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Spatial Variability of Urban Land Price in Addis Ababa, Ethiopia

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1 ABSTRACT

Land value results from the site's desirability and economic value, as well as the availability of essential facilities. Understanding the spatial variation and determinants of prevailing land prices is crucial for urban planners and policymakers, given that land value, infrastructure availability, and proximity to public services are interrelated. To this end, we used 938 datasets of land lease prices per square meter from an online source. Additionally, geographic coordinates for each neighborhood association, the lowest level of city administration (Woredas), were collected from Google Earth. The data was analyzed using both statistical and geostatistical methods. The results of the Hedonic Pricing Model (HPM) indicate that plot area, land zone, land grade, building height, lease benchmark price, advance payment, and distance from the city center significantly influence the land prices. On the other hand, the spatial autocorrelation analysis revealed clusters of similar lease prices across various geographic areas of the city. High lease prices were concentrated in the city center, while the clusters of low land prices were randomly distributed at the periphery. The insights from this study contribute to the capture of land value resulting from public actions. Besides, the findings have practical implications for urban planners in making site-selection decisions for urban development projects and in fostering equitable and sustainable infrastructure provision. Moreover, real estate buyers, developers, and appraisers have different interests in land marketing. Thus, the study's findings are also crucial for understanding potential hot and cold areas of land value, as well as the driving factors of land value variability across the city.

Keywords: Spatial variation, Spatial autocorrelation, Land value, Urban planning, Hedonic regression

2 INTRODUCTION

Land is a source and a foundation for a city's development. The value of land, therefore, reflects its development potential and the availability of the neighborhood amenities (Sharma et al., 2024). On the other hand, land is a scarce and heterogeneous asset. Each plot of land is unique in its features, which drives the spatial variability of land values and makes the land market complex. Understanding the spatial patterns and determinants of urban land prices has become critical for urban planners to reallocate land resources and ensure equitable distribution of development activities (Binoy et al., 2022; Ma et al., 2020; Sharma et al., 2024; Ozalp & Akinci, 2017).

Prior studies have examined factors influencing land values worldwide using parametric and non-parametric methods. Agosto (2017) found that economic agglomerations, government policies, and neighborhood characteristics influence land value in Cebu City, Philippines. Bv et al. (2020) demonstrated that access to roads, closeness to nuisances, and disaster vulnerability significantly influence land value in Kerala, India. Neighborhood characteristics, particularly access to the main road of a plot, have affected land values in Gujarat, Pakistan (Aziz et al., 2021). On the other hand, Uju & Iyanda (2012) conducted a comparative analysis of locational and non-locational factors affecting land value in Onitsha, Nigeria. They found that non-locational factors are the most determinative factors of land value, and that land value does not decrease with distance from the city center. In contrast, Thiwanka & Wickramarachchi (2022) found that location, neighborhood characteristics, accessibility, and topographic features significantly influence the land value in Colombo, Sri Lanka. Overall, the above findings lead us to conclude that land value is affected by various locational and non-locational factors, underscoring the complexity of the land market. Besides, the country's socio-economic contexts and market conditions influence land values. The demand for urban land, especially in developing countries, has increased rapidly due to rapid urbanization and population growth

(Tambe, 2025). For instance, in Addis Ababa, the capital of Ethiopia, urban land values are excessively high and unaffordable for a large share of the population, driven by rapid

urbanization and population growth (World Bank Group, 2019). As the country's capital, Addis Ababa hosts 25% of the country's urban population (Erena et al., 2017). According to the World Population Review (2024), the city's population is projected to increase by 4.44% annually, reaching 5.9 million by 2025. Furthermore, the influx of people into cities seeking employment and a better life has increased, placing a burden on the city administration to meet land and housing demand (Kebu et al., 2023).

In response to rapid population growth and urbanization, as well as the efficient use of urban land, the Addis Ababa City Administration Land Development Bureau has commenced land lease auctions. The Lease Proclamation No. 721/2011 aimed to ensure the equitable, efficient, and transparent delivery of scarce urban land to city residents. As a result, tender documents have been opened to the public, and interested parties can purchase them and compete on arm's length terms. As of today, six rounds of land lease auctions have been publicly conducted since 2023. Even if the land lease auction reflects the actual land price, resulting from competition among interested parties, the lease price still escalates rapidly (Miles, 2023). The land lease price is unaffordable, with pricing gaps and management challenges (Takele, 2018). Besides, the performance and implementation of the lease auction practice have been widely criticized for failing to meet the demand for urban land. As a result, informal settlements and squatting become the primary option for most urban dwellers in the city (Belete, 2017).

The vast portion of previous studies in the study area investigated the factors contributing to the escalation of urban land prices (Adamu, 2014; Belete, 2017; Takele, 2018; Weldegebriel et al., 2022), while few studies highlighted the determinant factors of urban lease prices in Ethiopia (Gebrihet & Pillay, 2020; Shita et al., 2022). However, there is limited research on the factors contributing to the spatial variability of land prices in Addis Ababa. Therefore, this study explores the determinants and spatial heterogeneities of land prices in Addis Ababa using both statistical and geostatistical techniques.

