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WHAT IS TITLE GUARANTEE WORTH IN LAND MARKETS? EVIDENCE FROM BENGALURU, INDIA

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Abstract

Land reforms require urgent attention in emerging market economies, and there is a vast body of literature that deals with the economic impact land reforms, especially land titling (Acemoglu et al., 2001). India, like other developing economies, has a presumptive titling system which is notoriously inefficient: a law that is in the draft stages of consultation is the Draft Land Titling Bill, 2011, which seeks to replace presumptive titles with conclusive ones. However, there is no study that has looked at the cost of not having an appropriate titling system. In this study, I attempt to quantify the premium paid towards title by using a quasi-natural experiment on differential titles that is available in the Indian market, utilising land prices in Bangalore, India. The differential title to land comes about as a result of State's activity in using eminent domain to acquire land parcels, conferring superior title on the parcels so acquired. A hedonic model is applied to a data set of 2263 observations of appraised land values to tease out the impact of guaranteed land title on land prices.

1   Introduction

Land reforms require urgent attention in emerging market economies and there is a vast body of literature that deals with the economic impact of various aspects of land reforms, specifically with respect to the issue of property rights in land and land titling (Acemoglu et al., 2001). When property rights are not well-defined through land titling systems, those who hold property spend significant resources to defend their rights which could be better spent in other productive uses. (Allen and Lueck, 1992).

Indefeasible title for land should reflect into the higher land prices compared to properties with contentious titles. This paper makes an attempt to quantify the premium paid towards indefeasible land title in a quasi-natural experiment setting in the Indian city of Bengaluru. Using market price data on vacant land between the years 2005 to 2010, the study explores the price premiums paid to differentially perceived levels of title and to urban planning. The study attains importance as an empirical estimate of the value of title insurance in India, in quantifying welfare losses related to contentious title and as a tool for policy prescriptions with reference to titling issues both in India and in other emerging market economies. The study is also one of the first of its kind to document and quantify the existence of premium paid for planned urban layouts in Indian cities.

A scan of economic theory on property rights provides a sound basis for land titling. At the individual level, weak property rights on land leads to under-investment (Dorner,1972; World Bank, 1974; Johnson, 1973), hinders access to formal credit markets where land may be used as collateral (Feder and Nishio, 1998) and leads to high monitoring costs in case of transfer of ownership. At the societal level, clear property rights lead to higher levels of productivity and investment, since optimal private spending on enforcement of land titles tend to be excessive compared to state-enforced property rights (Feder and Feeny, 1991; Malik and Schwab, 1991). State-enforced property rights are thus shown to be the optimal solution for land ownership, which is a club-good (Lueck and Miceli, 2006). As established since Nozick (1974), government can monopolistically provide protection of property rights more efficiently than private enterprises, typically through a land-titling system that enforces title to land.

Several papers in literature explore the value of titling to land values. The World Bank has devoted extensive effort to studying the impact of formal land titles across developing and emerging economies and one of the outcomes of land titling is an increase in the market value of land (Durand-Lasserve, 2006; Durand-Lasserve and Royston, 2002). A study by Pender and Kerr (1994) based in rural India indicates that land distributed under the government's land distribution schemes is worth about 15% less than land with transferable titles. Alston et al. (1996) indicate that title is an important aspect that determines land values in the Brazilian frontier. Formal land titles have been shown to increase market value of land by 45% in Jakarta (Dowall, 1998). Payne (2007) has studied extensively the corresponding situation in Senegal and South Africa. However, most of these studies follow the premium to title that arises out of specific policies of the government, such as either computerization or grant of titles, in an event study methodology. These title premiums arise as a direct result of a certain intervention, and the difference in value before and after the intervention is taken as the title premium.

In contrast to this, there is evidence that the quality of title impacts the price of the property in real estate markets when there are different types of persisting title issues. Colwell and Yavas (1993) model land prices as a function of plottage and deed types and based on a data set of 148 tracts that sold in 1829, find that tracts with general warranty deeds and bargain-and-sale deeds sell for a premium over quit claim deeds. The type of deed signals better, more secure property rights and therefore, commands a premium. Another study by White et al. (2011) indicates that the type of counterparty to the sale : intra-family; financial institution; sales in which realtors or limited partnerships were grantor or grantee or houses purchased from estates are likely to have an impact on the price of the property, due to the titling effects of the purchaser or seller. Brasington and Sarama (2008) based on a data set of around 37000 records aver that quality of deeds attached with housing transactions has a 'dramatic correlation with the sale price' of the property. The authors claim that houses with general warranty deeds, where title is indemnified by the seller, sell for nearly 100% more than the houses with quit claim deeds, where the seller does not indemnify against title risk.

The methodology commonly used in such studies is a multiple-regression framework in which housing prices are modeled in a 'hedonic' setting to ascertain the value of various attributes, including title. The hedonic method controls for the heterogeneous nature of properties by decomposing property price into its constituent characteristics, it recognizes that properties are composite products. Although attributes are not sold separately, regressing the sale price of properties based on their various characteristics yields the marginal contribution of each characteristic. According to Hulten (2003), the hedonic price function establishes "a relationship between the demand curves of consumers with heterogeneous tastes for different combinations of attributes within each category of commodities and their corresponding supply functions with different costs of factors and production functions for each attribute."

While being commonly accepted as the best method to value properties' attributes, hedonic modeling continues to be a challenge due to specification bias - the glaring problem with the hedonic regression is that the list of attributes which determine price may not be standardized. In some cases, the distance to the city centre may be important, while in other data-sets, the quality of air might be considered important. It is difficult to reach a trade-off in the number of characteristics to consider in order to capture enough aspects of quality (or aspects in which the selected varieties differ) on the one hand and to avoid multi-collinearity on the other. Moreover, this method requires a high level of product knowledge and access to detailed, reliable information on the various attributes and their levels. To obtain unbiased estimates, the regression should be specified correctly with respect to both functional form (Malpezzi, 2003) as well as with respect to independent variables (Case et al., 1991).

An in-depth analysis of housing literature provides us with some variables that are relevant in a hedonic model for vacant land prices. Both structural and location attributes are included in a hedonic regression. Land values have been established to be a function of distance from the city center and from secondary employment centers (Small and Song, 1994). Values for vacant land are also influenced by distance from roads and railways, or measures of accessibility (Bao et al., 2008). The kind of uses and the zoning regulations (Maser et al., 1977), as well as the Floor-Area ratio (Megbolugbe,1989) positively impact value of land parcels. Further, price of land is also found to be positively associated with the school district, neighborhood income and gentrification of the neighborhood. Some variables that are found to have a negative effect are pollution, noise, crime rate, and the presence of high tension wires or transit lines in the vicinity. Size is another variable that has a non-linear relationship with price per

unit area of the parcel (Colwell and Sirmans, 1998) This list is by no means exhaustive.

