

## FACTORS INFLUENCING RESIDENTIAL LAND PRICES IN TIEN DU DISTRICT, BAC NINH PROVINCE

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### SUMMARY

Land pricing has an increasing importance due to strong growth of the real estate market in Vietnam in the last years. In that respect, a permanent preoccupation for specialists is to find better methods to evaluate the real estates, especially residential land. In the international practice, the current methods for land pricing are statistical and econometric models. The main aim of this paper is to establish and use multiple linear regression models in order to identify factors that significantly affect the price of residential land in Tien Du district, Bac Ninh province. In this study, we collected data from 100 transactions of residential land in Tien Du district, Bac Ninh province. By using IBM SPSS Statistics 23 and applying multiple linear regression for data analyses, we found that there are 4 key factors, including: Location, Distance to Central Business District (CBD), Width of facade, and Security, significantly affect prices of residential land in the study area. The findings of this research, therefore, provide implications for solution development, with the aims being to manage, regulate and stabilize the residential land prices in Tien Du district, Bac Ninh province.

**Keywords:** Bac Ninh province, residential land price, Tien Du district.

### I. INTRODUCTION

Land is one of our most precious assets. It encompasses surface, space, soil, provision of food and water which not only provide special energy for the living on Earth but also create a basis for urban and industrial development by constructing economic, cultural, society, security and defence (Verheye, 2007). This resource is fixed in position and limited in area. It cannot be increased or lost itself. Therefore, land is an irreplaceable resource. In traditional societies it is a common good and cannot be alienated nor sold. However, in a modern free market system, because of the overpopulation growth and the development of economic society, the demand of using land become greater and more necessary than ever leading to land is a commodity that is desired and can be exchanged.

Land pricing is considered as one of important fields in economy. Land pricing is the foundation which is serviced for buying and selling, exchanging and transferring land. It is also the basis for some policies about compensation of land when the government recovers land and calculates the property.

From that, land pricing not only does stabilize the land market but also contributes in ensuring the fairness in society, especially in dissolving the conflict about building and implementation of the land laws.

Vietnam saw the significant difference between residential land price from government and that from real market. The price of residential land in real market is not recorded in exact paper. In land contract which is collected by the governors, the people make value of real estate equal 1/10 the value that they make a deal. This lose the tax contributing to the country. In addition to, the lack of the unity between two systems of land prices causes the people who is revoked land by the officials don't reach the agreement on price compensation for land users when their land is acquired. This makes a lot of shortcomings in managing and using residential land. Therefore, dealing with the limitations, building the table for residential land price is necessary with determining factors and how they affect price of residential land.

Tien Du district, Bac Ninh province is on the way to integrate and develop. On recent

years, the social-economic activities and the projects relating to them become more diverse and abundant. Especially, the development of infrastructure that puts more pressure on residential land. The land is used more and more and its price is fluctuated leading the problems related to the disparity in land price between the government and reality. Therefore, the determining the factors which affects to the prices of residential land by using multiple linear regression (which based on the Hedonic pricing method) to build efficient assorted-land price bracket is the important thing to reduce this difference. This also is useful for regulating the market of the residential land in the study area.

## II. RESEARCH METHODOLOGY

### 2.1. Study location

The area of Bac Ninh province is the smallest in Vietnam with 822.7 km<sup>2</sup> and population density of 1,375 persons/km<sup>2</sup> (GSO, 2014). It is the second highest province's

population density just only lower than population density of Hanoi and Ho Chi Minh City. This significantly affected to meet the needs of land use of 1.1312 million people inside the province (GSO, 2014). Located in the North of Vietnam. It borders the Hanoi City to the West and Southwest, Bac Giang province to the North and East, Hai Duong province to the Southeast and Hung Yen province on the south. The topography of the province is relatively flat with the dense network rivers. The topography not only affects to the slope direction but also results in the climate of this province is representative for tropical monsoon, with distinctive seasons: pretty cold and less rain in winter but hot and rainy in summer. The annual temperature varies between 17.4 to 29.4°C and the annual precipitation is 1500mm, depending on seasons. Bac Ninh is in focal economic region so it has high standard living of population.

