The Relation between Land Price and Distance to CBD in Bekasi

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Contents

List of Tables

List of Figures

List of Maps

List of Appendices

List of Acronyms

BAPPEDA   Badan Perencanaan Pembangunan Daerah (Regional Planning & Development Board)

BPN   Badan Pertanahan Nasional (National Land Agency)

CBD   Central Business Sub district

DKI   Daerah Khusus Ibukota (Capital City)

GIS   Geographic Information System

HDI   Human development Index

IMB   Ijin Mendirikan Bangunan (Building Permit)

NJOP   Nilai Jual Objek Pajak (Property Tax)

RTRW   Rencana Tata Ruang Wilayah (Master Plan)

SUSENAS   Survei Sosial Ekonomi Nasional (National Socio-Economic Survey)

VIF   Variance Inflation Factor

Abstract

This paper aims to observe the relationship between land price and distance to CBD in Bekasi. The assumption is that the relationship between land price and distance to CBD is negative and significant. In the analysis, we use data from city and regional planning in 2011 that consist of 12 sub district in Bekasi. From the statistical analysis result, the relationship between land price and distance to CBD is negative and significant. Furthermore, there are other factors that can influence the land price in Bekasi besides the location. We use infrastructure condition surrounding area of observation. For road infrastructure, the result is significant and negative and for water pipe infrastructure, the result is positive and insignificant.

In addition, this paper is also comparing the result from the Jakarta. The result is almost similar and the different is only on the coefficient. We also try to relate the result of this paper to the master plan 2010 – 2030 of Bekasi. In master plan Bekasi 2010 – 2030, urban planning in Bekasi is developed into 3 hierarchy systems which are 1 CBD, 4 sub CBD and 7 sub CBD with neighbourhood services level. Based on the analysis of the relationship between land price and distance to CBD, the implementation of the 3 hierarchy system are not yet effect the land price pattern in Bekasi and CBD is still as the core and centre of activity in Bekasi

Relevance to Development Studies

Bekasi is metropolitan city which is located near the Jakarta because of that the development of Bekasi is very influenced by the development in Jakarta. This condition can be seen by the changing in urban structure in Bekasi. The land uses in bekasi are dominated by the settlement. This new settlement is built to fulfil the need of housing for people for Jakarta and Bekasi because the land price in Bekasi is still cheap and affordable for people compare to Jakarta. For taking advantages on this situation, the Bekasi government divide the urban structure development into 3 hierarchy system which is integrated each other. The goal is to create equal development and equal distribution of services and infrasture.

Furthermore, this paper is trying to measure the relationship of land price and distance because the land price is one of the reason changing in land use and development of a new settlement in Bekasi. By knowing the land price model in Bekasi, the government can making development planning more precisely and bring more advantages on this situation by implemented 3 hierarchy system.

Keywords

Land price, distance to CBD and urban structure

Chapter 1
Introduction

1.1 Background

Nowadays, the urban structure in the city is changing very rapidly. This condition happens because of the shifting in land use from open space to settlements or economic activities. The changing of land use can be forced by the scarcity on the land for human activity and the price of the land in the city. This paper aims to measure the relationship between land price and distance to central business sub district (CBD). Based on the Von thunen (1826), the location of the land can influence the land price, which states that the distance and price is in negative correlation. The farther land from CBD means the smaller economic rent. Alonso (1964) considers about the relationship between individual and organization land use in urban structure. Alonso is also explaining that the development of the city is started on the CBD and spread out to the surrounding area (Alonso 1964).

Theoretically, referred to the utility of maximization for residents subject to the income constraint, housing price and housing consumption at a given location can be solved at the equilibrium when no one can improve their utility by simple relocation. Therefore, urban spatial structure is characterized by declining housing and land prices and land development intensity with respect to distance from the city center or the CBD. From empirical evidence, many scholars have indicated that the relationship of land price and distance to CBD is significant and negative, which means indicating the decreasing of land price by increasing distance from the CBD. Other fact is the influence of distance on values decrease overtime, reflecting the increased decentralization of economic within the urban area (Lewis 2007).

Moreover, in most cities, the concentration of development is focusing on the development in the CBD area. The CBD is created as centre of activity such as business, services and government activity. This condition leads to the different land value across the city, where the value in or near the CBB are higher land value than in the suburban area. However, Alonso argues, in the monocentric model, the influence of CBD area will be reduced by increasing technology. The technology in Alonso model is the transportation and easy access to reach city centre or CBD. This is also supported by the sector model which is developed by Homer Hoyt (1939). The main assumption in sector model is higher level of access means higher land values. This is based on two elements. First, easy access will stimulate people to live far from the CBD and second they can easily come and go to the CBD or city centre.

In Bekasi, urban land market and housing market development influence the changes of urban spatial structure, in which market forces have emerged and begin to influence urban spatial development. The rapid land market development is reflected by dramatic increase in both the number of land leasing transactions and the value of leased land. By 2006, the number of changes of urban spatial structure in Bekasi were almost 70 % of total area 210.49 km^2 (Total area of Bekasi) and the changes were dominated by the new settlements. It can be seen in the table 1.1. The biggest change in land use is on the settle-

ment which is from 1,157.77 ha in 1989 becoming 14,879.85 ha in 2009. The current biggest land leasing transaction and value of leased land occurred in 2006, which was about 240 hectare took place in 3 sub districts in Bekasi. This situation emerged because of the development forces of urban land and housing market development. This research aims to observe the relationship between land price and distance to CBD, where is the relationship still negative and significant or have different pattern?

Map 1-1 Land use Pattern in Bekasi
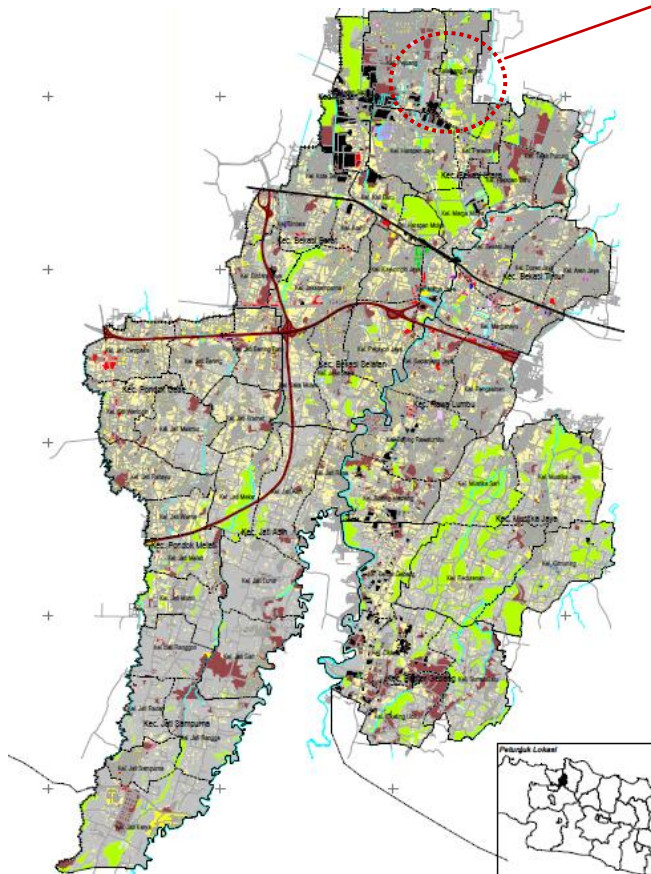
The new settlement which have the total area about 240 ha and changes the land use from open space into settlement

Source : Master plan Bekasi 2010-2030

Table 1-1 Land Use in Bekasi from 1989 - 2009

Land Use	1989 (Ha)	2000 (Ha)	2005 (Ha)	2009 (Ha)
Mixed Garden	1,899.49	1,898.95	2,037.88	1,740.33
Open Space	1.82	1.82	209.1	315.55
Grassland	1,529.85	1,529.85	2,199.31	792.12
Settlement	1,157.77	10,894.64	12,884.19	14,879.85
Irrigated	3,981.70	2,099.72	457.54	394.15
Rainfed Rice	1,513.35	1,513.35	680,04	532.31
Bush area	8,976.02	1,121.69	177.11	128.28
Moor	1,883.25	1,883.23	2,292.89	2,141.70
Reservoir area	105.75	105.75	110.94	124.72
Total	21,049.00	21,049.00	21,049.00	21,049.00

Source : Sitorus and Kumala Putri (2012)

1.2 Relevance and Justification

Land and price are mostly being a problem in development. Land is fixed resources and total area cannot change. The price of land increases every year due to the high demand of land. This situation creates big issues to the development process in those areas, and it can lead to the increase of the budget plan for development. Also, the implementation of planning can be hampered because of the price and limited area.