The study adopts a hedonic model to evaluate the premium paid to title in India. The setting is a quasi-natural[1] experimental setting where parcels with differential implicit titles exist. This is brought about by State action; the Bengaluru Development Authority (BDA) is the nodal agency for urban planning in the city and as part of its urban planning and development process, it acquires land for the creation of 'residential housing layouts'. At the time of acquiring land, the BDA publishes a list of predominantly agricultural sites that it would acquire to form a layout through a process of notifying individual land owners after a site survey. Such land is acquired through the eminent domain 'takings' of the BDA as a quasi-government body. Once the compensation is paid under the eminent domain taking, all prior claims and liens on the acquired sites are extinguished, and the sites are free of title contentions. These sites are subsequently developed and plotted, and sites are sold to the public through a process of allotment or auction.

Such sites within the BDA developed layouts have an implicit title guarantee due to the nature of processes followed. The title of BDA developed and allotted sites is now 'clean' after the eminent domain taking and after extinguishing past contentions on the site. The allottee is also indemnified against any title defects that may exist. Therefore, the quality of title of these BDA developed sites is much higher than the perceived quality of other sites which have been transacted at a similar time period. Land with clear titles is expected to command a premium over land without clear titles. A simple way to observe the premiums paid to title is to create a control group where title is guaranteed - the BDA sites, in this case - and compare the prices of these plots vis-a-vis the price for other plots where title is perceived to be at higher risk. Therefore, an analysis of price information for residential sites in Bengaluru across time and across different layouts / locations would help to isolate the impact of guaranteed land title on real estate prices.

Specifically, using a price information of around 2260 land parcels across the city of Bengaluru over a six-year period between 2005 and 2010, a hedonic modeling approach enables the estimation of the value of 'title-premium' to land prices. The dataset includes sites that were allotted by the BDA as well as sites that belonged to sub-divisions developed by private parties and revenue layouts.Unobserved heterogeneity in both location and time is controlled through exhaustive metrics that capture location

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[1] Discussions with the BDA show that there is no significant difference in ownership structure of land across the different layouts before the eminent domain takings.

information and time fixed effects are employed to control for changes in land price over time due to macro-economic factors.

The results indicate a strong price-premium for land with indefeasible title. A premium of about 4.3% can be ascribed to clear land titles alone, controlling for all other factors in the hedonic setting. It can also be ascertained that premium for planned layouts is equivalent to around 3%, indicating that there is a strong significant relationship between well-planned layouts and land prices.

The findings of this study assume relevance given the wide interest in land titling exercise in India and amongst emerging economies. The results are relevant in contributing to scholarly literature, by documenting the premium paid to indefeasible title in Indian cities, as well as in documenting the premium towards planned urban areas. Unlike other studies that follow the granting of title and the immediate increase in prices (Payne 2007), this paper discusses the persisting premium that accrues as a result of clean and clear titles. It also adds to literature on price-premiums for zoning by extending the study to an emerging market scenario.

The rest of the paper is structured as follows: Section 2 summarizes the institutional background of land titling in India, Section 3 outlines the data and methodology framework, followed by Results and Analysis in Section 4 and Conclusions and Discussions in Section 5.

2   Land Titling in India

2.1:   Background

Currently, India follows the 'recording system' based on the Registration Act 1908 that provides for registration of deeds and documents but does not confer absolute title to the property owner, whose title remains 'presumptive'. The person paying the tax/revenue for the property is the presumed owner; title to land is rather inferred from lack of contention rather than from positive documented identification of owner interest. To indemnify the State against challenge, the revenue laws of the State dictate that no suit shall lie against the State Government or its agents in respect of any records. When land is transacted, the due diligence of property records is left to the individual who seeks to obtain the right or title, requiring investigation into past ownership records to establish non-encumbrance. This leads to high costs on ascertainment of land title (Ramanathan, 2009).

Further, the multitude of agencies handling land records; the Revenue Department, the Survey and Settlements Department, The Registration Department, etc often work in silos and this only leads to increased transaction costs rather than serve as a check and balance for title verification. While the Department of Stamps and Registration registers the instruments of sale, the property tax department and the revenue department only capture the possessor of the property and the revenue to be collected or tax to be paid, which again does not register title or ownership. The existing system is hence prone to expensive litigation battles and high transaction costs to ascertain basic entitlement rights.

2.2   Provisions of the Draft Land Titling Bill, India (2011)

The Draft Land Titling Bill (2011) which has been introduced in the Indian Parliament in 2012 is based on the 'Torren's System', a 'conclusive' and clear property title system that will serve as a certificate of full, indefeasible and valid ownership.

A Conclusive Title may be defined as an unassailable and conclusive proof of ownership of property and embodies the four fundamental principles that need to be in place:

(i)   there should be a single agency to handle property records;

(ii)   the "Mirror" principle should be operative. This requires that at any given moment, the property records should mirror ground reality, i.e., they should be "real-time records";

(iii)   the "Curtain" principle should be applicable. This requires that the record of a title should depict the conclusive ownership status and probing into past transactions and titles of the property should become unnecessary; and

(iv)   there should be title guarantee and insurance for indemnifying the property holder against any loss arising due to inaccuracies.

There are however many challenges to implementing the Torren's system in the Indian context. In most states, manual property record management systems involving many departments have led to outdated records and survey maps. Massive computerization efforts are needed

before a rigid system can be put in place. The Government of India launched the National Land Records Modernization Programme (NLRMP) in 2008 to computerize property records and the registration process, survey and preparation of maps using modern technologies and facilitate the move to a conclusive land title recording system for immoveable property in the country.

2.3   Status of Karnataka

The southern state of Karnataka in India has been at the forefront in the field of information technology (IT) and in the implementation of automated systems for public use. One such example is the BHOOMI, the first e-governance project aimed at on-line delivery and management of land records. The success of the United Nations award winning BHOOMI model has been replicated in many other states in India. Designed to maintain and administer all land records of farmers, this system has successfully computerized 20 million records of land ownership of 6.7 million farmers in the state. The Revenue Department of the Government of Karnataka has recently taken up the task of creating Urban Property Ownership Records (UPOR) in four cities within the state on a Public Private Partnership (PPP) model. While the land title is not guaranteed explicitly, the UPOR card (certificate issued) has an unique ID for each property, with GIS co-ordinates for the property and links together all the records from the Survey and Settlement department (which maintains the spatial records of land and property), the Registration Department (which holds deed of sale/transfer of interest executed on the property) and the Revenue Department (which maintains data on Revenue collections/property tax paid on property or land). By integrating topographic, spatial, revenue, taxation and deed registration records in a central location, the UPOR card denotes a single, unique, identifiable property ready for the titling guarantee that will subsequently be rolled out.