3 STUDY AREA DESCRIPTION

The study was conducted in Addis Ababa, the capital city of Ethiopia. Addis Ababa is characterized by rapid urbanization and population growth. According to the World Population Review (2025) report, Addis Ababa's population is estimated at 5.9 million. The city comprises 11 sub-cities: Gulele, Yeka, Lemi Kura, Akaki Kality, Bole, Kirkos, Addis Ketema, Arada, Kolfe Keraniyo, Lideta, and Nifas Silk Lafto, as shown in Figure 1.

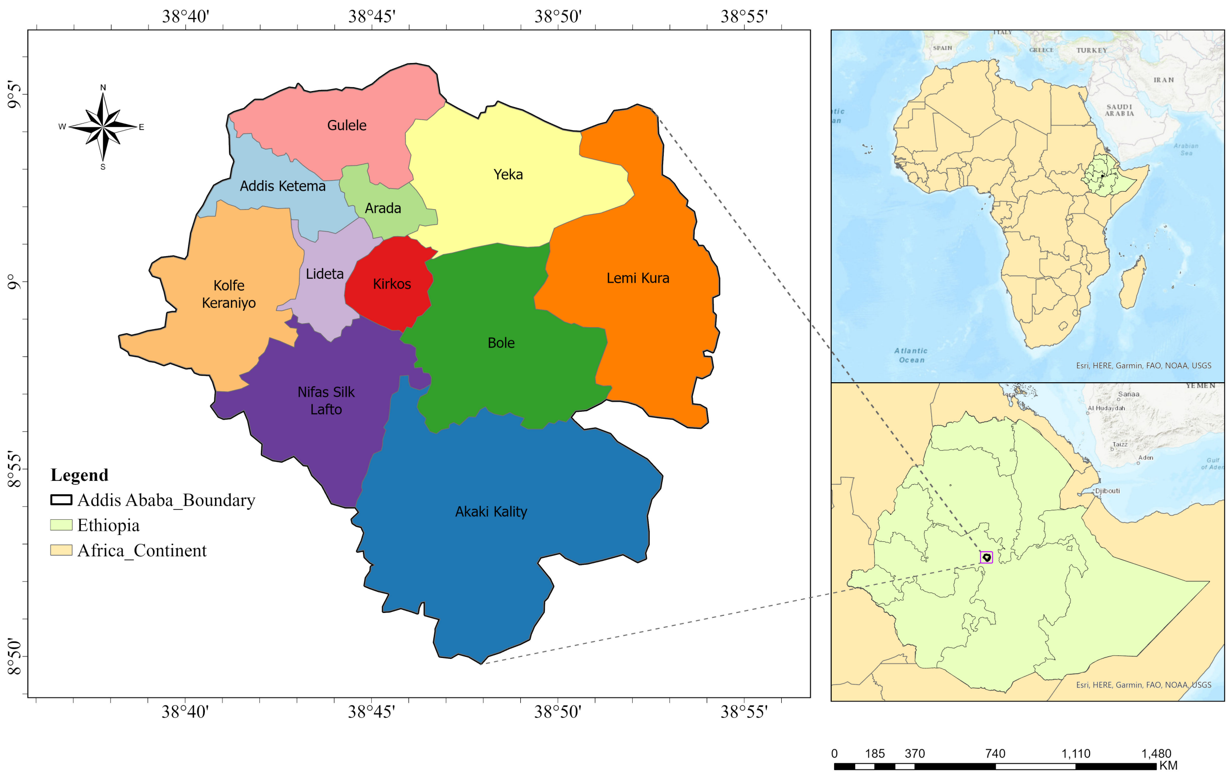


Figure 1: Locational map of the study area

4 METHODOLOGY

4.1 Data Sources and Method of Analysis

The study aims to identify and analyze factors affecting land prices in Addis Ababa using the hedonic pricing method (HPM). The study uses online data published by the Addis Ababa Land Development and Administration Bureau . The data contains lease price per square meter, plot area, lease benchmark price per square meter, land grade, land zone, land use type, down payment, building height, grace period, lease period, payment period end, potential, and a bid security (CPO). After data collection, these data are coded and edited for further descriptive, spatial, and statistical analysis. Additionally, the geographic centroids' coordinates of each district's woredas (districts) were determined using Google Earth. Furthermore, the distance of each Woreda to the city center (Menellik Square) was computed using ArcGIS Pro 3.4.

