	**Attributes Included**
Tier 1	Security, Parking, Elevator, Water Storage, Electricity Backup
Tier 2	Park, *Vaastu* compliance, Rain Water Harvesting, Waste Disposal, Maintenance
Tier 3	Gymnasium, Intercom, Clubhouse, Swimming Pool, Laundry
Tier 4	Garden/Terrace, Piped Gas, Water Purification, Internet, DTH Television
Tier 5	Air-Condition, Banquet Hall, Conference Room, Cafeteria, Lounge

Source: Magicbricks.

Note: Attributes are equally divided into five bins based on the decreasing rank in the share of properties reporting the presence of an attribute. Tier 1 bin contains the most common five attributes, reported present in at least 66% of properties. Tier 2 bin contains the next five attributes, reported in 42-66% of properties. Tier 3 bin contains attributes reported present in 27-42% of properties. Tier 4 bin contains attributes reported present in 21-27% of properties. And finally, the tier 5 bin contains the five rarest attributes present in less than 21% of properties. Each cluster of attributes is represented by a dummy variable equal to 1 if at least one attribute on the right-hand side is present and 0 if none is present. *Vaastu* compliance is a generic term for architectural features in a dwelling (like the location of doors, windows, kitchens, and bathrooms) that is considered by Hindus, Jains, and Buddhists to be essential for well-being and good fortunes. For details see "Design of Settlements in *Vaastu Shastras*" by Sinha (1998).

Table 2: **Summary Statistics of Property Features**

		UA					
Property Features		Bangalore	Chennai	Hyderabad	Kolkata	Mumbai	Delhi
Price	Mean	2.42	2.55	2.35	2.24	7.01	4.84
(million INR)	Std. Dev.	1.03	1.31	1.17	1.07	4.04	3.48
Built-up Area	Mean	1,366	1,107	1,466	1,202	1,152	1,633
(sq. ft.)	Std. Dev.	304	322	452	295	391	519
Bedrooms	Mean	2.46	2.32	2.56	2.64	2.20	2.87
	Std. Dev.	0.53	0.56	0.55	0.53	0.73	0.63
Bathrooms	Mean	2.36	2.23	2.53	2.09	2.21	2.78
	Std. Dev.	0.53	0.53	0.59	0.30	0.64	0.74
Dist. to CBD/SBD	Mean	8.49	13.91	7.59	8.18	11.98	13.57
(kms.)	Std. Dev.	3.76	8.22	4.76	3.58	6.75	7.55
Tier 1 Attributes	Mean	0.90	0.74	0.77	0.85	0.73	0.80
	Std. Dev.	0.30	0.44	0.42	0.36	0.45	0.40
Tier 2 Attributes	Mean	0.80	0.62	0.54	0.70	0.65	0.77
	Std. Dev.	0.40	0.49	0.50	0.46	0.48	0.42
Tier 3 Attributes	Mean	0.73	0.33	0.41	0.49	0.57	0.71
	Std. Dev.	0.44	0.47	0.49	0.50	0.50	0.45
Tier 4 Attributes	Mean	0.52	0.34	0.34	0.20	0.48	0.64
	Std. Dev.	0.50	0.47	0.47	0.40	0.50	0.48
Tier 5 Attributes	Mean	0.36	0.27	0.24	0.23	0.25	0.55
	Std. Dev.	0.48	0.44	0.43	0.42	0.43	0.50
Independent House	Mean	0.08	0.17	0.18	0.03	0.13	0.04
	Std. Dev.	0.27	0.38	0.38	0.17	0.33	0.19
Resale Property	Mean	0.15	0.17	0.25	0.19	0.45	0.63
	Std. Dev.	0.36	0.37	0.43	0.39	0.50	0.48
Move-in Ready	Mean	0.22	0.26	0.41	0.23	0.46	0.24
	Std. Dev.	0.41	0.44	0.49	0.42	0.50	0.42

Source: Authors' calculations based on Magicbricks.