This study attempts to evaluate the welfare loss of individuals due to lack of title guarantee and tie it back to the cost of state-enforced property rights through a robust land titling mechanism (Feder and Feeny, 1991).

2.4   The City of Bengaluru

Bengaluru Urban, a district in the state of Karnataka came into being in 1986 with the partition of Bengaluru district into Bengaluru Urban and Bengaluru Rural districts. Bengaluru Urban has four taluks: Bengaluru North, Bengaluru East, Bengaluru South and Anekal. The capital city of Bengaluru is situated in Bengaluru Urban district, the most advanced district in the state with 89% of the population being urban as of 2001.

Bengaluru is the fifth largest and second fastest growing metropolis in India. The city's population has grown by 47% over the last decade and is set to attain the 1 Crore mark by the end of this year (Census of India, 2011). Heavy Central Government investment in setting up public centre companies in the 70's has led to the concentration of technological and scientific centers in the city over time. (BDA, 2008). Home to major Information Technology and Biotechnology companies, the rapid urbanization of the city has led to sky rocketing land prices and increased demand for land parcels surrounding the city. At the same time, the city also tries to maintain its status of being "The Garden City of India" with an emphasis on public parks strategically located amidst crowded localities.

The Bengaluru Metropolitan Region (Greater Bengaluru) covers an area of 1307 sq.km., while the Bruhat Bengaluru Mahanagara Palike (BBMP) covers an area of around 800 sq. km., with the population of the city being 8.43 million (2011 census), making Bengaluru the third most populous city in India. The entire city is divided into 198 wards for ease of governance and provision of municipal services. Table 1 contains specific information about the city of Bengaluru.

{Insert Table 1 about here}

From a planning perspective, the city has developed in a concentric manner with newer areas being integrated into the city over time. There are five major zones that are observed in the present land usage pattern.

Belt 1- The core area consists of traditional business areas, administrative centre and the central Business district.

Belt 2 - The Peri - Central area, has old residential areas planned around the core area.

Belt 3- The Recent extensions of the city (past 3 - 5 years) flanking both sides of the outer ring road.

Belt 4 - The New layouts, have developed in the periphery of the city, with small vacant lands and agricultural lands.

Belt 5- The Green belt and agricultural area, in the city's outskirts including small villages.

Figure 1 provides a map of Bengaluru showing all the planning zones. The Bengaluru Development Authority (BDA), under the Bengaluru Development Authority Act of 1976 is mandated to plan and finance development of large infrastructures, new layouts and zones.

{Insert Figure 1 about here}

2.5   Types of Subdivisions/ Layouts in Bengaluru

A 'layout' is equivalent in terminology to a 'subdivision' and refers to provision of access roads to extend existing urban areas or to create new urban areas. Subdivisions may be large or small, depending on the developer who develops and/or constructs in the subdivision. Subdivisions may be sold either as land parcels or as housing.

Localities/ residential layouts within the city belong to one of the three types: layouts planned and developed by the Urban Development Authority (BDA layouts), layouts planned and developed by private developers (private layouts), and organically grown 'revenue' layouts.

From a planning perspective, each of these three different types of growths have different attributes: BDA layouts are completely planned layouts, with access roads, planned transportation hubs, major and minor roads of necessary width, sites set apart for schools and hospitals, etc. BDA layouts also set apart area for commercial hubs within the layouts, and parks and greenery. In terms of planning, BDA layouts are amongst the best planned layouts within the city.

Since inception, the Bengaluru Urban Development Authority has created about 62 layouts, and has allotted more than 2,00,000 sites as part of the layout development process. The typical size of a layout developed by the Urban Development Authority is around 5 acres (about 2 hectares). These layouts are conceived as primarily residential layouts, with provisions for commercial activity in the shopping complex areas, as well as provision for transport and transit services, public and semi-public spaces including parks and walkways and other civic facilities.

However, there are limitations on the usage of BDA allotted sites. The sites allotted by the BDA are expected to be used only by the allottee since the mandate of the BDA is to provide residential housing to those who have not benefitted from any other scheme; hence, there is a ten-year freeze on the sale of BDA sites from the time of allotment. Sites allotted under the BDA scheme may only be used for the specific purpose that they are planned for - residential, commercial, or for providing social infrastructure.

Appendix 1 lists a limited set of layouts that have been developed by the Urban Development Authority in Bengaluru (the BDA).

Private layouts are predominantly residential layouts whose plan has been approved by the nodal town planning agency. These layouts have to abide by certain planning norms before plans are approved. However, in terms of size, private layouts tend to be smaller than BDA layouts and while road networks and water, drainage, electrical connectivity etc are provided as per plan, private layouts do not usually plan for transportation hubs/ bus stops, schools and hospitals. Private layouts of a certain size also need to make provisions for open areas, accessibility and parks and green spaces. These norms are part of the Zoning Regulations in the Bengaluru Master Plan Document 2015 and are revised from time to time.

At the other end of the spectrum are organically grown 'revenue' layouts which typically crop up in the areas between of the private layouts and BDA layouts. Some of these organic layouts are historical districts, some others are a result of urban sprawl, and/or gentrification of squatter settlements. However, these layouts are typically characterized by low width of access roads, lack of adequate sewerage and water networks, lack of open spaces and thorough

disregard for zoning regulations.

2.6   Research Gap

The advantages of establishing a more conclusive land titling system has been studied widely especially with respect to the better governance practices and the increased transparency it will promote. Expected reduction in litigations due to clear land titling has also been studied widely and documented (Gupta, 2010). The State of Karnataka has been moving towards clear titling systems beginning from the 60s. Automation efforts to facilitate the public with readily available property data and records and recent implementation of UPOR in the state are all steps in this direction. However, there has been no detailed study on the premium a property with conclusive title commands. A large research gap in this context is the quantification of the nature of price discovery enabled by title guarantee. There is no study that looks at the costs of titling from the aspect of the premiums paid for titled land in India. This study attempts to bridge this gap by focusing on title premium and quantifying the premium a buyer is willing to pay for clear titles and planned layouts in the city of Bengaluru.