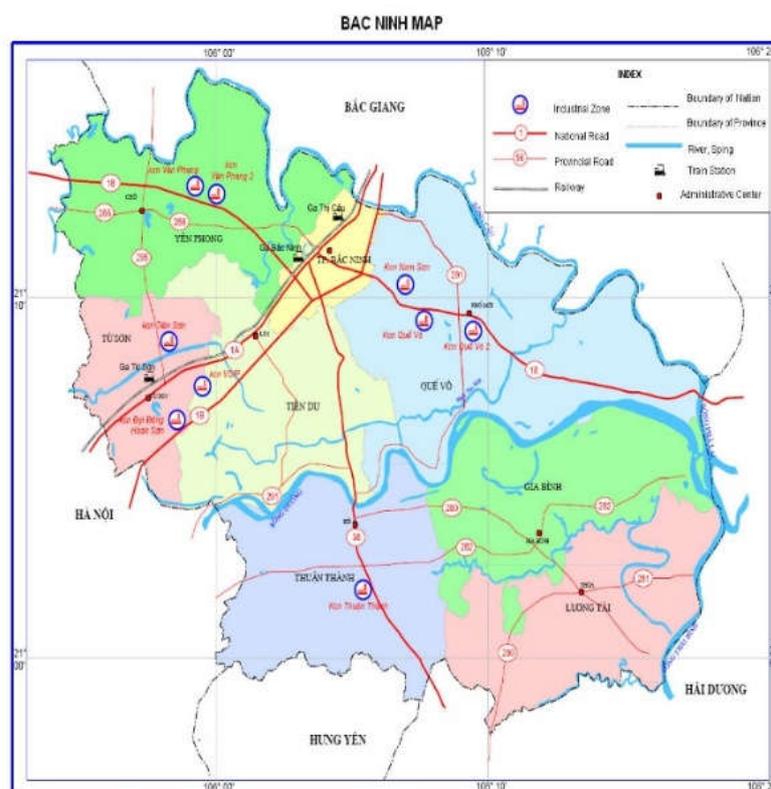


Figure 1. The map of Tien Du district, Bac Ninh province

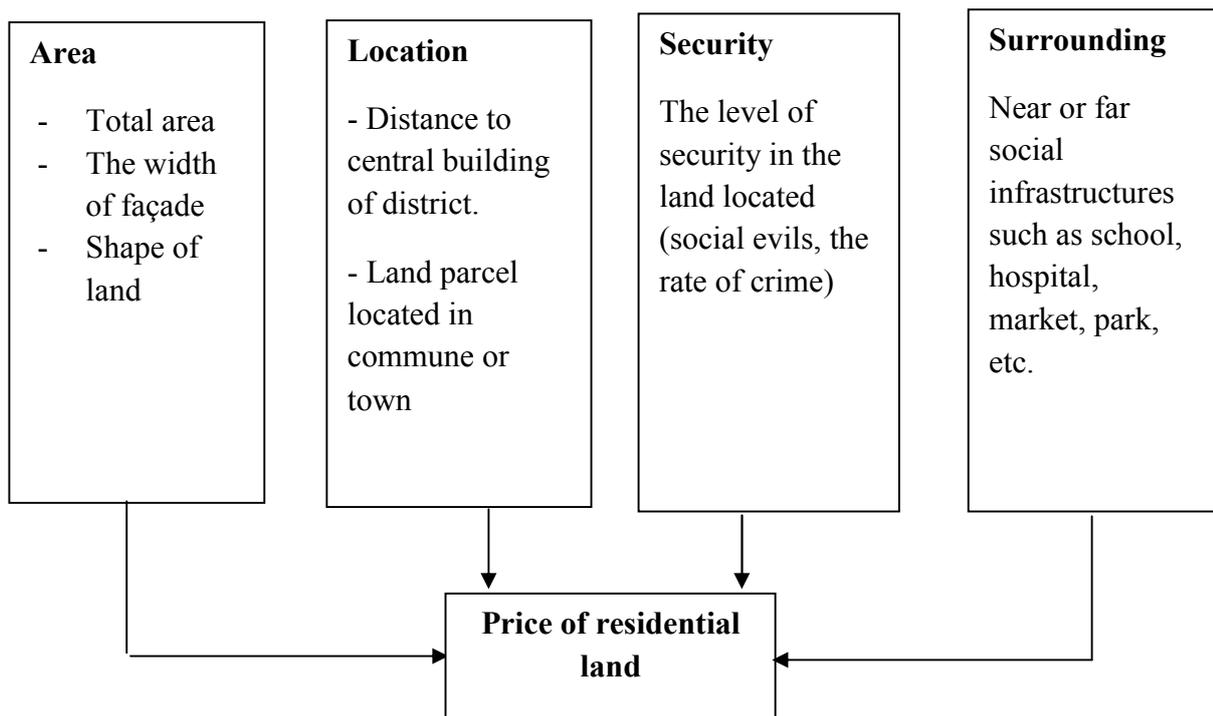
(Source: [www.skyscrapercity.com](http://www.skyscrapercity.com))