4.2 Hedonic Pricing Method (HPM)

Real estate prices are highly heterogeneous and are affected by a combination of structural, locational, and neighborhood factors (Ozalp & Akinci, 2017). As a result, the HPM is widely used to analyze the effects of the multidimensional nature of influencing factors on real estate prices (Sopranzetti, 2015). We employed the HPM to examine the effects of independent variables on lease prices. The HPM is summarized as follows.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \cdots + \beta_n X_n + e \quad (1)$$

Where

Y is the lease price per square meter,
β_0 is the intercept,
$\beta_1 \ldots\ldots \beta_n$ are coefficients (parameters),
$X_1 \ldots\ldots X_n$ are independent variables,
e is the error term

4.3 Spatial Autocorrelation (Global Moran's I)

Spatial Autocorrelation is a Spatial Statistics technique used to describe the spatial Autocorrelation of values, whether they are clustered, dispersed, or randomized, using Moran's I Index. In addition, the tool provides both z-scores and p-values for evaluating the significance of that index. Therefore, the Global Moran's I was employed to investigate the spatial pattern of land prices in Addis Ababa, assessing whether they are dispersed, randomized, or clustered. A Moran's I < 0 indicates a negative spatial correlation. The smaller the value, the greater the spatial difference; otherwise, the space is random when Moran's I = 0 (Esri, n.d.)

$$\text{Moran's I} = \frac{n}{S_0}\frac{\sum_i^n \sum_j^n w_{i,j} z_i z_j}{z_i^2} \qquad (2)$$

Where n is equal to the total number of features, $w_{i,j}$ is the spatial weights between feature i and j, z_i is the deviation of an attribute for feature i from its mean$(x_i - \bar{x})$, S_0 and is the aggregate of all the spatial weights:

$$S_0 = \sum_i^n \sum_j^n w_{i,j} \qquad (3)$$

The z_i score for the statistic is computed as:

$$Z_i = \frac{I - E[I]}{\sqrt{V[I]}} \qquad (4)$$

Where: $E[I] = -1/(n-1) \qquad (5)$

$V[I] = E[I^2] - E[I]^2 \qquad (6)$

4.4 Spatial Statistics (Hotspot Analysis (Getis-Ord Gi*)) and Spatial Interpolation

The hotspot analysis is essential for identifying statistically significant clusters of high and low land prices across the entire city of Addis Ababa using the Getis-Ord Gi* method. The Gi* statistic returned for each feature in the dataset is a z-score. For statistically significant positive z-scores, the larger the z-score, the more intense the clustering of high values (hot spots). For statistically substantial negative z-scores, the smaller the z-score, the more intense the clustering of low values (cold spots) (Esri, n.d.). The formula for Getis-Ord Gi* is given in equation 7.

$$G_i^* = \frac{\sum_{j=1}^n w_{i,j} x_j - \bar{X} \sum_{j=1}^n w_{i,j}}{S\sqrt{\frac{[n\sum_{j=1}^n w_{i,j}^2 - (\sum_{j=1}^n w_{i,j})^2]}{n-1}}} \qquad (7)$$

Where x_j is the attribute value for feature j, $w_{i,j}$ where the spatial weight is between feature i and j. n is equal to the total number of features, $\bar{X}$ is the variable's mean across all locations (eq. 8), and S is the variable's standard deviation (eq. 9).

$$\bar{X} = \frac{\sum_{j=1}^n x_j}{N} \qquad (8)$$

$$S = \sqrt{\frac{\sum_{j=1}^n x_j^2}{n} - (\bar{X})^2} \qquad (9)$$

After the hotspot analysis, the Inverse Distance Weighted (IDW) spatial interpolation technique were used for generating continuous data. Spatial interpolation is the process of determining unknown spatial data using known spatial data (Jia et al., 2018).

4.5 Variable Description and Measurement

The dependent variable is the lease price per square meter, and the nature of the explanatory variables is highlighted in Table 1.

Name of Variables	Variable code	Nature of Variables	Description and measurements of variables
Lease Price	LSE	Continuous	The amount bidders offered for a plot per m^2, measured in Ethiopian Birr.
Down Payment	DP_LSE	Continuous	It is an initial payment made by participants, measured in Ethiopian Birr. The

			minimum threshold payment made is 20% of the total price.
Area	AR	Continuous	Size of the plot measured in m^2
Land Zone	LZ	Categorical	Shows the location of the plot and is mainly related with availability of infrastructure and the land zone classified as Land Zone 1= center around central business district, Land Zone 2 = Transitional, Land Zone 3 = Peripheral
Land Grade	PG	Categorical	Shows the location of the plot related to proximity to main road and other infrastructure. Thus, Land grade of the plot is classified into five group's starts from Land Grade 1, up to Land Grade 5.
Land Use	LU	Dummy	The type of the Land Use (Mixed = 0, Business = 1)
Building Height	BH	Categorical	Land Use regulation for building heights, 1, for Maximum of G+1, 2, for Maximum of G+2, and n = Maximum of G+n)
Benchmark Price	BMP	Continuous	It's a minimum benchmark price set by the city administration to auction. It's measured by Ethiopian birr per m^2.
Down Payment of Benchmark Price	DP_BMP	Continuous	The down payment of the lease benchmark price is the initial payment set by the city administration, which is 40% of the bench mark price. It's measured by Ethiopian birr per m^2.
Grace Period	GPY	Continuous	It's a time frame given to the leaseholder after the payment of the benchmark price to relieve them from payment before the start of the annual lease payment.
Lease Period	LP	Continuous	The lease termination period, which is measured in years
Lease Payment Period	LPPP	Continuous	It's a time frame given for the completion of the lease in a year
Potential	PO	Continuous	A capacity to develop the plot and show it in terms of Ethiopian Birr (ETB)
A bid security	CPO	Continuous	A bid security deposited in a lessee's bank account
Distance from Central Business District	DCBD	Continuous	The distance from the district's centroid point to the central business district. Which is measured in kilometers.