A study of premium paid for a conclusive title is important from a micro economic perspective as it throws light on the search costs; also from a marco perspective, it helps identify the impact to the GDP. The costs of presumptive titles can be seen from the fact that more than 90% of land titles in India are "unclear" leading to numerous disputes over property (Sankhe et al, 2010). Limiting access to land to a few privileged developers leads to lesser transactions over time further limiting the price information to consumers. Lack of clear titles tends to affect policies and planning adversely. Land acquisitions for infrastructure development and town planning tend to be long drawn and embroiled in legal battles. A report by Mc Kinsey in 2001 comparing India's 6% economic growth to China's 10% at the time suggested that India's GDP growth was hobbled by the government market regulations, government ownership in businesses and the distortions in the market for land use due to lack of clarity in title. Impact on GDP by lack of title was estimated to be 1.3% (Sankhe et al., 2011). It is hence important to highlight the premium a clear title commands in the Indian markets.

3   Data and Empirical Framework

3.1   Data Sources

Various agencies were contacted as part of this exercise to evaluate the determinants that influence land prices. The primary data set, consisting of about observations on 2489 sites, was obtained from accredited real estate appraisers, the Institute of Valuers of India[2], Bengaluru Chapter, who appraise land parcels for mortgage lending for the period 2005 - 2010. The appraisal report is a mandatory part of the mortgage process and all of these appraisals have been used to extend loans equivalent to appraised value to purchase immovable property, thereby confirming the veracity of the appraisal information. Appraisals for the mortgage lending process have to follow the 'comparables' method of valuation and appraisers invest a lot of time and effort in collecting micro-market specific land price information from brokers, real estate agents and the Land registration offices, apart from a site visit. The use of appraisal information is not only complete in terms of all attributes of the property, it also allows for corroboration of the market price of the property declared for the purpose of mortgage financing with the independent expert opinion of the appraisers.

The entire sample of 2263 observations corresponds to about 60% of the appraisals done for the purpose of mortgage lending in land transactions in Bengaluru by all the accredited appraisers over the time period 2005 - 2010, or about 6% of all land transactions in Bengaluru during this period in terms of quantum of transactions[3], though the sample is unbalanced with reference to time periods.

The raw data is at the parcel level and provides the address of the parcel and its market price. Transaction price for real estate is very difficult to ascertain in India due to the widespread use of cash components (black money) and under-reporting of transaction value at the time of registration. The mortgage dataset and the appraisal data set come closest to actual

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[2] The Institute of Valuers of India is the largest valuation association in India, especially for real estate. They are mandated to provide valuations for all transactions on immovable properties. Data here is obtained from accredited valuers who provided reports to mortgage companies on loans that have been extended to purchase immovable property.

[3] Mortgage lending in Land is very little compared to mortgage lending in housing due to the speculative nature of land transactions. However, some of these provisions can be bypassed by claiming that a house would be built subsequent to the land purchase.

transaction value in the absence of an accurate valuation data with the land record departments. Any study on real estate in India has to contend with these inaccuracies due to the structural nature of the market and this study was built upon land price data-set that has been constructed by amalgamating different sources of very unique price data.

Of the 2489 parcels for which data was obtained, address fields could not be mapped using declared references for about 130 parcels and these parcels had to be dropped from further analysis. This was either because the specified parcels (addresses) were found to be occupied or because the specific locations/roads were not adequately mapped in publicly available maps, especially Google maps, which was used extensively in GIS coding of the sites. Of the rest, 59 parcels were unmapped because they belonged to locations with very thin transactions and the rest were removed since they were outliers.

Extensive use of GIS mapping techniques allowed for the land parcels to be plotted on Google Earth and various distance metrics that determine land prices were ascertained from the spatial location of land. A digitized map of all 198 wards of Bengaluru was super-imposed on the attribute database maps and the distance from centroid of the relevant ward to the identified CBD was taken as the measure of Distance to City Centre. Transportation network maps that provided major and minor road networks were used to determine displacement to major arterial roads. The various employment centers in Bengaluru are mapped based on data from the Census and Labor Bureau, though this list is by no means exhaustive given the large unorganized sector. 'Anchor employment centers' are identified using the Industries department's database on industrial areas, as well as using Master Plan (2015) documents for the city of Bengaluru. Land price is also a function of the Zoning regulations, the allowable Floor Space Index (FSI) (otherwise known as Floor-Area-Ratio (FAR) in common parlance), and the height restrictions. All of these were ascertained for the land parcels under study from the Master Plan 2015 documentation for Bengaluru.

Two other variables were considered to be important - the size of the plot is relevant in determining the associated premium or discount. Larger plots may sell at a discount (plattage effect) or at a premium (plottage effect) compared to smaller plots (Colwell and Sirmans,

1978). Size is also a non-linear function of price per unit area and estimation of impact of size on land price is easier with a logarithmic functional form.

The All-India average Consumer Price Index for Industrial Workers for Bengaluru city is used to deflate the nominal values of Land prices. The Labor Bureau of India, Government of India, publishes the data on a monthly as well as annual basis, in a disaggregated fashion for different activities. The inflation pertaining to 'housing' activity is considered as the relevant figure for deflating land values.

The variable of interest to the study is the premium or discount that pertains to the quality of title. In keeping with this, all sites that are created by the Bengaluru Development Authority as part of its layout program were appropriately identified and coded with a dummy variable (BDA_Dummy). This dummy variable served to identify the treatment group which is hypothesized to have a title premium.

One other issue that arises in the attempt to quantify the value of implicit title quality is the degree of urban planning across the sites in the sample. Since BDA layouts are also superior in terms of planning and provision of amenities, any model that quantifies the title premium should also control for interaction effects due to planning. To account for the 'planning' variable, data was obtained from the BDA on all planned private and public layouts. These were subsequently ranked into four buckets based on their amenities that were provided at the time of creation of the layout.

The first bucket included amenities such as drainage, water and electricity connections, shops, parks, schools, transport and other social infrastructure within a distance of 2 kms from the layout. Large private layouts and large BDA layouts were included in this bucket. The second set contained small BDA layouts and private layouts which did not have as many amenities - typically had water, electricity and drainage connections, but social and transport infrastructure was not available. The third set contained revenue or historical urban centers where planning was virtually non-existent. Adequate care has been taken in choice of amenities to reduce multi-collinearity between the layout rankings and the distance metrics computed earlier.

The variables denoting the treatment group for title premiums and the Planning Rank were subsequently collapsed to create four different groups based on their differences in title premium and planning. The four groups so created are (1) BDA sites that are expected to have a title premium as well as a planning premium (2) Large Private layouts which have a best-in-class planning infrastructure but no title premium (3) Smaller private layouts that have a lower planning infrastructure and no title premium (4) Revenue Layouts where planning is non-existent and there is no title premium.