Tien Du District, Bac Ninh Province was chosen to be a case study because of the following reasons. It is one of the main districts in province, restructuring economics into industrialization. It needs more infrastructure so putting a lot of pressure on the land use. Therefore, this area also is a focal point of reducing the different level between the land price of government and market which plays an important role for land pricing effectiveness. Tien Du district bordered Yen Phong district to the North, Thuan Thanh district to the south, Que Vo district to the east, Tu Son town to the west. The district has three national highways 1A; 1B; 38 and 276; 295 provincial road runs through the city connecting to Bac Ninh, Hanoi capital and surrounding provinces which contributing the

exchanges economy (consumption products) and cultural of provinces with other places. According to land use state of Tien Du district, the area of land agriculture is 6955.75 ha, accounting for 64.17% of the total land of the district; the land for non-agriculture (services, industry, etc.) is 3815.58 ha (35.2%) and the non- land used is about 67.61 ha (0.63%). Tien Du district had 35,000 households comprising 135,000 inhabitants (2015). There are 71,099 people who are working and accounts for 52.8% population.

**2.2. Data collection methods**

A wide range of potential factors that influence the prices of residential land are grouped into those that relate to characteristics specific to land; area, location, security, surrounding that are discussed below (Figure 2).



**Figure 2. Factors influencing the price of residential land**

**Area**

Many studies showed that the floor area have a positive relationship to the price of the house (Limsombunchao, 2004). This is also similar to the price of land. This is because

buyers are willing to pay more for a larger space, especially the functional space. The land with an area larger than meet the needs of families with many members and those who can afford to pay for a better standard of living.

For example, Limsombunchao (2004) studied in the housing market in New Zealand found that adding more area to increase the value of a land is about 0.08%. Bajari and Kahn (2000) reported that large land area related to the price of land.

### **Location**

Location factors to be considered in many studies. Factors related to the location identified in relation to the entire metropolitan area. Location factors easiest and most common implementation is to measure position distance from the house to the centre which significantly impacted on land pricing which had been proven by researchers (such as Follain and Jimenez (1985); Bajari and Kahn (2000); Limsombunchao (2004)). Buyers tend to trade-off between the cost of housing or land to build house to the cost of travel. Positive impact of public transport services on land prices have been examined empirically. So *et al.* (1997) studied in Hong Kong about the convenience of transportation, as measured by the distance to the station nearest public transports (rail, bus) showed land prices depend on the means of public transportation in the territory. Therefore, buyers are willing to pay more for the property with easy access to the workplace such as in town where has more convenient transportation.