Table 1: Description of Variables

5 RESULT

5.1 Description and Determinant Factors of Lease Price

As shown in Table 2, the minimum lease price per square meter is 8,720.51 Ethiopian Birr (ETB), equivalent to 56 US Dollars (USD), and the maximum price is 470,422.5 ETB, equivalent to 3,024.25 USD. The average lease price per square meter is 52353.77 ETB, equivalent to 337.439 USD. In addition, the average plot area is 339.3185 m². The average benchmark price for the plot per square meter is 1324.268, and the average advance payment is approximately 582.02. The mean values of the bidder's potential and bid security are both 1021,201 ETB. The average distance from each woredas centroid to the city center is 10.55 kilometres.

Measurements	LSE	AR	DP_LSE	BMP	DP_BMP	PO	CPO	DCBD
count	938	938	938	938	938	938	938	938
mean	52353.77	340.07	43023.45	1334.73	533.89	1021201	1021201	10.55
std	34808.51	398.84	20562.57	376.17	150.47	1746831	474691.5	4.51
min	8720.51	75	4648.4	904.77	361.91	175000	36643.19	1.37
25%	36099.25	150	30750	1027.84	411.14	350000	85129.32	8.76
50%	46500	200	41500	1221.18	488.47	522666.7	142514.3	8.96
75%	57975	350	51008.38	1531.91	612.76	1073333	251840.1	15.29
max	470422.5	4798	311000	2213.25	885.3	35126000	8329566	18.14

Table 2: Summary Statistics for continuous variables

For categorical variables, Table 3 shows that 39.55% of auction plots were located in the transition zone, and 39.13% in the city's central areas. In comparison, 21.32% of the lease auctions were situated in the city's outlying areas. Additionally, mixed land use accounted for 99.47% of all auction plot leases in Addis Ababa.

Variable	Dummy Class	Freq.	Percent	Cum.
LZ	1	367	39.13	39.13
	2	371	39.55	78.68
	3	200	21.32	100
	Total	938	100	
LG	1	132	14.07	14.07
	2	140	14.93	29
	3	316	33.69	62.69
	4	41	4.37	67.06
	5	309	32.94	100
	Total	938	100	

LUT	0	933	99.47	99.47
	1	5	0.53	100
	Total	938	100	
BH	5	23	2.45	2.45
	9	841	89.66	92.11
	11	2	0.21	92.32
	14	2	0.21	92.54
	19	70	7.46	100
	Total	938	100	

Table 3: Summary Statistics for Categorical Variables

To evaluate the effect of the explanatory variables on lease price, we used the HPM. First, we checked the basic assumptions for model computation, such as data normality, multicollinearity, and independence of observations. Multicollinearity among the variables was assessed using the Pearson correlation coefficient (r) to determine the strength and direction of their relationships. The results are displayed in the confusion matrix (Figure 2). The Pearson correlation coefficient varies from -1 to +1, with the extreme values indicating a perfect negative or positive relationship between variables. As shown in the correlation map in Figure 2, several variables are highly correlated; therefore, the four variables Ln_DP_LSE, Ln_CPO, Ln_PO, and Ln_DP_BMP were removed. Additionally, the three continuous variables GPY, LP, and LPPP were excluded because they have a fixed effect on lease price. The Variance Inflation Factor (VIF) was also used to reduce the number of explanatory variables further (Cheng et al., 2022). Only variables with a VIF value of 10 or less were included (see Table 4).