The completed dataset with attributes now includes the following variables 1) the appraised land price denoted by P deflated by the housing specific deflator for the city of Bengaluru for the corresponding time period 2) the distance to the city center in kilometers 3) the distance to the nearest Infrastructure/employment point in kilometers 4) displacement to nearest arterial road in kilometers 5) distance to closest market/ commercial area 6) distance to nearest transportation hub in kilometers 7) The FAR of the plot calculated as Total buildable area/ plot area 8) A size variable calculated as size of the plot in Sqft 9) A Dummy to denote whether the plot can be used for commercial purposes 10) Dummy variables to denote the combined effects of title and planning.

3.2 Model Specification

The hedonic model is represented in its log-linear form by the equation:

parcel. Price is in Indian Rupees[5].

Ln(DistCBD) is the natural logarithm of the linear distance of the site from the CBD measured in kilometers. The CBD is taken as the Main Railway terminal/ Bus terminal.

Ln(DistEmp) is the natural log of the distance from the nearest employment centre in kilometres. Ln(DistAR) is the natural logarithm of the linear distance of the site from the nearest arterial road in Kilometres taken as major roadway as per the Master Plan 2015 for Bengaluru city. Ln(DistMarket) is the natural logarithm of the linear distance of the site from the nearest commercial centre in Kilometres.

Ln(DistTrHub) is the natural logarithm of the linear distance of the site from the nearest Transportation Hub, which could be a bus station or railway station, in Kilometers.

Ln(Sq_Size) is the natural logarithm of the square of the size of the site in square feet.

FAR is a variable which measures the Floor Area Ratio of the land parcel (density regulation). Use denotes commercial use, Use =1[6].

BDALyt is a dummy variable that denotes the site is in a BDA developed layout and has an applicable title and a planning premium (BDALyt =1).

LargePrivateLyt is a dummy variable that refers to a site within a large private layout, with title premium = 0 and high planning premium (Largeprivatelyt =1).

SmallPrivateLyt refers to a site within a small private layout, title premium = 0 and low planning premium (SmallPrivateLyt =1)

RevenueLyt refers to a revenue site in an unplanned layout, title premium = 0 and planning premium = 0 (RevenueLyt=1)

β_0 is the intercept and the β_i terms are the coefficient estimates from the linear regression model. Errors ε_i are normally distributed (i.i.d).

The Y_i terms refer to fixed effects in time (with coefficients of γ).

The model does not use a location fixed-effect due to the planning architecture of the city of Bengaluru. Since planning zones are identified as Rings around the city centre, (as per Figure 1), the distance from the city centre proxies for much of the change in planning infrastructure and

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[5] In the time period of the study, 1USD equalled between INR 38-INR 50.
[6] Though Mixed use is possible, mixed use is more post-facto ratification of change of land use than a specific designated zone as per the Master Plan. Therefore, only commercial land use is considered.

FAR as well, making the property specific location fixed effects redundant. A robustness check is performed as part of the modelling exercise to determine the actual contribution of the distance from the CBD vs. its effect in determining planning zone of the parcel.

Based on the literature review, the distance from CBD, distance from the arterial road, distance from the employment centre, distance from commercial centre (nearest market area), distance from transport hub are expected to be negatively correlated to land price.

Land price may have a convex, concave or close to linear relationship with the parcel size (Colwell and Sirmans, 1978; Thorsnes and McMillen, 1998). This is also corroborated by Colwell and Sirmans (1978) who indicate that a convex effect - a plottage effect, where large land parcels command a premium - is typical for rural lands where agglomeration happens, and a plattage effect - smaller plots cost more per unit area - is exhibited by urban lands where costs of sub-division are high. Colwell and Munneke (1999) also find that land price per unit area is negatively related to size in urban land parcels.

However, the parcel sizes commonly traded in urban areas in Bengaluru are usually between 1200 and 4800 sqft (111 to 445 sqm.) and considering that affordability of smaller plots is higher (requiring lesser outlay to purchase), it is hypothesised the demand for smaller affordable plots is higher than that for larger plots that require greater expenditure, leading to unit land prices falling as the size of parcel increases. The coefficient of functional form of parcel size on unit land price is likely to be negative showing a plattage effect. This plattage effect may or may not be fuelled by the cost of sub-division of land parcels alone as per Colwell and Sirmans (1978).

A graphical analysis of plot size vs. price in the data set shows that there is a close to linear relationship between the logarithm of size and the logarithm of Price per unit square feet.

Given that the functional form is unknown, robustness checks are performed for all functional forms - a convex relationship (plottage effect), a concave relationship (plattage effect) and a linear relationship between size of parcel and land price. Floor Area Ratio, which describes the area that can be built on a plot of a certain size, is expected to have a positive relationship with

price - the higher the FAR, the higher the parcel price (Bertaud and Brueckner, 2003; Monk and Whitehead, 1999). FAR is a function of the minimum road width of the adjoining road, and the size of the property. FAR in Bengaluru ranges from a minimum of 1.0 to a maximum of 4.0 where the plot is within a distance of 1 Kilometre from the Metro railway line.

It is also hypothesised that the time fixed effects are likely to be significant and positive. Land Prices in Bengaluru have been on an upward trend barring a downturn in 2009 and the coefficient estimates of the time dummies should follow the macro-economic movement in land prices.

4   Results and Discussion

The data set contains land prices of 2263 plots spread over six years from 2005-2010. Specifically, the number of observations per year and the price per square foot (the dependent variable) statistics are provided in Table 2.

{Insert Table 2 about here}

As can be seen from the distribution of sites as well as prices over time, real estate markets experienced a downturn in 2009 after a steep rise in 2007. The number of sites that were assessed for mortgage was the least in 2009. By 2010 the Indian real estate market was well on its way to recovery, and have remained stable ever since. The descriptive statistics are across all the years in Table 3.

{Insert Table 3 about here}

The initial analysis consisted of a stepwise multivariate regression model (pooled OLS) to evaluate the relationship between the land price variable and the physical determinants and property including fixed effects in time. The Price variable was found to be lognormally distributed with no apparent periodicity.

The FAR variable was found to be highly correlated to both the Lot size (.757) and to the

Distance from CBD (.658) and was subsequently dropped. This makes sense because the permitted FAR as per the Master Plan of Bengaluru, 2015, is a combination of the Plot size, and the Planning zones, which are conceptualised as concentric rings around the city centre. The model was again run after dropping the FAR variable. It is ascertained that there is no serious problem of multi-collinearity among the independent variables, thus, no transformations of variables are found necessary. It is also ascertained that predicted error terms are normal and satisfy the pre-conditions for multiple regression. The Ramsey RESET test indicates that there is no omitted-variable bias, which could be another concern in hedonic regression.