Bekasi, which about 210.49 km^2 of area, is one of the metropolitan cities in Indonesia. It has nearly 2,2 million people which spreads in 12 sub districts and 56 villages. The big population of Bekasi contributes to increasing demand of land and housing prices. With this high population, Bekasi needs large number of area for new settlements, infrastructures and public facilities. Consequently, total area of open space (bush area and paddy field) in Bekasi is reduced until 31,82 % from total area of Bekasi (Bappeda Kota Bekasi (Regional Planning & Development Board) 2010)

In Bekasi Masterplan 2010 – 2030, Bekasi is divided into 1 CBD and 4 Sub CBDs. By dividing into 1 CBD and 4 subs as a centre of economic activity, the government of Bekasi is expecting that the economic activity between regions will be equal and the distribution of settlement will be perfectly separated. The land value and housing price will not much different across sub districts in Bekasi. Because of this condition, this paper will observe the relation between land price and distance to CBD in Bekasi.

Base on the data above, the objective of this research proposal is trying to observe the relation of the land prices and distance to CBD in urban structure and the influence of the distance of the observation area to the central business sub district. Are there any significant and important effects of distance to the land prices and housing prices in urban structure in Bekasi? Knowing the elasticity of the land, it can be important input for planner and local government to make city master plan.

1.3 Research Objectives and Possible Research Questions

In this research proposal, I propose one main question which is dealing with the relation between land prices and housing prices to the distance in urban spatial structure in Bekasi. It is an empirical question that focuses on testing the urban economic theory by questioning the relationship between the land price and the distance to the CBD. The hypothesis of this research is the relationship between price and distance is negative and significant.

1.3.1 Research Question:

How is the relationship between the land price and distance to the CBD in urban spatial structure in Bekasi ?

1.3.1.1   Sub questions:

What kind of factors that can influence the value of land prices?

What are the effects of other factors to the land prices?

1.4 Data

1.4.1 Primary Data

This research will be based on primary data. It is a cross section data set from Indonesia in 2011 and contains information about total area of land use, housing data and appraised prices of the land in 12 sub districts in Bekasi in 2011. We take sample from building permit files in the city and regional planning in Bekasi. The data is used to investigate the relation between the land price and distance to CBD in urban structure. Furthermore, major information sources will be:

- List and total area of settlements in Bekasi from Dinas Tata Kota Bekasi(*City and Regional Planning Bekasi*).

- Land use pattern of Bekasi. It is used to measure the distance between specific location of study from Dinas Tata Kota Bekasi(*City and Regional Planning Bekasi*).

- List of land price from Dinas Tata Kota Bekasi(*City and Regional Planning Bekasi*).

- Road Infrastructure surrounding the land and housing.

  Indicator that using in road infrastructure such as : local, collector and artery road.

- Environment condition such as infrastructure for clean water, waste water and permit for flooding system in those area.

- Type of building, such as: housing, shop, office and warehouse.

1.4.2 Sample of Data

In this research, I use primary data from city and regional planning of Bekasi. This paper limits the scope on the data by numbers of people who precede permission to build a new building or to expand the building. However, there are no different between issuing permit for new building or expand the building because the requirement is same. The administration requirement for applying building permit is certificate of land, appraised price (land price from tax office or NJOP) and resident permit. I use the appraised price from the tax office as source of land value from the sample.

The method that we use for collecting sample is purposive random sampling. The purposive random sampling method means that, the sampled population study is a population that meets certain sample according to objective criteria of research and what should be represented depending the assessment or consideration of researcher. The data consist of land price, total area, type of building and infrastructure in 12 sub districts in Bekasi. We use price and distance as main variable to observe and infrastructure, environment and land tenure as dummy variable that can influence the price.

1.5 Possible practical problems in carrying out proposed Research

Major problems that emerge in this study might relate to data availability and quality. The data of land and house appraised price can be big problem because the data might be incomplete for all sub districts, the and the variation of the data might be not so different across sub districts in Bekasi, if it turns out that there is not enough variation across sub district (12 sub district in Bekasi), no significant conclusions might be drawn from the analysis.

The main objective of this thesis is to test the relationship between the land price and distance to CBD. The theory indicates that the effect of land values to distance is significant and negative. The study will be based on evidence from statistical data and econometric analysis. This statistical result indicates the importance of the urban spatial structure to the housing market behaviours, and the relationship between land price and distance to the CBD.

1.6 Organization

In this research paper, I will divide into 5 chapters. The first chapter describes about the background of the research. In chapter 2, we explain the existing condition in Bekasi such as population, economic and land use. Chapter 3 is literature review and chapter 4 is Methodology. In methodology section, we explain about the sampling of data and which uses methods such as geographic information system (GIS) and economectric model. The last chapter is analysis and result.

Chapter 2
General Overview of Bekasi City

2.1 Geographic condition

Geographically, Bekasi is located on 106^0 48'28 "- 107^0 27'29" East Longitude and 6^0 10'6 "- 6^0 30'6" south latitude with altitudes between 11-81 m above sea level. The location of Bekasi is very strategic as this city is a border region between the two provinces, DKI Jakarta and West Java Province. Bekasi consists of 12 sub districts and 56 villages. The total area of Bekasi is 210.49 km^2, with Mustika Jaya as the biggest area (24.73 Km^2) and Bekasi Timur as the smallest area (13.49 Km^2) (Bappeda Kota Bekasi (Regional Planning & Development Board) 2010).

In general, Bekasi is a place in average on 25 m above sea level. The morphology condition of Bekasi is relatively flat with the variation of slope between 0-2%. To add, Bekasi does not have hill or mountain. Bekasi is included on the low and flat area which the most extensive area is in the center and north to the coast. Based on the morphology condition, Bekasi is potential place to develop into metropolitan city with the main activity such as settlement, trade, services and industry. However, Bekasi have some limitations because of this morphology condition as this region is included in the flood-prone areas.

Furthermore, from the existing land use, the total area that has been developed nearly 52.09% and non develop 48.91% (Bekasi Masterplan, 2010 – 2030). The dominant land use in Bekasi is the settlement and is located in 4 sub districts namely Bekasi timur, Bekasi barat, Bekasi selatan dan Bekasi utara. These 4 sub districts are located near the CBD and have adequate access to the city centre. In the non-develop area, the dominant use of land are for agriculture activities in the form of dry, mixed farms, and fields. Unused lands are mostly located in the southern city of Jakarta, which are in Jatiasih, Jatisampurna, Mustikajaya and Bantargebang.

The strategic location of Bekasi is also creating problem to the urban development. The problem is begun when the people outside Bekasi (like people from Jakarta) have difficulty to find land and to find affordable price to build the settlement in their original place. These people change their investment to Bekasi because of the cheap price and strategic location of the city. The change of land use from the undeveloped area to settlement can be observed from the building permit that has been issued by the local government. The big change in land use is indicated in the south of Bekasi from the agriculture activities into new settlement.

2.2 Economic and Population Overview.

Economic condition in Bekasi is very influenced by economic activity from Jakarta. The majority of people who are living in Bekasi work in Jakarta and everyday they commute from Bekasi to Jakarta. Bekasi is a buffer zone of Jakarta and accommodate spill over economic activity from Jakarta. This condi-

tion creates opportunity for Bekasi to develop the new economic activity such as manufacture industry, services and market. To develop economic activity in Bekasi, government of Bekasi initiates to take advantages from the total population in Bekasi and creates new job opportunities in Bekasi.

In detail, the diversity of economic activities in Bekasi can give pattern to the structure of the economy of specific region. This can be realized by counting the potential of natural resources and human resources that are available in Bekasi. One indicator that is often used to describe the economic structure of a region is the sectoral distribution percentages. Between 2005 and 2006, economic Structure in Bekasi, can be described into three big sectors namely primary, secondary and tertiary. Groups of secondary and tertiary sectors are still dominant for giving influence to the economic activity in Bekasi, with their respective share of 45.40% and 53.53% in 2005. While in 2006 the secondary and tertiary sector are contributed around 46.37% and 52.64%.

In master plan 2010 – 2030, the economic activities in Bekasi continue to increase in the period 2004-2006. Except in 2004, economic growth of Bekasi is always higher than West Java and Indonesia. In 2005, the growth rate was 5.65% and the growth rate was slightly higher than in West Java and Indonesia. The growth rate of West Java and Indonesia in 2005 was 5.62% and 5.55% respectively. Similarly, in 2006 growth rate of Bekasi reached 6.07% and was still better than West Java and Indonesia, which only reached 6.01 and 5.48%. While for 2004, 5.38% economic growth of Bekasi was higher than in West Java (4.77%) but below the growth rate of Indonesia which reached 5.50%.