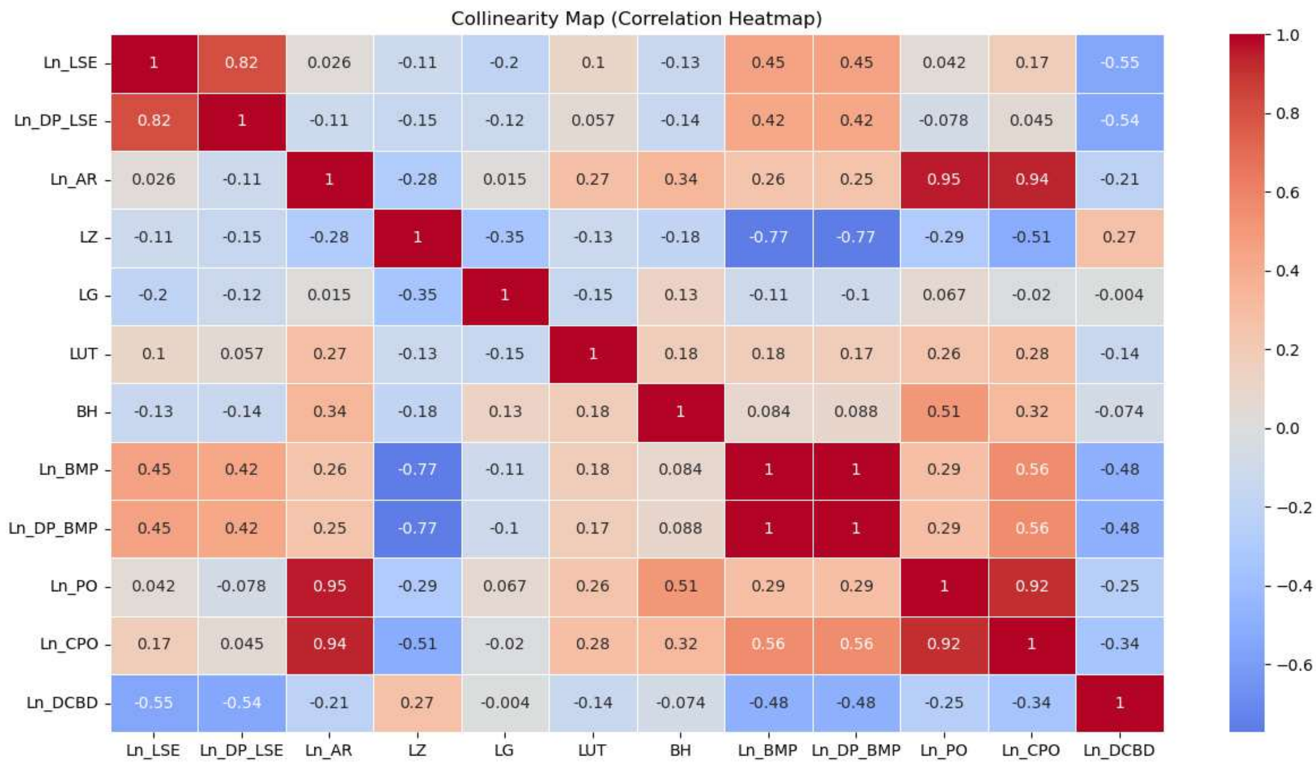


Figure 2: Collinearity Map (Correlation Heat)

Variable	VIF	1/VIF
Ln_BMP	5.78	0.172902
LZ	5.36	0.186737
LG	2.09	0.479242
Ln_DCBD	1.79	0.558529
Ln_BMP	1.78	0.562399
Ln_AR	1.38	0.725446
BH	1.19	0.840449
LUT	1.15	0.867915
Mean VIF	2.56	

Table 4: Variance Inflation Factor (VIF)

The normality test was performed after checking for multicollinearity. To do that, all continuous variables were converted to natural logarithms. This avoids the skewness and kurtosis effect of the variables. The residuals of the dependent variables, as shown in Figure 3, appear approximately normally distributed, and the points lie on the reference line in the Q-Q Plot, indicating normality of the data, even if a small deviation occurred on both upper and lower end tails. On the other hand, the residuals in the scatter plot of residuals (Figure 4) appear roughly normally distributed and look equally distributed on the x- and y-axes, which supports the test for heteroscedasticity.