### **Security**

The safety of the area in which the land as located or crime rate also plays an important role in determining land value. If the area is one that is crime riddled then the value will be lower (Gregory Akerman, 2009). Babawale and Adewunmi (2011) indicated that the outside factors such as security, parking- lot, the distance from apartments to church also impacts the price of real estate. It is important to the explanation of variations in land prices are variables derived from urban theory, such as distance to the CBD, and from the amenity

literature, such as a community's crime rate, arts, and recreational opportunities (Haurin and Brasington, 1996). Austin Troy and J. Morgan Grove (2008) using Hedonic analysis of property data in Baltimore, they attempted to determine whether crime rate mediates how parks are valued by the housing market. The results showed that parked proximity is positively valued by the land market where the combined robbery and rape rates for a neighbourhood are below a certain threshold rate but negatively valued where above that threshold.

### **Social infrastructure**

The price of land also depends on how far social infrastructure (schools, hospitals, supermarkets, parks, etc.) from the land. Closing to shopping area or shopping centre showed the impact on the value of surrounding residential properties. Leong et al. (2002) noted that there is a shopping centre within 2 km radius making the price of land will increase by around 0.11% in Penang, Malaysia. Besides that, external benefits, including beautiful scenery, quiet atmosphere and the presence of urban green space has been studied experimentally by Sander and Polasky (2009) used data in the city of Ramsey, United States. Results also showed that people appreciated residential areas with green space and access to the recreation area with trees. The quality of environment also influences prices of apartments in Brazil. The apartments located near sewage treatment factory has low value, while near the public service establishment has positive impact to the apartment's price (Furtado 2009).

In this study, data of 100 residential land transections were collected. Data collected based on Figure 2. Tien Du district has 13 communes and 1 town. Two representative communes (Noi Due and Phu Lam communes); one town (namely Lim) were

selected to collect data. The sample design was followed by a randomly stratified sampling approach to obtain representative strata (Table

1). The data were collected from 15<sup>th</sup> August 2016 to 28<sup>th</sup> August 2016.

**Table 1. Sampling design in Tien Du district, Bac Ninh province**

Commune/Town	Total number of residential land transections
Noi Due	40
Lim	30
Phu Lam	30
<b>Total</b>	<b>100</b>

**2.3. Data analysis methods**

After data collection, the first step would be data preparation with editing, coding, and data entry to ensure accuracy of data from raw data and detect errors or omission to correct. IBM SPSS Statistics 23 was used for data analysis. A multiple linear regression was conducted to identify key factors influencing the price of residential land in the study area. In this study, the independent variables include Location, Distance to CBD; Area, Width of Facade; Shape; Social Infrastructures, and Security; and the dependent variable is price of residential land. The regression equation was used as following:

$$LAND\_PRICE = \beta_0 + \beta_1 * DISTANCE\_CBD + \beta_2 * AREA + \beta_3 * SHAPE + \beta_4 * WIDTH\_FACADE + \beta_5 * SOCIAL\_INFRASTRUCTURE + \beta_6 * SECURITY + \beta_7 * LOCATION + \epsilon_i$$

In which:

$\epsilon_i$ : is the random error;

$\beta_0$ : a constant;

$\beta_1$ : the slope of the regression surface (the  $\beta$  represents the regression coefficient associated with each independent variable).

• **Dependent variables:** the price of residential land (LAND\_PRICE): this is quantitative variable; the unit is million VND/m<sup>2</sup>.

• **Independent variables:**

**Distance\_CBD:** this is variable showing the distance from piece’s land to the central building of district.

This is quantitative variable; the unit is kilometres. The distance is measured from the location of land plots to centre of Bac Ninh province. In reality, the land plots are nearer to the central, the price of them is higher than the land which located far from there because the land closes to the central, the ability to respond highly the essential needs such as the facility of transportation also the development of social-economy system, etc., Expectation that, the DISTANCE variable will be inversely proportional with PRICE variance, expected coefficient is (-).

**Area:** is the variable shows the area of land parcel

This is quantitative variable, the unit is square meters, expected coefficient is (+). If the area of land parcel is larger, the ability to meet the daily needs of people will be higher. In addition to, the capacity to invest and develop is greater leading to the price of land increases.