Statistically, in 2007, the human development index (HDI) of Bekasi was 75.81. This figure put Bekasi in the third-highest ranking of HDI in West Java province. Education level Index of Bekasi in 2007, which consisted of index Literacy Rates and the average level of complete education index of the primary School, was about 90.11. Bekasi education level index is the higher achievement for the Education level Index, given the province of West Java itself in the same target education level index numbers only reached 81.20 and even in 2010 only expected to reach 85.9. Health index of Bekasi in 2007, as reflected in the life expectancy index is reaching 74.98.

However, Bekasi also faces big problem on population and social culture such as:

- The population growth rate in Bekasi is very high. The big increase in the number of population has created problem in urban development of Bekasi. The limitation in land for development can create problem for people to live in Bekasi. For example, people hard to get the location or land to build the new settlement with good facilities and infrastructure. Other problem is the threats to the environmental quality of town because the population density threshold is exceeded, especially in downtown areas.

- The job opportunities in Bekasi still relatively low, while the availability of labor or substantial job seekers can ultimately lead to the problem of unemployment.

- The heterogeneity of the community, both socio-economic and socio-cultural needs of the diverse demands have not been accommodated in the utilization of urban space.

2.3 Land Use pattern in Bekasi

In general, the land use pattern in Bekasi is dominated with the services and settlement. The trade and service activities that develop in the Bekasi are located along the main road, both arterial roads and collector roads. The central business distric in Bekasi is centered along the Juanda and A. Yani Street. Government in Bekasi try to expand the economic activity to other distric in Bekasi by developed the market on other places such as making Pondok Gede as the new CBD is the west of Bekasi. For small scale, in every new settlement in Bekasi have small market that can fulfil the basic need of people live In those area. The economic activity are generally locating along the Main Street, collectors or Local Street and mixed with other activities, whether it is residential population, industrial and warehousing services with a small scale. Most of the activities that develop as trade and services in the city of Bekasi has not been providing with the adequate parking facilities, which often cause traffic jams.

The problems that arise with respect to the trade and services are:

- Activities of trade and regional scale are not only growing in urban centers but inform of a linear pattern along arterial and collector roads primer.

- Activities and services trade that is developed in linear on artery and collector road network can burden and disruption to the road.

- Not well organized of site plan in city center makes bad image of the corridor in CBD.

- The CBD in Bekasi is not supported by adequate parking facilities.

Industrial activity in Bekasi was partially dispersed in several industrial locations such as in Harapan Jaya, Medan satria, Kalibaru, and Pejuang Sub distric. In addition, Bekasi is also trying to develop new industry areai in Bantargebang, Cikiwul, and Ciketing Udik. Generally, the presence of industrial activities are mixed with other activities, such as housing or trades and services, so that if not handled properly controlled can pollute the surrounding environment, either in the form of sound pollution, air pollution, or waste generated. To prevent pollution of the industrial waste industry activities that generate hazardous waste need to be equipped with waste treatment facilities. Meanwhile the development of industrial activities should be directed to the development of industrial activities that do not pollute the environment (clean industry).

For the open space, the total area that has been allocated for the open space is relative very small because almost in public facilities, government office are not allocated places for open space. The open space is only located on the settlement which is provided by the developer. However, the total area of open space is not adequate compare to total area of Bekasi. Furthermore, the open space in Bekasi has been change function into economic activity or illegal housing.

Bekasi have 3 small reservoir or called 'situ' such as situ gede in bojongmenteng, situ lumbu in bojong rawalumbu and situ pulo in jatisampurna but the management of those situ are not good. A lot of area surrounding situ has been change function into housing or small settlement. The total are for water absorption are reducing very fast time overtime.

2.4 Conclusion of Bekasi overview

Bekasi is one of the metropolitan cities in Indonesia which have advantages by the strategic location of the city. Bekasi is located near the Jakarta as the centre of economic activity in Indonesia. Because of that the economic activity in bekasi is dominated by the services and industry activity that support the development of Jakarta. It can be seen by the total share of the secondary and tertiary sectors as the dominant sector and biggest share in revenue.

The strategic location of Bekasi is also creating problem to the urban development. The problem is begun when the people outside Bekasi (like people from Jakarta) have difficulty to find land and to find affordable price to build the settlement in their original place. This problem is causing the rapid changing on the land use pattern in bekasi from open space into a new settlement which is almost 70 % of land use changing is transform into new settlement with small economic activity.

Furthermore, the existing land use pattern in bekasi is dominated with settlement, trade, services and industry. The centre is developed as the core which has function as the centre of economic activity and government office. The surrounding area is developed as supported area which is the place for a settlement, small market, industry and open space. However, in master plan 2010 – 2030, Bekasi government try to develop hierarchy system with specializations function which support each other.

Map 2-1 Administration of Bekasi with CBD and Sub CBD

Source: Masterplan Bekasi 2010-2030

Chapter 3
Literature review

3.1 Location Theory

The price of land is influenced by many factors. One of the factors is location. Location can be the main important factor in determining the value of the land besides of the condition of land itself. According to David Ricardo, the population will growth significantly and infertile land will be used in process production, where the land was not longer useful to fulfil the human basic need. Ricardo also mentions that the land value is revenue minus factor production besides land in competitive market and the value will be proportional with the differences of the soil fertility.

In the urban structure, According Reksohadiprodjo (1988) the value of land is not assessed by the soil fertility but is more related to the distance and the position of the land in the urban structure (Reksohadiprodjo and Pradono 1988). According to Von Thunen (1826), the land that is located furthest from the city has zero rent value and the trend is increasing in linear by the reducing distance to the city center. In this theory, the land with the same distance to the city center has same value of the rent (Rodrigue et al. 2009).

3.1.1 Neoclassic Theory

The neoclassic theory derives from the combination of factor production on rent theory and maximizing the profit. One of the pioneers in spatial economics is Johann Heinrich von Thünen. The von Thünen theory examines the rent value of land. Von thunen applies marginal productivity to explain the rent value and land rent as the function of yield per unit of land, production expenses per unit of commodity, market price per unit of commodity, and distance to market (Rodrigue et al. 2009). The model that is developed by von thunen based on the transportation cost to the market. The model is called isolated stated and develop with four ring with different specifications and functions. In economics, von Thünen rent theory estimates economic rent value by spatial variation or location of a resource.

The isolated state model is comparing between optimal use of the land surfaces and the transport. Von thunen observes the effect of these two variables on the profit maximizing when set the others factor to be homogenous and isolated. The isolated state model is also observing the interaction of the surrounding area to the economic activity in those is to achieve profit maximizing. The assumption of von thunen model is that transport cost depends on the distance from the market and different kind of products. If we examine from the definition of economic rent, the different between total revenue and total cost, therefore the farmer will cultivate all the land or not to cultivate all the land. All the land will gain the same economic rent value and the gain from farming per unit area (locational rent) decreases with increasing distance from the market (Rodrigue et al. 2009).

Furthermore, the development of land rent model continues. Ernest Burgess (1925) is the first scholar who explains urban social structure. The theory

11

is well known as Burgess Model (concentric model) and Burgess gives explanation of distribution of social group within urban area. The model looks like concentric ring model and the city centre is in the middle of the model. Burgess makes assumption in his model that the market centre with the city centre (Central Business District or CBD). CBD is a more widely used for office buildings, shopping centres, banks and hotels. The assumption is that the farther from the CBD area, the economic rent value is getting smaller (ibid).

Moreover, the concentric model is modified by Homer Hoyt (1939). Homer Hoyt also uses central business sub district as the centre of development, but the development of the model is not following the ring model of the concentric model. The Hoyt model or the sector model allows the city to follow transportation line such as roads, seaports and railways. Hoyt makes assumption that city tends to grow in wedge shaped pattern or in sectors pattern. The city growth begins from the central business sub district with the support of major transportation routes. The main assumption in sector model is higher levels of access meant higher land values, thus, many commercial functions would remain in the CBD but manufacturing functions would develop in a wedge surrounding transportation routes. Hoyt concluded in the model that the transport network is capable of providing higher coverage and a cheaper fare on a particular land area (ibid).

3.2 True Rent and Quasi Rent

Marshall (1870) makes separation between true rent and quasi rent. According to Dooley (1991), Marshall defines the true rent as income from the nature of factor production such as land, capital and labor. He defines the three factor productions such as labour as the power of mind and body to create a good from the work, capital is the entire thing that used in production besides than land, and land is place for production. On the other hand, the quasi rent is defined as the rent that comes from the machine and appliances or derived from the thing that made by human.