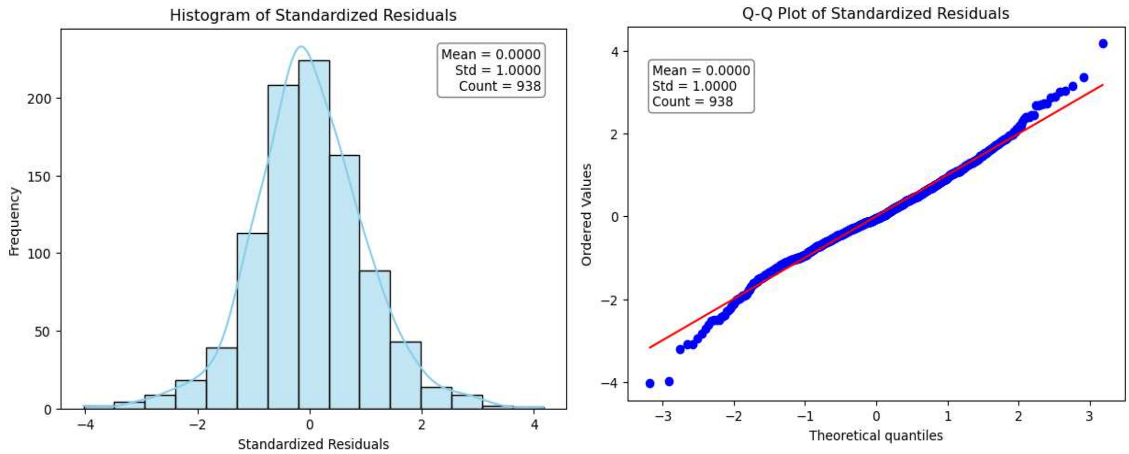


Figure 3: Normality Test: Histogram and Q-Q Plot

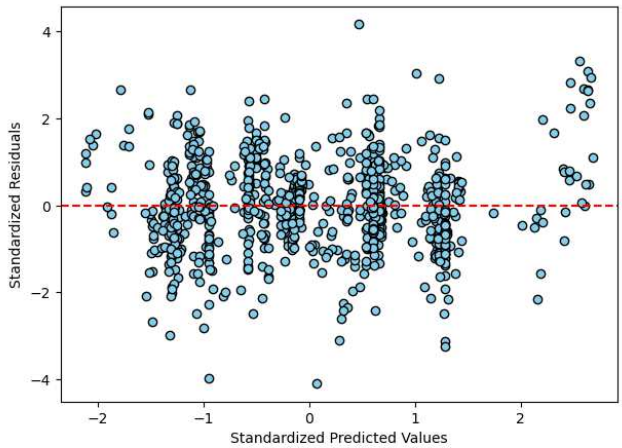


Figure 4: Scatter Plot of Residuals vs Predicted Values

The results of the HPM analysis indicate the statistical significance of the factors influencing lease prices. As illustrated in Table 5, all independent variables are significant factors influencing land prices in Addis Ababa: plot size, land grade, land use type, the level of building height (except BH with G plus 11), the benchmark price, and distance to the city center.

Source	SS	df	MS	Number of obs		938
				F(14, 923)		81.37
Model	126.7014	14	9.050097	Prob > F		0
Residual	102.6602	923	0.111225	R-squared		0.5524
				Adj R-squared		0.5456
Total	229.3616	937	0.244783	Root MSE		0.3335
Ln_LSE	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
Ln_AR	-0.15406	0.020731	-7.43	0.000	-0.19475	-0.11338
LZ						
2	0.436006	0.052627	8.28	0.000	0.332724	0.539289
3	1.040004	0.081728	12.73	0.000	0.87961	1.200398
LG						
2	0.344578	0.054695	6.3	0.000	0.237237	0.451919
3	0.142654	0.039774	3.59	0.000	0.064597	0.220711
4	0.399349	0.069315	5.76	0.000	0.263316	0.535383
5	0.50691	0.056448	8.98	0.000	0.396128	0.617691
1.LUT	0.375203	0.110122	3.41	0.001	0.159084	0.591322
BH						
9	-0.72416	0.103004	-7.03	0.000	-0.92631	-0.52201
11	-0.33509	0.259049	-1.29	0.196	-0.84348	0.173306
14	-1.03825	0.249115	-4.17	0.000	-1.52715	-0.54935
19	-0.70989	0.100607	-7.06	0.000	-0.90734	-0.51245

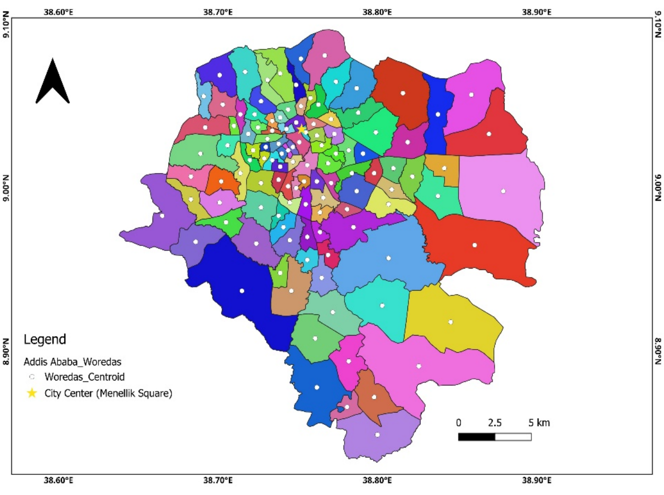
Ln_BMP	1.536676	0.110314	13.93	0.000	1.32018	1.753172
Ln_DCBD	-0.37283	0.03023	-12.33	0.000	-0.43216	-0.3135
_cons	1.39728	0.899128	1.55	0.121	-0.36729	3.161853

Table 5: Hedonic Pricing Model

5.2 Spatial Variation of Lease Price in Addis Ababa

Land prices result from development activities and reflect urban structure. Therefore, land prices vary widely across space and are influenced by infrastructure availability, such as roads, and social factors (Tsutsumi et al., 2011). According to the second land lease auction in Addis Ababa, the highest land price of 470,423 ETB per square meter was recorded in Kirkos sub-city, near the city center. The Nefase Selk Lafto district had the lowest land lease price at 20,100 ETB per square meter. In the third round of the land lease auction, the highest price of 268,000 ETB per square meter was recorded in the Arada district. In contrast, the Akaki district had the lowest land lease price with 16,621 ETB per square meter. In the fifth round of land lease auctions, 265,000 ETB per square meter was recorded in the Kirkos district, while the Akaki Kality district recorded 8,720.51 ETB per square meter. Finally, in the sixth round of land lease auctions, the highest bid was 90,100 ETB in the Gulule and Nifas Selk Lafto districts, and the lowest, 23,721 ETB, was found in the Akaki Kality district. The results highlight the spatiotemporal and spatial variability of lease prices in Addis Ababa.