Note: Property listings data has been used for six UAs, listed during January 2010-October 2012. Built-up area is in square feet. Distance to CBD/SBD is calculated based on the minimum distance of a property neighborhood (locality), in Kilometers, to a Central Business District (CBD) or a Secondary Business District (SBD). Tier 1 through 5 attributes are as defined in table 1. Base categories for independent house, resale property, and move-in ready are apartment, new property, and under-construction, respectively. Except for built-up area, all values rounded off to two decimal places. Prices are in millions of real Indian National Rupees (INR), inflation-adjusted to 2001 values, using the district-level industrial worker Consumer Price Index. Based on the Eurostat-OECD database, $ 1 = 9.8 INR in purchasing power parity (PPP) terms in 2001. Eurostat database is on the following weblink: https://data.oecd.org/conversion/purchasing-power-parities-ppp.htm

Table 3: **Characteristics of Urban Agglomerations (UAs)**

	UA					
Characteristics	Bangalore	Chennai	Hyderabad	Kolkata	Mumbai	Delhi
No. of Districts	1	3	3	5	3	13
No. of Localities	466	329	277	215	144	939
No. of Listed Properties	30,635	13,872	5,491	13,403	41,087	137,783
Population (millions)	8.52	8.65	7.68	14.06	18.39	21.78
Land Area (sq. Kms.)	748	932	1,226	1,056	1,063	1,917
Density (per sq. kms.)	11,385	9,280	6,624	13,311	17,297	11,361
Population per Locality	18,284	26,302	27,715	65,386	127,742	23,196
Area per Locality (sq. kms.)	1.61	2.83	4.42	4.91	7.39	2.04
Properties per Locality	66	42	20	62	285	147

Source: Authors' calculations based on Magicbricks and Census of India (2011).
Note: Property listings data has been used for six UAs, listed during January, 2010-October, 2012. Population, land area, and administrative data are based on Census of India (2011). Density refers to population density and is calculated by dividing population figures by land area. The average population per locality is population divided by the number of localities in a UA. Area per locality is equal to land area divided by the number of localities for a UA. Properties per locality is calculated by dividing the number of properties listed in a UA by the number of localities reported in the UA. All area values are in square Kilometers. Area per locality is rounded off to two decimal places. Population values are rounded off to the nearest one-hundredth of a million. Area, population per locality, and properties per locality are rounded off to the closest integer.

Table 4: **Expected Move-in Ready and Resale Premia by UAs**

	UA					
	Bangalore	Chennai	Hyderabad	Kolkata	Mumbai	Delhi
	Panel (a): Without Locality Dummies					
Move-in Ready	0.151***	0.033**	-0.006	0.030	0.125**	0.211**
	(0.005)	(0.005)	(0.007)	(0.020)	(0.022)	(0.088)
Resale	0.152***	0.125**	0.077**	0.128**	0.102***	0.098***
	(0.005)	(0.014)	(0.013)	(0.037)	(0.005)	(0.027)
Locality FE	No	No	No	No	No	No
Monthly FE	Yes	Yes	Yes	Yes	Yes	Yes
District FE	No	Yes	Yes	Yes	Yes	Yes
District × Monthly FE	No	Yes	Yes	Yes	Yes	Yes
N	30,635	13,872	5,491	13,403	41,087	137,783
Adj. R-sq.	0.666	0.674	0.717	0.718	0.831	0.763
	Panel (b): With Locality Dummies					
Move-in Ready	0.137***	0.013	0.000	0.028***	0.113**	0.083***
	(0.005)	(0.006)	(0.006)	(0.003)	(0.020)	(0.018)
Resale	0.129***	0.029	0.045	0.098***	0.051***	0.003
	(0.005)	(0.015)	(0.019)	(0.021)	(0.001)	(0.030)
Locality FE	Yes	Yes	Yes	Yes	Yes	Yes
Monthly FE	Yes	Yes	Yes	Yes	Yes	Yes
District FE	No	Yes	Yes	Yes	Yes	Yes
District × Monthly FE	No	Yes	Yes	Yes	Yes	Yes
N	30,635	13,872	5,491	13,403	41,087	137,783
Adj. R-sq.	0.747	0.810	0.810	0.799	0.899	0.892

Source: Authors' calculations.