The quasi rent theory is developed base on the classic assumption of classic rent theory which is promoted by David Ricardo (Dooley 1991). According to Dooley (1991), Marshall defines the quasi rent as the income comes from the machine and other appliances made by human and profit comes from the investment. Marshall is also explaining that the float capital earns interest and it is different from the quasi rent. Quasi rent has similarity with the rent. In the short period, the supply of the machine and appliances that made by human is fixed and it is the same with the supply of land. If the demand increases, the quasi rent values also increase and the condition is also the same with the rise of true rent. Hence, quasi rent is price determined.

Furthermore, Marshall also mentions the true rent is different with the quasi rent (ibid). As mention above, the rent is natural gift and quasi rent is rent that comes from machine or appliance that made by human in production. For land, supply is fixed and cannot be changed in short run or in long run. In the quasi rent, supply is not fixed although in the short period. Rent is permanent which the difference between total revenue and total cost is and quasi rent is temporary phenomenon which is different between total revenue variable cost. According to David Ricardo (1809) on Ricardian rent, the true rent is developed because of the different in land fertility and land scarcity (Dooley

1991). In contrast, Marshall develops quasi rent because of the scarcity on manmade appliances (ibid). In this paper, we going to measure the relationship between land prices base on the rent by it natural gift and the distance to the CBD.

3.3 Land Value

The value of land can be reflected upon the flow of profit of the land. This profit can be related to the environment factor of the land which is divided into two factors namely human factor and non human factor. By human factor, it means that increasing the value of land can be done by build something on the land such as building and housing. Another factor named non human, is the externality factor of the land. According to (Wolcott 1987) the value of the land is influenced by four factors like:

- Economic Factor

The economic factor is relation between supply and demand on the land which is also calculating the purchasing power in economic. The economic factors are also considering the human desire and the need of the people of the land. Demand variables are including the amount of labour, wage levels, income levels and purchasing power, interest rates and transaction costs. Supply variables are availability of land, cost of permit, tax and others overhead cost.

- Social Factor

Social factor is relating with the characteristic of the people in specific area. The characteristic of the people that can influence the value of land are total population, number of family in the house hold and level of education. This characteristic can create the pattern of land in the area.

- Government Factor

The government factor is related with the regulation and policy in land use. Government has function to manage and plan the use of land in region. Government plans the pattern of land use and prepares the need of facilities and infrastructure in one region. Besides that, the government has also function to determine amount of the tax rate on an area.

- Physical Factor

Physical factor of the land can be measured by observing the externalities of the land. There are two externalities of the land which are positive externalities and negative externalities. Positive externalities of the land are when the land have strategic location such as near the economic activity and has easy access to all place in the city. Other positive externalities are infrastructures that are free from natural disaster like water flood, road and population density. Positive externalities will increase the value of the land compared with the land without positive externalities although the land has same size and shape.

The negative externalities are the negative factors that can influence the value of land. The negative externalities such as near to waste treatment facility; long distance from the city centre and the place is subject of flood. The value of land will drop and becomes lower than lands that do not have negative externalities (Pearce and Turner 1990).

3.4 Land Price

3.4.1 Appraised Price

In this paper, we use appraised price. Appraised price in Indonesia is issued by the tax office. The tax office makes valuation base on the annual valuation. The valuation is done by using the value of capital. Since the 1986, the appraised price is using capital value. The method that is used to calculate the appraised price is mass appraisal method. According to Lewis (2007), the mass appraisal method is a system that first we organized all individual land parcel and make group with specific categorized according to, their location or zone and their age and building materials used in construction respectively. The classification systems for land and buildings have 50 and 20 distinct categories respectively. The capital or 'sales' value of the tax object (*nilai jual objek pajak*—NJOP) is then determined by the application of class-specific unit values (i.e. rupiah amounts per square metre) to individual land parcels and building floor areas (Lewis 2007).

3.4.2 Market Price

Market price is the value of the land base on the agreement between seller and buyer without coercion and with the existing terms and conditions. The buyer has time and capability to measure the value of the land, and also the seller. However, the seller cannot influence the appraisal value and buyer's decision. The seller acts for himself and not representing another person. The market price is reflected the best price and the beset market condition in that time. According to (Eckert et al. 1990), values of land are depicting a time price or value for money from property, goods or services for buyers and sellers.

3.5 Urban Structure

Large number of migration to the urban is one factor that contributes to the increase number of residents in the cities as it is generally found in developing countries. Migration processes often cause symptoms that are not expected in urban area, such as the growing number of labour force that have not been able to be absorbed in productive employment, inadequate facilities of life, the emergence of slums to environmental problems.

Furthermore, higher population growth in periphery area is also contributed to the expanding area of city centre because of the reallocation area. In general, the land conversion in urban area is taking the agriculture sector such as paddy field, dry field and garden. This happens because of the demand from the market. The agriculture seems more potential to develop as the market, industrial places and other infrastructure because of the prices and the location. As a result, the periphery area around the city will be a process of change from open area to covered area.

There are three model of urban structure model such as;

- Concentric Model

The Concentric model is purposed by E.W Burgess (1925). This model is based on his observation on the number of the city in American especially

Chicago in 1925. In the Burges model, the development of the city should follow the circle pattern with one centre inside the circle and the city consists of concentric zones, where every zone represents the different land use pattern (Yunus 2000). The assumption in the burgess model is the furthest the location of land from the CBD the better quality of infrastructure on that location but the longer time for commuting.

Figure 3-1 Concentric Model
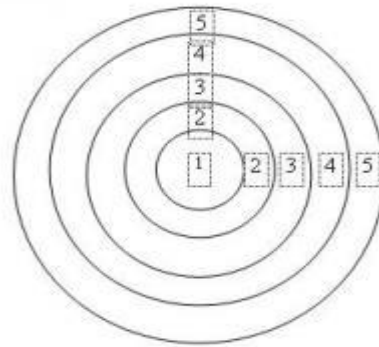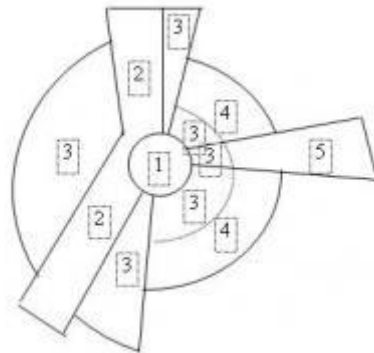

Source : (Yunus 2000)

The picture shows that the number one (in the core) is the CBD. CBD is the centre of activity and have big magnitude to the development of the city. The number 2 is transition zone and the transition zone is place surrounding the business activity which has low quality of environment such as the settlement for people with low income. Number 3 is the zone for working class. Number 4 and 5 are the zone for middle class and the commuter zone.

- Sector Model

Homer Hyot (1939) purposes the sector model to explain the development of the urban area. The Hyot model is also known as sector model. The sector model explains that the urban area should develop follow the pathways pattern and the industry growth on other part of the city outside of the CBD. In the future, the industries will growth as the industry zone which is separate from the CBD and city centre. From the observation, most of the cities develop follow the line which have high value of rent, and the other is located on the place where the value of land is cheaper which lie from the city centre through the periphery area. In progress, the area with high value of land is moving out to the periphery area (Spillane and Wan, 1993).

According to Yunus (2000), the sector model is also explaining the tendency of the people to choose the area for live base on their level of convenient. This level of convenient can be measured by the complete infrastructure and facilities that they have in those areas which is can seen on the model that the high class settlement are the farthest from the CBD. This happens because people want to find the areas that are not crowded and good quality of infrastructure and services. The environment condition also influences decision of the people to choose the place for stay.

Figure 3-2 Sector Model

Source: (Yunus 2000)

Description:

1. CBD Zone
2. Industry and trade centre zone.
3. Low class settlement Zone
4. Middle class settlement Zone
5. High class settlement Zone

- Multiple Nuclei model

Multiple nuclei model is purposes by the Harris and Ulman (1945). The multiple nuclei model explain that the urban area should developed as a good planning system and with sustainable development from the many activity zones which is growth separately in one big system of urban development management. In the process of development are marked by the specialization process of specific area and differentiation on space or area. The specialization process is when one specific area develops or has function as one specific activity such as settlement or industry (Yunus 2000). Nuclei model assume the location near the CBD have the highest price and the settlement are move to outside the CBD. In the nuclei model, there are small CBD that can support the activity of the settlement area. This model is tried to implement by Bekasi government by created a hierarchy system with specialization function.