To understand the spatial patterns of land lease prices in Addis Ababa, we employed spatial analysis techniques, including spatial Autocorrelation and hotspot analysis, within a GIS. First, we adjusted the lease price per square meter for inflation, accounting for the time value of money. This is because the second and third rounds of the lease auctions were conducted in 2024, while the fifth and sixth rounds were conducted in 2025. Next, we generated the centroid coordinates for each woreda (the smallest administrative district) of the city (see Figure 5). Afterwards, the adjusted average lease price per square meter was integrated for woredas. The spatial autocorrelation analysis (Figure 6) showed a cluster of similar lease prices in Addis Ababa. The Moran's I is 0.194618, which is greater than zero. The z-score value is 2.844184, and the p-value is 0.004453, which is less than 0.05. This indicates a concentration of similar values across the cities. Additionally, the statistical hot- and cold-spot areas of the lease price, highlighted on the spatial interpolation map, are shown in Figure 7. The Inverse Distance Weighting (IDW) hotspot analysis revealed significant hotspots around city centers, particularly in the Arada and Kirkos districts. In contrast, cold spots were identified in the city's periphery, in the Akaki Kality and Lemi-Kura districts. Moreover, the 3D visualization in Figure 8 shows the spatial distribution of the average lease prices of woredas in Addis Ababa. The city center shows higher land values than the peripheral areas, and the gap between the city center and the peripheral regions is larger.



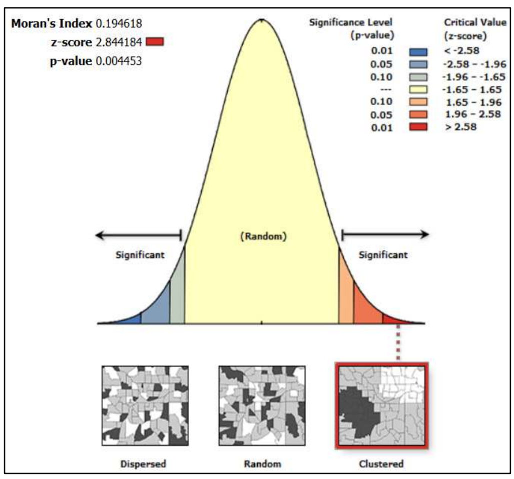
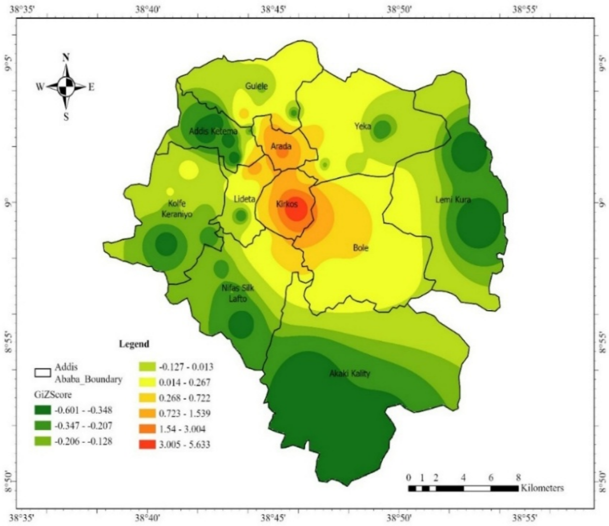


Figure 5: Addis Ababa's Woredas, Figure 6: Spatial Autocorrelation of Lease Price