**Shape:** is the variable shows the shape of land parcel.

This is qualitative variable. When applying the multiple linear regression model, this variance will be coded with the values: the value is coded as “1” if the shape of land is rectangular and is coded as “0” if it has others shapes (square, parallelogram, trapezoid, reverse trapezoid etc.)

**Width\_Facade:** is the variable represents the size of facade.

This is quantitative variable, the unit is meter, expected coefficient is (+). The size of facade is larger, the more convenient for the commercial such as constructing building to do business, advertise, etc. This factor also can affect the price of land.

**Social\_Infrastructure:** is the variable shows the social infrastructure around the land parcel.

This is dummy variable. If the location of land parcel is surrounded by the school, hospital, market or super market, the value is coded as “1” and if it is far away from these places, the surrounding would be coded with a 0, expected coefficient is (+).

**Security:** is the variable, presents for the security of the land parcel.

This is dummy variable. Security is coded into 1 = Secured and 0 = Insecure.

**Location:** is the qualitative variable,

presents for kind of location of land. This is coded into “1 = land belongs to commune” and the other is “2= land belongs to town”.

### III. RESULTS AND DISCUSSION

#### 3.1. Descriptive statistics on surveyed households

The price of residential land is calculated by million VND per m<sup>2</sup> (Table 2). The lowest price of residential land in the study area is 2.4 million per m<sup>2</sup>. The average price of residential land in the study area is 7.41027 million per m<sup>2</sup>. Distance from the parcel of land to CBD as short as 5 km. The farthest distance is 18.5 km. The average distance is 9.9455 km. The parcel of land with the smallest area is 50m<sup>2</sup>, the largest area is 400 m<sup>2</sup>. Average land parcels with an area of 141.2118m<sup>2</sup>. The parcel of land in the study with the smallest facade is 1m. The largest facade is 24 m. The average facade is 9.474 m.

**Table 2. Description of quantitative variables for surveyed households**

	N	Minimum	Maximum	Mean	Std. Error	Std. Deviation
Land_Price	100	2.400	20.000	7.41027	.333524	3.335243
Width_facade	100	1.0	24.0	9.474	.5286	5.2861
Distance_CBD	100	5.00	18.50	9.9455	.35728	3.57279
Area	100	50.00	400.00	141.2118	6.78507	67.85065

**Table 3. Description of qualitative variables for surveyed households**

Variables	Frequency	Percentage (%)
<b>Location</b>	<b>100</b>	
Town	30	30
Commune	70	70
<b>Shape</b>	<b>100</b>	
Other (square, trapezium, etc.)	40	40
Rectangle	60	60
<b>Social infrastructure</b>	<b>100</b>	
Far	45	45
Near	55	55
<b>Security</b>	<b>100</b>	
Unsecured	44	44
Secured	56	56

According Table 3, there were 100 available respondents showed that 30% the location of land belongs to town units and 70% of the land lies in communes. Also, the shape of land with 60% is rectangle and 40% is other shapes such as square, trapezium. Social infrastructure where a parcel of land located near facilities about 2 km (schools, hospitals, markets, supermarkets...) with 45% of total cases, the rest of land parcel is located far away schools, hospitals, markets, supermarkets (2 km) is 55%. Additionally, descriptive statistics showed that 56% of the parcel of land is located with the good security while the percentage of parcel of land is located on the poor security is 44%.

**3.2. Key factors influencing price of residential land in the study area**

Direct multiple linear regression was performed to assess the impact of a number of factors on prices of residential land in the study

area. The model contained seven independent variables (Social infrastructure, Location, Area, Distance to CBD, Width of Facade, Shape, and Security).

An adjusted R<sup>2</sup> statistic, also known as the coefficient of determination, measures the correlation between the dependent and independent variables. An adjusted R<sup>2</sup> statistic of 0.563 indicated that 56.3% of the variance in land price is explained by the seven independent variables (Social infrastructure, Location, Area, Distance to CBD, Width of Facade, Shape and Security) by the model. As shown in Table 4, four independent variables (Location, Distance\_CBD, Width\_Facade, and Security) were statistically significant in predicting ‘Price of Residential Land’ in the study area. The beta weights (Table 4) suggest that ‘Location’ explained most of the variance, followed by ‘Distance\_CBD’, ‘Width\_Facade’, and ‘Security’.