Figure 3-3 Nuclei Model

Source: (Yunus 2000)

Description:

1. CBD Zones Daerah Pusat Bisnis
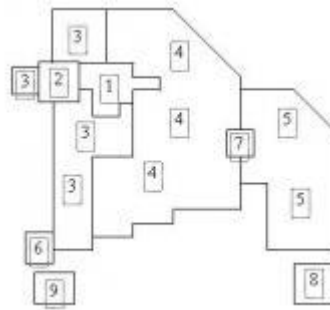2. Small and medium Industry and trade centre zone.
3. Low class settlement Zone
4. Middle class settlement Zone
5. High class settlement Zone
6. Big industry zone
7. Small CBD zone
8. Settlement zone in periphery area
9. Industry zone in periphery area

3.7 Purpose of city planning in Bekasi

In Masterplan Bekasi 2010 – 2030, the development of urban structure in Bekasi is to achieve harmony and balance of all sub centre of economic activity and creates an effective function of those sub centre that can operate and function as good as CBD in city centre to support the development of Bekasi in broader context. The development of urban structure in Bekasi includes the development of all public facilities and infrastructure such as road and drainage. The urban development planning in Bekasi is following the multiple nuclei model. Bekasi will be developed with multiple sub centres with specialization and every place has different function. However the all sub centres are integrated with each other and support the economic growth in Bekasi.

The required concept to develop is the hierarchical system with specialization in function. This concept is developed to define the function and role of the area or zones in Bekasi. In more detail, the hierarchy system in Bekasi is divided into 3 hierarchies, namely:

- City Service Center

One city service center is located in Medan Satria, Bekasi Utara, Bekasi Timur, Rawalumbu, Bekasi Selatan sub district and the scope of the service is

17

covering Sudirman street, Juanda street, Cut meutia street and Ahmad Yani street with the main function as government services, healthcare, higher education, trade centers, entertainment and recreation centre.

- Sub City Service Center

The four sub city service centres have function as a centre of economic activity, social and administration. The scope is covering Pondok Gede, Bekasi Utara Jatisampurna and Mustika Jaya sub district.

- Neighborhood Service Center

Seven neighborhood service centers have function as a center of government and trade with the scale of sub distric services and / or neighborhood. The scope is described below:

1. Medan Satria sub district is centered on Medan Satria Village.

2. Rawalumbu sub district is centered on Bojong Rawalumbu Village.

3. Bekasi Selatan sub district is centered on Jaka Setia Village.

4. Bekasi Barat sub district is centered on Bintara Village.

5. Jatiasih sub district is centered on Jatirasa Village.

6. Pondok Melati sub district is centered on Jatiwarna Village.

7. Bantargebang sub district is centered on Bantargebang Village.

3.8 Empirical Evidence

Ooi and lee (2004) observe the characteristic of residential land and housing market. The hypothesis in this research is 'whether high land prices in urban areas granger cause high property prices or whether high property prices lead to high land prices. The result shows that there is cointegration between house price and land price and the granger causality shows the relation of house price to land price but not otherwise (Ooi and Lee 2004). This causality brings implication that the change in land price can be explaining by the change in the housing price. Furthermore, there are other factor that can influence the price of land and housing which are government policy and private ownership. The private owner of land sells their land to the developer by the giving prices in the market. The new supply of land can influence the price of land and housing price in the market. However, according to (Evans 2004) the increase of supply of land for housing would give impact to the prices in long time's not in direct impact because for building are need permit to start for construction. After the process start the new supply of land and new housing can give impact to the price in the market.

Furthermore, Colwell and Munneke (1999) examine the land price and the land assembly in the CBD. Coldwell wants to find the relation between the land price patterns in the CBD to the land price surrounding the CBD. The assumption is the price pattern for CBD is less concave than other area. This result gives explanation that the different in price in CBD are small than other places. In this research, Coldwell also found the result of the coefficient on the distance is negative and significant to the CBD (Colwell and Munneke 1999).

Other empirical result about land price and distance comes from Blane David Lewis (2007). Lewis observes the relationship about the residential land price and distance to the CBD. Lewis takes example the housing prices pattern in Jakarta Indonesia. The hypothesis that Lewis wants to test is the effect of distance on land values is significant and negative and the influence of distance on the price of land has became less important over time. Lewis found evidence from Jakarta that the effect of distance to land value was significant and negative. Lewis also found that the distance of CBD to land value gave less impact time over time. Lewis also compares the use of market price and appraised price to the distance. Market price give same result with appraised price which is the effect of distance on land values is significant and negative. From the observation, the price pattern in Jakarta is concave pattern.

3.8.1 Conclusion of empirical result

From empirical evidence, the land price has strong correlation with the housing price. According to Ooi (2006) the land price pattern can be explained by the characteristic of the housing on that location of the land. However, the impact of higher supply of housing and higher value of housing does not directly give impact to the land price. There are long processes to influence the land price in specific location or places. Moreover, the land price is also very influenced by the distance to the CBD. Coldwell (1999) and Lewis (2007) observe the relationship between land prices and distance to CBD. They found that the relationship between land prices and distance to CBD is negative and significant.

Chapter 4
Methodology

4.1 Data sampling

In this research, we use primary data from city and regional planning of Bekasi. We use GIS map to measure distance and to observe the infrastructure on the sample. Main objective of this research is to measure the relation between distance to the CBD and price (land price and housing price). In Bekasi, there are nearly 300 big settlements and about 70 % of total area which have been built and are used for new settlements. However, we limit the observation into one year and only data from 2011. We take data from 12 sub districts in Bekasi and every sub districts we take several sample that can represent the characteristic of price in Bekasi.
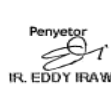
We take about 189 samples from 12 sub districts in Bekasi and I use purposive random sampling method. Sample is part of the population. This means that there will be no sample in the absence of population. Population is the entire element or elements which we will carefully. There are three reason using sample, firstly, the population is so big and we do not have time to make all observation. Secondly, there is several limitations such as on time, budget and human resources. Finally, using sample sometimes give more reliable result than using all population.   The number of sample is greatly influenced by three factors such as (1) the degree of uniformity, (2) the analysis plan, (3) the cost, time and manpower available (Singarimbun and Effendi 2011). According to Roscoe (1975) provide guidelines for determining the amount of sample as follows: (1) Sample size should be between 30 s / d 500 elements (2) If the sample is break down into the subsample the minimum number of subsample should be 30 (3) In the multivariate study (including multivariate regression analysis) the sample size should be several times greater (10 times) than the number of variables to be analyzed.(4) To study a simple experiment, with strict controls, sample size could be between 10 s / d 20 elements (Roscoe 1975).

In choosing sample, we use purposive random sampling. We only use data from 2011 and from city and regional planning in Bekasi which people want to make the building permit for new building. The data consist of land price in 12 sub districts in Bekasi. We use price and distance as main variable to observe and road class, building type and water pipe as dummy variable that can influence the land price.

Procedure on taking sampling for measuring the relationsip between price and distance to CBD in Bekasi, we take data from the building permit files (IMB files) on Bekasi area in 2011. We take all data and check the data base on the completeness of the files such as land certificate, property tax, identity card from the applicant, site plan and building plan because not all the files have complete data although when apply the building permit the data is complete. There are some files does not have complete data because of the files organizing in city and regional planning in Bekasi are not well organized. After we check the files, we input the data of land price, total area of the land, name of the street and sub district of the sample based on the official form that issued

by the city and regional office of Bekasi (see figure 4-1). We get 189 samples that distributed on 12 sub districts in Bekasi in 2011. After we get the sample and know where the location of the sample, we use GIS to measure the distance and to observe the infrastructure on the sample such as road type and water pipe.

Figure 4-1 Form of Building Permit Calculation

Source: Dinas Tata Kota Bekasi (City and regional Planning) (2011)

In determining the sample, we are also thing about the equal distribution of the sample. However, in the selection of the sample cannot reach equal distribution across sub district in the sample. For example, the Medan Satria and Pondok Melati sub district have smaller number of observation compare to other sub district (Table 4.1). The possible reason is in the Medan satria the new settlement or people who want built a new building are small because the scarcity of land and lot number of new settlement that is offered by the developer. On the other hand, in Pondok Melati the small number of observation is

caused by the location is far from the CBD and lack of the access from and to Pondok Melati sub district.

Table 4-1 Total of Population and Data Sample

No	Sub district	Total Population	Sample
1	Pondokgede	311.849	20
2	Jati Sampurna	128.726	14
3	Jati Asih	248.524	35
4	Bantar Gebang	125.643	13
5	Bekasi Timur	336.969	11
6	Rawa Lumbu	279.604	18
7	Bekasi Selatan	283.097	12
8	Bekasi Barat	359.869	12
9	Medan Satria	232.624	7
10	Bekasi Utara	429.073	12
11	Mustika Jaya	170.225	27
12	Pondok Melati	193.047	8
	Total Population In Bekasi	3.099.249	189

Source : Analysis 2012

Unequal distribution of the sample can lead to the bias on the statistical result. The bias might happen because the collected samples are not accurately represent the characteristic of the population. For example, the demographic characteristic of male and female, we expect the sample 50 % male and 50 % female, if the sample is only 30% male and the sample will lead to the bias because the lack responds from the male population. Furthermore, the samples that we take might not fully represent the population in the specific sub district area of observation because some areas are less than the others. However, we are expecting that the less number on the several observations can represent the characteristic of land price pattern on that area and the statistic result is not interpreted because the sample is spread equally across sub district of the observation area.