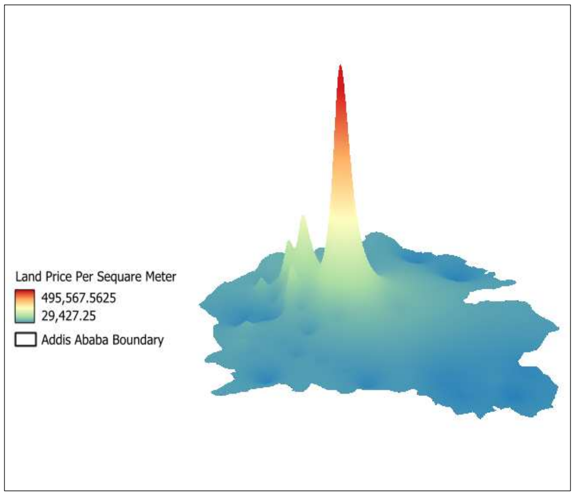


Figure 7: IDW Hotspot Analysis, Figure 8: 3D Visualization of Land Price

6 DISCUSSION AND POLICY IMPLICATIONS

This study investigates the determinants and spatial heterogeneity of land prices in Addis Ababa. The study found positive correlations between lease prices and plot area, land-use type, Compulsory Payment Order (CPO), Potential (PO), Lease Benchmark Prices, and Down Payments. Conversely, a negative relationship was identified between land zone, land grade, building height, and distance from the Central Business District (CBD), as shown in Figure 2. The results suggest that auctioneers are willing to pay more as the plot size increases. However, bidders are less inclined to pay more for plots located farther from the city center, especially in transition and peripheral areas. Meanwhile, the Hedonic Pricing Model showed that plot size, land grade, land use type, building height, plot benchmark price, and location are key factors influencing land lease prices in Addis Ababa. This study's results align with a previous study by Weldesilassie & Gebrehiwot (2017), which suggested that the base price, plot size, location, grade, and auction period significantly impact land value. Similarly, Gebrihet & Pillay (2020) found a positive and significant relationship between the markup price and factors such as plot location, plot size, payment period, monthly income, access to basic services, land-use type, and the land-lease auction period. A study also indicated that distance to the city center, proximity to the main road, and access to healthcare facilities significantly influence land prices in Pekanbaru City, Indonesia (Pratiwi, 2025). Thiwanka & Wickramaarachchi (2022) demonstrated that locational factors, neighborhood characteristics, accessibility, and topographic features significantly affect land value in Sri Lanka. Moreover, the study findings showed the spatial variation of lease prices across different parts of the city. Significantly high land prices (hotspot values) were found in and around the city center, especially in Arada, Kirkos, and parts of the Bole and Lideta districts. In contrast, low values (cold spots) were seen in Addis Ketema, Akaki Kality, Lemi-Kura, Nifas Silk-Lafto, and Kolfe Keraniyo sub-cities. These spatial patterns indicate that location and accessibility influence price determination. The high land values in the city center may be due to infrastructure such as roads, parks, and essential amenities.

Understanding the determinants and spatial heterogeneity of land prices has practical implications for homebuyers, property developers, and urban planners. The study's findings help homebuyers make informed decisions about choosing neighborhoods by providing access to affordable land that meets their housing needs. Additionally, identifying hotspot and cold-spot areas of land value supports property developers in making evidence-based decisions regarding potential profits, development opportunities, and risk assessment (Miles, 2023). Moreover, the study's findings also support urban planners' understanding of how access to amenities and infrastructure development influence land value and the efficient use of urban land. This knowledge allows them to make decisions that promote equitable public infrastructure and capitalize on the increased land values generated by infrastructure projects, supporting sustainable urban growth and increasing urban revenue. Additionally, since urbanization in Ethiopia has been rapidly increasing over the past few decades, with an annual growth rate of 5.4%. The growth is expected to nearly double, reaching 40 million by 2030 (UN-Habitat, 2023). For example, according to the World Population Review (2024), the population of Addis Ababa is forecasted to increase by 4.44% annually, reaching approximately 5.9 million by 2025. Additionally, the influx of people into major cities seeking jobs and better opportunities has increased, putting more pressure on city governments to meet housing needs and exacerbating the challenge of providing urban land for housing (Kebu et al., 2023). Abubakar & Aina (2019) demonstrated that rapid urbanization in Nigeria requires the development of basic infrastructure, such as housing, roads, and public services. However, a funding shortfall remains a major issue in South African municipalities, impeding efforts to address infrastructure problems (Mazele & Amoah, 2022). Therefore, the government should create policies and strategies to allocate urban land effectively to meet housing needs and ensure the adequate and equitable provision of infrastructure for sustainable urban growth.

7 CONCLUSION

This study explores the determinants and spatial variations of land prices in Addis Ababa. The results from the Hedonic Pricing Model show that plot size, land grade, land use type, building height, benchmark price, and plot location are significant factors influencing land lease prices in Addis Ababa. The hotspot analysis indicates that land values are high in the city center and low in the city's outer areas. The plot's location significantly impacts its price. Plots near the city's Central Business District (CBD) are more expensive than those on the city's outskirts. The findings show the influence of both demand- and supply-driven factors on land lease prices. Auctioneers are willing to pay more for a plot in the city center than for one in peripheral areas, supporting the idea that location impacts price determination. Additionally, bidders take the plot's size into account when offering a premium.

Information about the main factors influencing land prices is essential for urban planners and policymakers to ensure efficient allocation of urban resources throughout the city. Additionally, understanding spatial differences can provide valuable insights into developed and undeveloped areas that require infrastructure, helping optimize urban land use. The findings help urban planners understand the spatial variability and dynamics of lease prices, aiding decision-making for optimal resource allocation and development. However, the study has some limitations. We are not incorporating all woredas for analysis, and some have no lease auction prices because no plots in those woredas have been auctioned. This impacts the accuracy of the spatial interpolation maps in our results. Future research will address this gap by collecting additional data when new lease auctions become publicly available and by exploring the factors influencing lease prices and their spatial variabilities using advanced geospatial techniques, such as the Geographically Weighted Regression Model. Overall, based on the study's findings, the following recommendations are provided.

- Maximizing government revenue through land value capture. Information about land value maps is crucial for assessing the spatial variation in land values. Urban planners can gain insights into high and low lease prices and use them to inform decision-making to capture the increased value resulting from development activities.
- Expanding equitable access to public services and infrastructure. Urban planners should prioritize fair distribution of public services and urban infrastructure across different districts of the city to balance the attractiveness and accessibility of land.
- Enhancing land lease policies and ensuring that the lease system provides fair and transparent access of the urban land for residents from diverse backgrounds. Although lease prices result from arms-length transactions between parties, the system does not adequately address the needs of the majority of society seeking land. Therefore, the government should develop alternative methods to ensure access to urban land for low- and middle-income residents.

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