The results of the estimation are indicated in Table 4. The results indicate that the variables that specify distance metrics of the site to the CBD, to the nearest employment centre and to the nearest Arterial Road are significant. In fact, the distance to the nearest Arterial Road is the primary factor that seems to influence land prices, more than distance to CBD metric. This could be attributed to the polycentric nature of the city of Bengaluru, which reduces the relevance of the Distance to CBD.

{Insert Table 4 about here}

Since the distance to CBD also proxies for the planning zone in which the specific parcel falls, and therefore impacts the FAR, the model was re-run with planning zone dummies replacing the distance to the CBD. The results of the regression are substantially unchanged, indicating that the significance of the distance to CBD metric is more to do with the specific planning zone in which the parcel falls.

The model was also modified to account for the distance to SBD rather than to the CBD. The distance metric to SBD was negative but insignificant, but this can be attributed to identification issues. In the absence of reliable data on population and employment densities, it is difficult to identify the various SBD's in the city, even though a limited number of nodes are well- recognised as SBD's.

Distance to the nearest transportation hub is not significant and neither is the distance to the

nearest commercial area. Distance to the nearest Employment Centre does have a significant negative impact on land prices, though its impact is less than that of the distance to the Arterial Road. thus recognising the predominant role of accessibility to transportation in explaining land prices.

The impact of size is significant and negative, as expected. The functional form of the model seems to accommodate a linear relationship between the log of land value and the log of size of the plot, in effect a quadratic function between the size and land value, rather than a linear relationship between Land price and size. The negative value of the coefficient indicates that there is a 'plattage' effect - as the size of the parcel increases, the price that is paid per unit area decreases, or smaller parcels are valued higher per unit area than larger parcels.

Figure 2 denotes the size of parcel vs price per unit area. For the sake of robustness, as per Colwell and Sirmans (1978) a convex as well as a concave functional form for size (both quadratic and cubic and inverses as relevant) are compared with the linear model and it is ascertained that the function is indeed inverse quadratic in form.

{Insert Figure 2 about here}

Surprisingly and contrary to expectations, the 'Use' variable denoting commercial use for land parcels dropped out of the model, even though the coefficient is positive (.0043) and is of the correct sign. There could be two separate explanations for this phenomenon. Firstly, zoning regulations enforcement is not quite rigorous and illegal conversion to commercial uses occurs in spite of zoning an area as purely residential (Sudhira et al., 2007). The planning authority is usually playing catch-up by zoning areas as commercial *after* thay have been commercialised. So one view is that market forces will take over irrespective of deemed zoning for the site as per the Master Plan. The second explanation is to do with the distance to Arterial Road metric. Usually, those land parcels that are zoned as commercial are so designated in relation to the major roadways, so it is likely the variable is subsumed in the distance to Arterial Road[7].

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[7] "Mutation Corridors" are a unique construct in the Master Plan 2015 whereby areas adjoining arterial roads that have already been rampantly and illegally commercialised are declared as 'mutation corridors' essentially recognising that these are

4.1   Impact of Planning and Title

The variables of specific interest are the premiums paid for the implicit title guarantee to BDA sites. This is captured by the coefficient associated with the BDALyt variable and the value of the coefficient is positive and significant. The coefficient value indicates that this is one of the largest contributors to the pricing of the parcel, accounting for about 7.4% of the price increase attributable to both the title premium and the planning premium. Planning premium, which is extracted from the coefficient values assigned to the Large Private Layouts (which are assumed to have a positive planning premium but no title premium) accounts for about 3% of the land price. Differencing the total premium for BDA sites from the planning premium (as exhibited by the parcels in Large Private layouts) provides the premium for title alone. This figure works out to a 4.3% increase in price simply due to the parcel having an implicit title premium. Smaller Private layouts which have a lower degree of planning account for about 1.1% increase in land prices. All variables are significant and have the relevant signs.

A separate model was considered taking into account interaction effects between planning and title guarantee, and these interaction effects were found to be insignificant.

To put the title premium in perspective, consider that the Karnataka real estate market has transactions worth conservatively around 60,000 - 75,000 Crores (equivalent to 600 - 750 Billion INR, or around 10 Billion USD) each year[8]. Of this, if we assume that around 4.3% is the title premium that is paid by each buyer for a clear title, this amounts to a staggering welfare loss of around 2580 Crores INR (430 Million USD) for the property buyers. Compare this to the INR 40 Crore (6.67 Million USD) budget that it costs the State to deliver title guarantee through its UPOR schemes[9]. The welfare gain of such a move to individual buyers is substantial and the

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residential areas on their way to being mutated to largely commercial uses. These and 'mixed use' have been challenged legally to help retain the character of residential areas.

[8] Back-calculated from revenues of the Office of the Inspector-General of Stamps and Registrations for Karnataka, based on a revenue of INR 5,265 Crore for the year 2012-2013, based on a 5.5% stamp duty +1% registration fee on immovable property registrations which account for more than 80% of the revenue collected. Of the entire transactions over Karnataka, less than 5% are of BDA sites and this adjustment has been ignored.

[9] The State estimates the UPOR project to cost about INR 40 Crore, as per the conversations with the UPOR officials. Check also http://www.livemint.com/Politics/xXcKTCPRAJ7dZoSUtWFHQP/Karnataka-to-call-for-fresh- bids-in-property-ownership-surve.html accessed on 24th April,2004

cost to the State agency is barely around 1.55% of the total cost borne by the buyers currently. With such large welfare implications purely based on the price premium paid to title guarantee, not to mention the associated monetised value of time and effort involved in ascertaining title, there is a very strong case for the Land Titling Bill to be quickly made into an Act in India, along with the infrastructure to enforce it.

International evidence on costs of titling suggests that title insurance account for about 0.5% in the US and around 1%- 1.5% in the United Kingdom for a title indemnity insurance. In comparison, Bengaluru real estate markets capture a 4.3% premium, which is around ten times more expensive than the premium in US markets and about 4 times more expensive than the typical UK market.

The premium for planning accounts for about 3% of land price and the methodology for this study this corresponds to the premium for planned sub-divisions across other studies (Cheshire and Sheppard, 2002; Cheshire and Sheppard, 1995). The premium for planning is observed to be lower than that calculated in various other studies (Cheshire and Sheppard, 2002; Bitter, 2013)

The relatively low premium for planning is perhaps explained by the nature of service delivery. The amenities priced in planning typically encompass provision of all kinds of infrastructure such as electricity, inner roads, open spaces, sewerage and water connections. However, providing the infrastructure for such services rarely translates to actual delivery of services. For instance, there are many sub-divisions (layouts) where provision for water connections are available, but no water is supplied by the municipality, and the residents depend on private groundwater connections. So while a premium is paid for planned infrastructure development, there is limited impact of provision of planned amenities on the price of the parcel. This is reiterated by Nallathiga (2006) who finds that in provision of public goods does not necessarily influence urban land prices. This is contrary to the general belief held in theory and is a unique feature of the under-developed market for public goods and the under-enforced market for zoning regulations existing across Indian cities.