4.2 GIS Method

To measure the distance between observation and the city centre, we use map and geographic information system (GIS) to help to measure the data. In GIS, we use spatial analysis to measure the distance. We take the nearest distance of the sample to the CBD and we use road corridor to measure between sample and city centre. For example, in the data, the observation is on wibawa mukti IV in Jatiasih. To measure the distance, we take a distance line from wibawa mukti corridor to ahmad yani corridor. We use the nearest distance from the sample of observation to the ahmad yani corridor.

In GIS, We also measure the effect of dummy variable such as infrastructure and land attribute. Information of infrastructure and environment condition surround land and housing, we observe from the GIS map. The map that we use is thematic map with infrastructure and existing land use. The CBD location as the centre of the measurement is on Jl A. Yani , this location as CBD of Bekasi city and this location is mention in Bekasi master plan.

4.3 Methodology to measure relationship between land price and distance to CBD

The empirical evidence shows that the effect of the land price and house price have negative to the distance from the city centre and the influence of city centre to the land price have decreasing over time because of the decentralization especially in agglomeration of economic activity. To measure the relationship between distance and land price, we use appraise price instead of market price because information about market price is not available and every place have different information of price. For example, the market price for new settlement can different over time and it depends on demand and interest rate.

The purpose of the paper is trying to see the relationship between price and distance from city centre. The data used in this paper is appraised price from tax office and the indicators used land area, distance of the property to the city centre, class of road on which the land sits, environmental conditions surrounding the property and land tenure (Lewis 2007).

According Lewis (2007) Appraised price is based on the measurement of capital value that has been measured by regional tax office in the context of administering the central government property tax. The appraised prices describes the value of land that measured in square metre and measures to specific unit of land in this case using rupiah amount per square metre. Distance of the property to the central business sub district is measured to the nearest kilometre. GIS is used to measure the distance. Road class is a dummy variable, we set between local and non local road. The environmental conditions variables indicate access to key types of infrastructure (especially water and wastewater) and some others physical characteristics of the property (permit for flooding insurance). Land tenure is about the legality of the land (is the land already register in National land agency (BPN)) and land tenure can be measured by the ownership of the land. In Indonesia we have 3 type of land owner ship such as: certificate of ownership (sertifikat hak milik), certificate of right to build (Sertifikat hak guna bangunan), deed of sale and purchase (Akte jual beli) and land documents (girik). In this research, we omit the land tenure variable because when people want to make building permit they must have land certificate. We use building type to see the effect when the land has different value of building on it. The type of building as dummy variable, 1 = housing and 0 = non housing building.

Econometric model that we used is OLS to regress the relation between distance and price. The result are showed on econometric model to see coefficient and significant of the test.

A standard model of urban land price is:

$$\frac{P_i}{A_i} = \beta_0 e^{\beta_1 x_{1i}}$$

where, Pi is the price of land i; Ai is parcel size; x1i is the distance of the property to the city centre; b0 is the unit price of land at the centre; and b1 is the rate at which the price changes as a function of distance, that is, the land value gradient (Lewis 2007).

Relating estimation is:

$$\ln(\frac{P_i}{A_i}) = \ln \beta_0 + \beta_1 x_{1i} + \sum_{j=2}^{n} \beta_j x_{ji} + \varepsilon_i$$

where, x_{1i} is the distance to the CBD and the xji are additional determinants of the unit price of land such as road class, type of building and water pipe; β_1 and β_j are the associated coefficients to be estimated; and εi is the usual error term (ibid).

Based on the basic model of urban land price, the price is quadratic function of distance. In this paper, I used econometric model base on the standard model and econometric model that used by Lewis when he measured the relation between price and the distance to CBD.

The Econometric model is

Ln Y = Ln β_0 + β_1 X$_1$ + β_2 X$_2$ + β_3 X$_3$ + β_4 X$_4$ +ε

Where:

Y = Land Price

X_1 = Distance to CBD

X_2 = Road Class as Dummy Variable; 1 = Local Road 0 = Non local (Arteri/ collector)

X_3 = Type of Building as Dummy Variable; 1 = Housing; 0 = Non Housing

X_4 = Water Pipeas Dummy Variable;   1 = water pipe; 0 = Non water pipe

We use only three dummy variables to see the influence of the variable to the land price. However, there are other variables that can also influence the land price. For example, water sanitation, drainage, and gas service are the factor that can also influence the land price in specific location, but in sample the condition is the same because we use data from building permit files and requirement to get the building permit are having all infrastructures that mention above. For Bekasi area, Bekasi does not covered by the gas services. Other variables that can also influence the land price is poor and rich area in the specific area. The poor and rich area can determined the price of the land because people tend to more interested for having land in rich area than in the poor area. However, in Bekasi the data of rich and poor are is difficult to find. There are data about income of household from the national socio-economic survey (susenas) that conduct by Indonesia statistic biro. The problem is the area of the sample in susenas and the area of the sample in this paper is different because of that we cannot use the susenas data to represent the characteristic in the sample of my observation.

4.4 Data description

In this research paper, we try to make an observation about the relationship between land prices with distance to the city centre. We take land price and distance to CBD or city centre as main variable to observe. We get 189 number of observation from 12 sub districts in Bekasi in 2011. The samples are spread

in 12 sub districts and 56 villages in Bekasi. Even though, the total number is not equally distributed. The majority of the population of the new building or settlement is located in the north of Bekasi such as Mustika jaya, Bantar gebang, Jatiasih and jatisampurna sub district. These sub districts have low density and have potentiality as place for new settlement and other activities because the availability of land still large and have competitive in price.

On the other hand, in the north area of Bekasi, the number of population is big with high density. However, these conditions are not reflected to the number of sample in the observation. The sample in those areas are relatively small because the number of a new settlement or new building in this area are very rarely because of scarcity in land and high price of the land. However, northern areas of Bekasi have big advantages in location and infrastructure. From the distance, the northern area of Bekasi is more close to the city centre, government services and other public facilities such as mall, bus terminal and train station. Infrastructure in northern area is much better than southern part of Bekasi. In northern area, there is already underserved by pipe water, good drainage and better public transport mode.

However, nowadays, the urban development planning is more focused on developing the southern Bekasi because of the availability of the land, toll road development and new access that connect Bekasi with Jakarta and Bogor. In southern area, there are toll road, Jakarta outer ring road, which connects Bekasi with Jakarta and Bogor. The existence of the Jakarta outer ring road (jorr) toll road brings advantages and development to the southern part of Bekasi. This can be seen with the total number of building permit that have been apply and number of new settlement in this area. This condition also gives impact to the land price surrounding the toll road although we do not know how much the impact of the toll road to the increase of the land prices.

Furthermore, to observe the relationship of distance and land price, we also observe other factor that can influence the value of land. We observe the types of building, whether the building is in the form of house or other forms such as shop, warehouse and office. We measure where the type of building can influence the value of land. Other factor that we observe is infrastructure surrounding the area of studies. We observe the road class and water pipe and measure the effect of this variable whether give positive or negative effect to the value of land. We use this variable as dummy variable.

Table 4-2 Summary Statistic of the Data

Variable	Observation	Mean	Std. dev	Min	Max
Total Area	189	6,585.43	29,739.83	112	350,000
Land Price (M2)	189	490,985.4	376,243.2	103,000	2,640,000
Distance (KM)	189	7.58	3.90	0.76	18.53
Type of Building	189	0.48	0.50	0	1
Type of Road	189	0.57	0.49	0	1
Water Pipe	189	0.38	0.48	0	1

The table shows the summary description of the data that is used to measure the relation between land price and distance to CBD. The numbers of observation are 189 samples. For land price, the mean is 490,985 rupiah / m^2. The range of land price is between Rp. 103,000 until Rp 2,640,000. The highest

price on the sample is located in Margahayu village which is located near the CBD and the lowest price is located in Cimuning Mustika jaya. However, the cheapest price in the sample is not pointed directly because of the furthest distance from the CBD because the Mustika Jaya is not the furthest village from the CBD. The total area of the cheapest sample is 17,000 m^2 and the masterplan of the area is for settlement. Before the area develop as settlement, the area have function as paddy field because of that the price relative cheaper. The distance range is between 0.76 km the nearest and 18.53 km as the furthest.