Note: Each column in either panel presents the results from a hedonic regression of log price on log of built-up area, number of bedrooms, number of bathrooms, distance to CBD/SBD, five tiered categorical attribute bins, and dummy variables for independent house, resale property, and move-in ready. Properties used in the analysis are listed during January, 2010-October, 2012. Panel (a) regressions do not include any locality dummies while panel (b) does. Price is in real INR with base year 2001. District and district × monthly dummies omitted for Bangalore (with only one district). Kolkata consist of five districts, Delhi consist of thirteen, while Mumbai, Chennai, and Hyderabad consist of three each. Base categories for independent house, resale property, and move-in ready dummies are apartment, new property, and under-construction respectively. All values (except for observation count) rounded off to three decimal places. Clustered standard errors at the district-level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5: **Capitalization of Move-in ready Premium and Price Growth in Resale Values**

	UA					
	Bangalore	Chennai	Hyderabad	Kolkata	Mumbai	Delhi
Move-in ready	0.123***	0.007	-0.004	0.061***	0.114**	0.034***
	(0.006)	(0.004)	(0.004)	(0.004)	(0.025)	(0.005)
Resale	0.116***	0.012	0.013	0.155***	0.019**	-0.009
	(0.017)	(0.023)	(0.007)	(0.021)	(0.003)	(0.030)
Resale ×	0.040**	0.034	0.043	-0.102***	0.033***	0.062**
Move-in ready	(0.018)	(0.017)	(0.024)	(0.008)	(0.002)	(0.022)
Resale ×	-0.062	0.353	-0.575	0.180	0.100	0.145
1-Yr. Price Growth	(0.126)	(0.317)	(0.632)	(0.114)	(0.088)	(0.265)
Resale ×	-0.488***	-0.028	0.393	-0.037	0.265**	-0.053
2-Yr. Price Growth	(0.166)	(0.374)	(0.492)	(0.081)	(0.060)	(0.240)
Locality FE	Yes	Yes	Yes	Yes	Yes	Yes
Monthly FE	Yes	Yes	Yes	Yes	Yes	Yes
District FE	No	Yes	Yes	Yes	Yes	Yes
District × Monthly FE	No	Yes	Yes	Yes	Yes	Yes
N	30,635	13,872	5,491	13,349	41,087	137,760
Adj. R-sq.	0.748	0.810	0.811	0.800	0.899	0.892

Source: Authors' calculations.

Note: Each column presents the results from a hedonic regression of log price on a vector of property attributes. These attributes are log of built-up area, number of bedrooms, number of bathrooms, distance to CBD/SBD, five tiered categorical attribute bins, dummy variables for independent house, resale property, and move-in ready, interactions between resale property and move-in ready, one and two-year difference in mean log prices at the district-level, and the interactions of one and two-year difference in mean log prices at the district-level with the resale dummy. Properties used in the analysis are listed during January, 2010-October, 2012. Price is in real INR with base year 2001. District and district × monthly dummies omitted for Bangalore (with only one district). Kolkata consist of five districts, Delhi consist of thirteen, while Mumbai, Chennai, and Hyderabad consist of three each. Base categories for independent house, resale property, and move-in ready dummies are apartment, new property, and under-construction respectively. 20 observations in the districts of New Delhi and North Delhi (in Delhi UA) and 54 observations in the districts of Haora and Hugli (in Kolkata UA) had no listed property during a few months in 2008-2009 which created missing values for the two-year price growth variable. The reduced observation count is reflected in the columns for Delhi and Kolkata respectively. All values (except for observation count) rounded off to three decimal places. Clustered standard errors at the district-level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$