The impact of time dummies is observed from the fixed-effect model of time. Realty prices increased in 2007 sharply, followed by a large drop in 2009 and both these effects are captured by the coefficients for the respective year dummies. The large constant term in the model specification and the statistical significance of this term could imply that the model is incomplete in terms of explanatory variables. Variables such as income, demographics, population and employment statistics, mortgage interest rates, etc play an important part in explaining the role of land prices. Unfortunately, given the paucity of reliable data sources in India, the difficulty in procuring and integrating data from various sources across different time periods, as well as the econometric issues in losing degrees of freedom by including location-specific fixed effects, a judgement call was made to work with the existing data-set.

In spite of these limitations, this study sheds light on the influencers of land price in Bengaluru real estate market, and set the context for discussing the importance and the value attached to title premiums in an emerging market economy, showing that land markets in Bengaluru are fairly well developed, supported by the observation that most theoretical constructs that have been found to influence land prices in other developed markets are also at play here.
Future research is needed to study the impact of vintage of the sub-division (layout creation) and the number of intervening transactions since the first sale on the price of the parcel. This would shed light on the change in title premium over time, and whether the title premium has strengthened with improvements in land markets and land records management.

5   Conclusion

Establishing property rights to immovable assets, especially land, is a topic of current concern across the developing world. Traditionally, land reforms in India have focused on creating a system of record keeping through a presumptive system of titles based on registration of deeds. The current focus of the government is on bringing about a conclusive title system based on the Torrens framework of the Mirror principle, the curtain principle and the assurance principle.

The current study estimates the title premium paid to clear titles in land using a quasi-natural

experiment set in the city of Bengaluru. The crux of the argument is that the sites that are developed by the Urban Development Authority in Bengaluru have a clear title and satisfy allthe criteria for a Torrens system of land titling and therefore command a premium for the title. Using differences in title in land developed and allotted by the urban development authority and contrasting this with land developed by other parties, the study estimates the title premium that accrues to properties with clear titles.

The study uses data over six years viz. 2005 to 2010 to evaluate the impact of implicit title guarantee provided by the State on residential layouts developed by the Urban Development Authority. The identification strategy relies on building a parsimonious model which has no omitted variable bias and also accounts for unobserved heterogeneity at various levels in the analysis. The unit of analysis is location-time. Using a data set of 2263 observations in a model accounting for time fixed effects, the dependent variable of logarithm of parcel price per unit area is regressed on distance metrics such as distance to CBD, distance to employment, distance to transport hub, distance to arterial road, distance to nearest commercial market, land use for commercial purposes, floor area ratio and parcel size. Since the layouts / subdivisions developed by the urban development authority may also have an associated planning premium involved, the planning premium is extracted using a control group of sites sold in large private layouts which have similar amenities. The differential premium for title can then be estimated. Robustness checks are included to control for the interaction effects of planning and title.

The results indicate that distance to arterial road and distance to employment center are statistically significant and so is the distance to the Central business district, which proxies for the planning structure of the city as well as subsumes zoning and floor-area ratio regulations. The quadratic functional form of parcel size is statistically significant with a negative coefficient, providing a plattage effect where land prices decrease with size. In essence, Indian land markets behave much the same way as other land markets elsewhere and the same factors influence prices albeit with different coefficients.

The results on the title premium shows that a staggering 4.3% premium is commanded by

property with clean titles. A cursory comparison with the international scenario show that this is four- to ten-times higher than the title insurance costs in developed markets. Back-of-envelope calculations indicate that the State would incur a cost which is around 1% of the welfare los currently experienced by individual buyers if the State were to implement a scheme of title guarantee. This reiterates the observation by Feder and Feeny (1991) that optimal private spending on enforcement of land titles tend to be excessive compared to state-enforced property rights. As Nozick (1974) emphasises, governments should monopolistically provide protection of property rights through land titling, and can do this more efficiently than privately negotiated contracts for property rights since titling is a club-good (Lueck and Miceli, 2006)

The study also teases out the exact impact of planning in urban land prices and finds that, as opposed to literature from other contexts, planning premium is lower in the current study due to the structural issues with delivery of services. While there is a small but significant premium for planned layouts and amenities provided in them, provision of the infrastructure for such services rarely translates to actual delivery of services, especially where the role of the municipality is involved in service delivery.

Our results also make important contributions to the extending scholarly literature in property rights and in urban land markets. In the literature on property rights, this study is one amongst the first to empirically test out the existence of title premium, which has long been suspected but never estimated in the Indian context.

While this paper makes significant contribution to literature, there are a variety of caveats and limitations. For one, title premiums would change with the specific vintage of the layut/subdivision, as well as with governance. Future work could tease out the exact nature of title premiums across different types of lands within the city and across cities. Future theoretical work could also model the welfare implications of different kinds of title guarantee schemes that could be employed.

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Table 1

Bengaluru at a glance

BBMP Area, population	800 sq km, 8479183 persons (Census 2011)
Bengaluru District area, Population 2011	2190 sq kms, 95 88 910 persons (Census 2011)
Bengaluru District pop. as % of Karnataka's population 2001	12.37%
Bengaluru District pop. as % of Karnataka's population 2011	15.69%
Growth in population in last decade	46%
Karnataka population as % of india's population 2011	5.05%
GDP of Bengaluru Urban District, Karnataka (ratio)	Rs. 117356 crore, Rs. 34523594 crore (34%)
Per capita income	Rs. 162043