Chapter 5
Analysis and Result

5.1 Test for classic assumption

Before we analysis the relationship between land price and distance to CBD, we test the data for the possibility of breaking the basic assumption of statistical analysis. We check for autocorrelation, heteroskedastic and multicolinearity in the specific model that we want to examine.

5.1.1 Multicolinearity Test

From the result, we can show that from the tolerance value are showed no independent variable have a tolerance value of less than 10%. This tolerance value means there are no correlations between independent variable which has value more than 95 %. Variance Inflation Factor (VIF) is also showing the same result with the tolerance value. The VIF values of independent variable are less than 10, which mean that there are no correlations between independent variables. From the VIF result and tolerance, we can conclude that there is no multicollinearity between independent variables in the regression model.

Table 5-1 Multicollinearity Test

Variable	Tolerance	VIP
Log Distance	0.366	2.73
Type of building	0.886	1.13
Type of Road	0.915	1.09
Water Pipe	0.359	2.78

5.1.2 Heteroskedasticity Test

We test the model for heteroskedastic assumption. To test the appearance of the heteroskedastic, we use graph and statistical analysis. The assumption in homoskedastic is no pattern on the residual plotted against the residual plotted (Bruin 2006). In the figure 5.1, we can observe that there are not pattern in the graph of residual versus fitted (predicted) value. It means that the residual is homogeneity and constant.

Figure 5-1 Residuals versus fitted (predicted) values
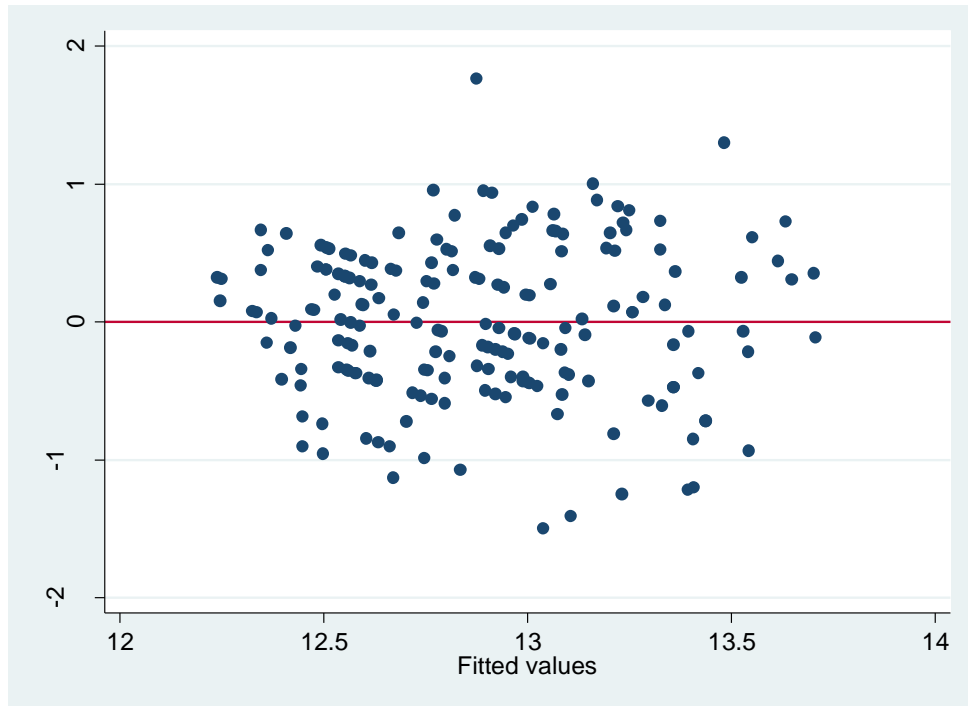
Table 5-2 Cameron & Trivedi's Decomposition of IM-test

Source	Chi2	df	P
Heteroskedasticity	12.92	11	0.2987
Skewness	2.32	4	0.6770
Kurtosis	0.01	1	0.9100
Total	15.25	16	0.5063

Table 5-3 Breusch-Pagan / Cook-Weisberg test for Heteroskedasticity

Chi2(1)	6.61
Prob >chi2	0.0101

Note: Ho: Constant variables

Fitted value of land prices

Furthermore, from the non graphical method, we can observe the heteroskedastic by using Cameron & trivedi's decomposition of IM- test and breush pagan test. The null hypothesis on both tests is that the variance of the residuals is homogenous. When the p-value is very small, we can reject the null hypothesis and accept that the variance is not homogenous. From the two table (table 5-2 and 5-3), we can conclude that the variance is homogenous. However, when heteroscedastic appear, the OLS estimation does not result bias result. Furthermore, according Berry (1985) if heteroscedastic is marked 'the significance tests are virtually unaffected and thus OLS estimation can be used without concern of serious distortion' ((Berry and Feldman 1985)).

5.2 The empirical finding of the relationship between land price and distance in Bekasi

In this research paper, we want to examine the relationship between land prices and distance in Bekasi. We want also to observe other factors that can influence the price in one specific area. The effect of distance to land value is negative and significant. In the model, we use land price as dependent variable as a function of distance, and we have also type of building, type of road and water pipe as dummy variable which have function to observe other factor that can influence the price pattern in the Bekasi.

Theoretically, the relationship between land price and distance to CBD is negative and significant influence the price. It means increasing distance of land location from the CBD reducing the land price and land price has reducing trend by the increasing distance from the CBD. Before performing the statistical analysis, we expect the model give same result with the hypothesis which is the land price has negative relationship with distance. We also make early observation from the data and some of the data show that the land price near the CBD has higher price compare to the land which is located far from the CBD. However, this are not apply for all observation because some observation show opposite trend.

Table 5-4 Land Price Model (dependent variable: ln land price)

Regressor	Coefficient
Constant	13.830 *
	(0.268)
Ln distance	-0.368 *
	(-0.113)
Type of building	-0.176**
	(0.086)
Type of road	-0.340*
	(0.085)
Water pipe	0.056
	(0.139)
Adjusted R^2	0.2623

Notes: Significant level : * : 1 % ** : 5%

Standard error is in square bracket

$$\text{ln land price} = 13.83 + -0.368 \text{ ln distance} + -0.176 \text{ type of building} +$$
$$t: \quad (51.46) \quad (-3.25) \quad\quad\quad (-2.04)$$
$$-0.340 \text{ type of road} + 0.056 \text{ water pipe}$$
$$(-3.97) \quad\quad\quad (0.41)$$

From the econometric model, we can see that distance is statistically significant to the land price and have the negative sign. The model gives same estimation with the early hypothesis which is the relationship between land price and distance to the CBD is negative and significant. For other factors such as types of building, type of road is also statistically significant to the change of land price. For water pipe, the statistical result is insignificant.

In detail, the result is showing the same relationship between the hypotheses which is the effect of the distance is negative and significant. The value of land will reduce by the increase of the distance from the CBD. The result shows that increasing 1% of land distance to CBD is reducing the land price 0.368%. This result can be interpreted that the magnitude of city centre or CBD to the land value is still have influence or magnitude to the land price in Bekasi. We can also evaluate the result from the existing condition in Bekasi. In Bekasi, the characteristic of the infrastructure and public facilities are still focused in the northern area where the city centre is located. Moreover, The majority of the economic activity in Bekasi is centered in the CBD and not spread equally in all areas of Bekasi because of this condition the majority of high value of land is located near to the CBD and start reduce by the increasing of the distance.

Another variable that we test is type of road. The negative sign show that the local road (1 = local road) has lowest value for determining the value of the land. The class of road is statistically significant influence the land price. For variable road class, it can be interpreted that the width of the road ground in front of a property will be more appreciated or valued by the high value of the land. It is possible because the width of the road ahead a land property that makes the location very strategic and has high accessibilities compared with the land located in the small streets and alleys.

From the result, the type of building is giving negative sign and statistically significant. In the model, we use the variable as dummy variable and 1 as housing; 0 as other building type. The negative sign means that the land with housing are built on the land has less value than other building. This result can be interpreted when land with other type of building on it such as office, shop or workshop have added value in the value of the land compare to the housing. On the other hand, the housing are only give value as the place for living and do not have other beneficial function. Other reason, the other type of building such as shop and office are sometimes located in strategic location with a lot of advantages like easy accessibilities and good infrastructure.

The last variable is water pipe. We use water pipe variable as the dummy variable that 1 is location with underserved by water pipe and 0 is not cover with water pipe. The result shows that the water pipe is statistically insignificant and has positive sign. The positive sign means that the area is covered by the water pipe have higher value of land compare to the land without the water pipe. It is possible because the good access of clean water in area can increase the value of the land especially in Bekasi area with bad quality of ground water. However, the water pipe is insignificantly influence the land price because the scope areas of water pipe are not spread equally in the Bekasi. The area services of water pipe in the meantime are only on the northern part of Bekasi.