**Table 4. Model summary for key factors affecting price of residential land**

Independent variables	B	Standardised coefficient (Beta)	Sig. (P-value)	VIF	Influential order of factor
Constant	10.057		.000***		
Social_infrastructure	.538	.081	.249 <sup>NS</sup>	1.095	
Location	-3.673	-.507	.000***	1.194	1
Area	.001	.027	.710 <sup>NS</sup>	1.155	
Distance_CBD	-.236	-.253	.001***	1.154	2
Width_facade	.147	.233	.001***	1.101	3
Shape	-.515	-.076	.270 <sup>NS</sup>	1.065	
Security	1.261	.189	.007***	1.075	4
Dependent variable: Land_Price					
Number of observations	100				
Model summary:					
• F(92,7)	19.235***				
• R squared	0.594				
• Adj R squared	0.563				
• Durbin Watson	1.506				

Note: NS: Not significant, \*\*\* Sig.<0.01, \*\* Sig.<0,05, \*Sig<0.10 (two-tailed)

**IV. CONCLUSION**

A wide range of factors influence the prices of residential land in Tien Du district, Bac Ninh province. Based on our analysis we found that ‘Location’ explained most of the variance,

followed by ‘Distance\_CBD’, ‘Width\_facade’, and ‘Security’ were among the most highly connected factors influencing prices of residential land in the study area. The better knowledge of how factors affect the land price

is very important role for both increasing residential land value and efficiency of land management. The findings of this research, therefore, provide implications for solution development, with the aims being to manage, regulate and stabilise the residential land price in Tien Du district, Bac Ninh province. It is essential to build land information system to serve for the land management through analysing data on land use right transfer on real estate market. Furthermore, skills for staff about applying multiple regression method for predicting land price should be provided. These made the multiple regression method become useful tool in land management and evaluating the true value of land that creates increasing in budget from using land also decreasing conflicts about land.

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## CÁC NHÂN TỐ ẢNH HƯỞNG ĐẾN GIÁ ĐẤT TRÊN ĐỊA BÀN HUYỆN TIÊN DU, TỈNH BẮC NINH

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### TÓM TẮT

Định giá đất ngày càng đóng vai trò quan trọng bởi vì sự phát triển nhanh chóng của thị trường bất động sản tại Việt Nam. Về khía cạnh này, mối quan tâm thường trực của các chuyên gia là làm thế nào để tìm kiếm được các phương pháp định giá tốt hơn cho bất động sản mà đặc biệt là đất ở. Thực tiễn trên thế giới là hiện đang áp dụng các phương pháp định giá đất dựa trên các mô hình thống kê và kinh tế lượng. Mục đích của bài viết này là thiết lập và sử dụng mô hình hồi qui tuyến tính đa biến nhằm xác định các nhân tố ảnh hưởng đáng kể đến đất ở trên địa bàn huyện Tiên Du, tỉnh Bắc Ninh. Trong nghiên cứu này, chúng tôi đã thu thập thông tin từ 100 giao dịch đất ở trên địa bàn nghiên cứu. Trên cơ sở ứng dụng phần mềm thống kê SPSS IBM 23 và áp dụng mô hình hồi qui tuyến tính đa biến cho việc phân tích số liệu, chúng tôi đã xác định được 4 nhân tố ảnh hưởng đáng kể đến giá đất ở trên địa bàn nghiên cứu, bao gồm: Vị trí, Khoảng cách đến trung tâm thương mại của huyện, Bề rộng thửa đất, và An ninh. Kết quả nghiên cứu có thể làm cơ sở cho việc đề xuất các giải pháp góp phần quản lý, điều tiết và ổn định giá đất ở trên địa bàn huyện Tiên Du, tỉnh Bắc Ninh.

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