Figure 1

Bengaluru Metropolitan Area
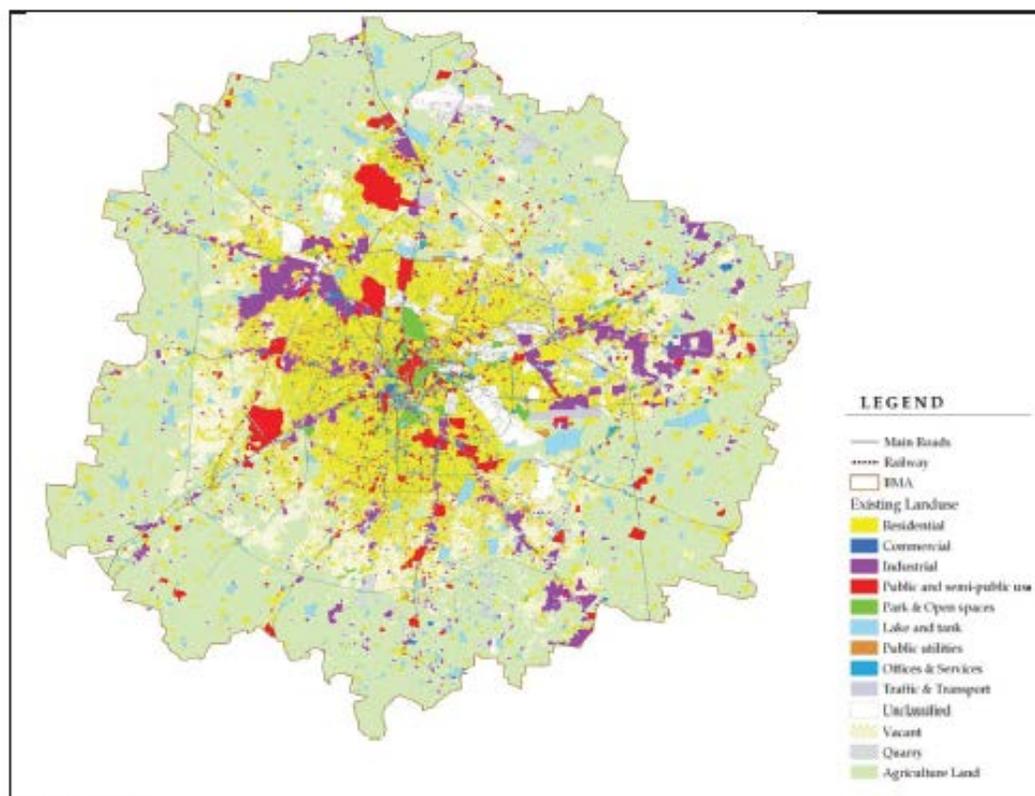
Source: BDA

Table 2

**Data Points by Year and Descriptive statistics on Price by Year**

Year of analysis	Number of Usable Data points	Price per square foot in Rs.			
		Minimum	Max	Mean	S.D.
2005	440	1525.00	12300.00	4247.5543	1591.56456
2006	316	1568.45	13715.54	5335.5708	2189.64067
2007	422	1869.99	17428.64	6741.4657	2884.80073
2008	310	2437.44	24735.73	8310.8253	3785.17159
2009	284	2599.20	29230.57	9141.0661	4341.63565
2010	491	2938.12	29302.25	10443.0114	4746.98209

Figure 2

This figure establishes the functional form of parcel size with Price per unit area for the observations under analysis

A) Distribution of Price with Size of Parcel
B) Distribution of Log Price with Log Square of Parcel Size
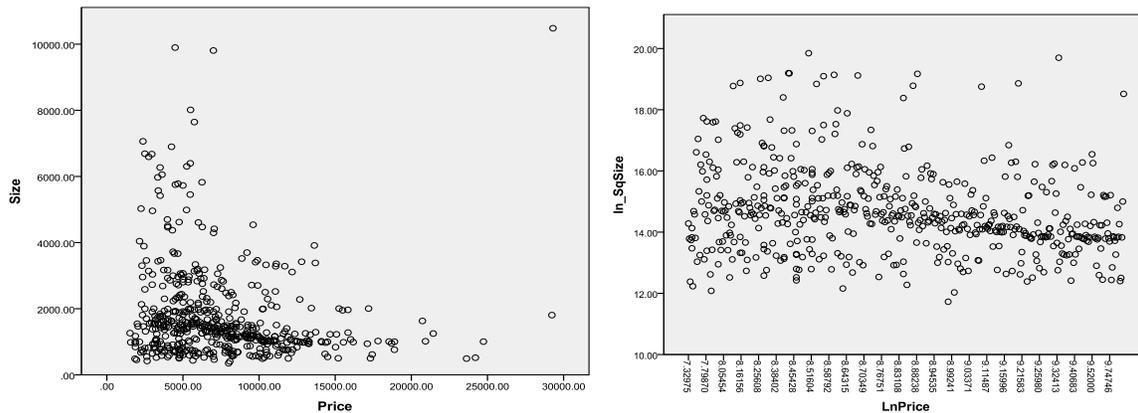
Table 3

Descriptive Statistics

Variable	Minimum	Maximum	Mean	Std. Deviation
Price	1525.00	29302.25	7369.92	4052.01
DistCBD	1.00	15.99	7.11	3.61
DistAR	0.58	5.15	2.83	0.93
DistTRHub	2.71	6.91	4.87	1.04
DistEmp	2.31	13.68	5.97	2.38
FAR	1.38	4.00	2.28	0.82
Size	351.63	20395.33	2142.83	2523.19
Use	0	1	.19	.357
BDALyt	0	1	.22	.412
LargePvtLyt	0	1	.25	.431
SmallPvtLyt	0	1	.25	.431
RevenueLyt	0	1	.29	.455

Table 4

Results of the Model

(Constant)	9.525 ***	0.155
		(61.5)
lnARDist	-.553***	0.040
		(-13.820)
BDALyt	.428***	0.041
		(10.399)
LargePvtLyt	.299***	0.038
		(7.810)
lnEmpDist	-.117**	0.041
		(-2.830)
SmallPvtLyt	.110**	0.035
		(3.126)
lnSq_Size	-.028**	0.018
		(-3.086)
LNCBDDist	-.072*	0.027
		(-2.628)
YR1	.0512*	0.0592
		(17.82)
YR2	0.0798	0.0638
		(9.84)
YR3	0.193**	0.0899

		(2.945)
YR4	0.1024	0.0788
		(6.45)
YR5	-0.0452***	0.039
		(-12.43)
YR6	0.0345	0.069
		(3.458)
Adjusted R-Square		0.683
F statistic		149.534
Number of Obs		2263
DW test		2.037

Note: Figures in brackets are t values;
***p<0.01,**p<0.05,*p<0.1;

Appendix 1

Indicative List of BDA Layout List

Name of Layout	No.of Sites
Banashankari	6542
BTM layout	7519
Chandra Layout	137
Domlur	641
HAL	422
HRBR	806
HSR Layout	10300
JayaNagar	301
JP nagar	5017
Koramangala	200
Kumara Swamy Layout	6398
Nagarbhavi	1469
Rajaji Nagar	1137
RMV	1968
Sonehalli	811
viyalikaval layout	1130
West Chord Road	123