Table 5-5 Comparison Result of Price Model (dependent variable: ln land price)

Regressor	Coefficient	Coefficient without type of road	Coefficient without water pipe
Constant	13.830 *	13.600*	13.924*
	(0.268)	(0.272)	(0.139)
Ln distance	-0.368 *	-0.337*	-0.405*
	(-0.113)	(0.117)	(0.069)
Type of building	-0.176**	-0.265*	-0.179**
	(0.086)	(0.086)	(0.085)

Type of road	-0.340*	-	-0.343*
	(0.085)		(0.085)
Water pipe	0.0568	0.110	-
	(0.139)	(0.143)	
Adjusted R^2	0.2623	0.2034	0.2656

Notes: Significant level: * : 1 % ** : 5%

Standard error is in square bracket

We also try to measure separately between road and water pipe because there are chance that the road and water pipe have same influence and impact to the land price. From the table above, the result is still the same that the water pipe is insignificantly and has positive sign influence the land price. The different measuring separately between road and water pipe is on the significant level of the type of building. without type road, the type of building is significant in 1 %.

5.3 Comparison result with the Jakarta

We try to compare result from Jakarta to see the relationship between land price and distance to CBD. Many scholars have already measured the relationship between price and distance. In period 1987 – 1989, Dowal and Leaf (1991) observed the relationship of price and distance. In their research, the writer were using appraised price to see the relation of price and distance to CBD. However, the writers used different source of appraised price. The writer took the appraised price from broker calculation instead using data from the tax office. Even though using the different method of appraised price calculation, the result of the relationship of price and distance was negative and significant. For the period 1987 – 1989, the coefficient of price to distance are -0.181,- 0.174 and -0.168 (Dowall and Leaf 1991).

Furthermore, Han and Basuki (2001) are also observing the relationship between price and distance. The writer tries to examine the change of price during 1996 to 1997. The writer use same dependent variable but different method of appraise price source. Han and Basuki are using appraised price from tax office but the methodology that is used by the writer are not in logarithm. From their research, the relationship between price and distance show same sign. The price is negative function of distance and the coefficient is -0.084 as distance increase by 1 kilo meter (Han and Basuki 2001).

Lewis (2007) is also observing the relationship of price and distance. Lewis is using data from tax office on 1997. The different between Lewis and Han and Basuki is the model that they use. Lewis use logarithmic to measure the relationship between price and distance. However, the result is nearly the same with Han and Basuki. The price is negative function of distance and the coefficient is -0.054 as distance increase by 1 kilo meter.

Han and Basuki (2001) give an argument by the different coefficient between Dowel and Leaf result in 1991. There are significantly decrease on coefficient between 1987 and 1997. They argue that different result because of fast growth and structural change in subarea in Jakarta. Other reason is because of the different data, different model and diverse technique of analysis.

To conclude, if we make comparison with Bekasi, the result is the same. The price is negative function of distance and when the distance to the CBD increase the price is lower than the price near the CBD area. The different is on the magnitude of the CBD to the land price in Jakarta and Bekasi. For Jakarta area, the magnitude of CBD is smaller than the magnitude in Bekasi. The coefficient in Jakarta is -0.054 and the coefficient in Bekasi is -0.368. The possible reason that the total area of Jakarta is bigger than Bekasi and Jakarta have better and infrastructure are spreading equally in all part area in Jakarta.

5.4 Conformity the result to the urban structure in Bekasi

The purpose of city plan in Bekasi is creating the harmony and balance on land use and human activity. The concept is creating hierarchy system with specialization function. As already mention above, the hierarchy system in Bekasi is divided into 3 hierarchies, 1) city service centre 2) Sub City service centre 3) Neighbourhood Service Centre. This model of hierarchy is implemented on 2010 and accordance with the Master plan 2010 – 2030 which is developed with the aim to achieve equal distribution in services and infrastructure. By creating sub CBD and neighbourhood service center, the government of Bekasi try to reduce the influence of the CBD as a core of economic activity and spread the economic activity across sub district.

To conclude, before the implementation of master plan 2010 – 2030, the economic activity and service in Bekasi was located and focused on in city centre or CBD that located in A. Yani and Juanda Street. However, the implementation hierarchy system in Bekasi is still not yet changes the land price model in Bekasi which is the greater the distance of land from the CBD the cheaper the price of the land. Even though, in some place near the toll gate and sub CBD the land prices have increasing trend. For example, the area in Jatiasih village, the land price is slightly higher compare than the village in Jatiasih sub district. This condition happens because of existence of the toll gate in Jatiasih village.

Chapter 6
Conclusion

In this research paper, we measured the relationship between land price and distance to the CBD in urban structure in Bekasi. Theoretically, the relationship between land price and distance to CBD is negative and significant. Other objective is to find others factor that can influence the land price in Bekasi and how is the effect to the land price?. From the empirical studies, the observations show that the price have negative relationship with land price, when the distance to CBD increase the land value is reducing.

The area of observation is on Bekasi which consist of 12 sub district and 56 villages. Furthermore, the land use pattern in Bekasi is dominated with the services and settlement. The trade and service activities in Bekasi are located along the main road, both arterial roads and collector roads. The central business distric in Bekasi is centered along the Juanda and A. Yani Street. The A. Yani Street is the starting point when we want to measure the distance from the sample to the CBD. The methodology to measure the relationship between the land price and distance to the CBD in Bekasi, we use the data from city and regional planning in Bekasi in 2011. The variables are land price and distance as main variable, and road class, type of building and water pipe as dummy variable. These dummy variables are used to see other factor beside distance than can influence the value of land.

The result show that the relationship between land price and distance to CBD is negative and significantly. It means the increasing distance from the CBD the land price becomes cheaper compare to the land closest from CBD. The coefficient is -0.368 and the t value is 0.001. For variable road class and building type, the results are negative and significant. It means the road class and building type can influencing the value of land. The negative for road class means that reducing in class road has negative impact to the land value. For example, the land is located on the wider road have higher value than land on small road because of the easy accessibility and strategic location. It is also the same for the building type which is the housing type have negative sign to the land value because the added value of housing compare to other building is smallest. In other hand, the water pipe variable has different result. The result for water pipe is positive and insignificant. The positive sign means that the area is covered by the water pipe have higher value of land compare to the land without the water pipe. However, the water pipe is not significantly influence the land price because the scope areas of water pipe are not spread equally in the Bekasi.

The result of relationship between price and distance in Bekasi is slightly different if we compare to the result from the Jakarta. The coefficient in Jakarta is higher than in Bekasi. In Jakarta, CBD areas are not having big effect to influence the land price. This different happens because of the characteristic in Jakarta. Jakarta is divided into 5 big regions and every region has CBD and sub CBD. This condition creates nearly equal in infrastructure and facilities across regions (Lewis, 2007). This is different with urban development in Bekasi. In masterplan Bekasi 2010 – 2030, Bekasi have 1 CBD with 4 sub CBD and also supported by 7 small economic activity in neighbourhood. The eco-

nomic activity are still concentrated in city centre which have function as CBD because of that the magnitude of CBD in Bekasi are higher than Jakarta.

6.1 Policy relevance to urban structure development in Bekasi

The Bekasi government are trying to develop the urban structure in Bekasi into 3 hierarchy system which is integrated each other. This action is been done to accelerate the development in Bekasi either infrastructure or economic development and also to reduce the influence of the CBD as the core and centre of all activity in Bekasi. However, the main problem for creating equal distribution of services, public facilities and infrastructure is how to develop the sub centre as sub CBD that can support the city centre as CBD. Based on the empirical evidence on the relation of the land price and distance to CBD, the relationship between land price and distance from CBD is negative and significant. It means the influence of the CBD still stronger in Bekasi from the land price pattern perfective because CBD in Bekasi is still concentrated as the centre of growth and activity.

By dividing into 3 hierarchy system, the urban structure in Bekasi is expected to develop faster and equally across village in Bekasi because with the 3 hierarchy system, the magnitude of CBD as a core can be reduce and the activity are not centralized are only on the CBD. This condition can also give impact to the land price in Bekasi area. The equal distribution of acitivity and services can make the land price across village in Bekasi similarly. Moreover, the similar characteristic of infrastructure and land price can accelerate the economic development in Bekasi.

Appendices

Appendix 1
Data Sample

No	Village	Sub district	Total area	Land Price (m2)	Distance (KM)	Type of Building	Type of Road	water pipe
1	Bojong rawa lumbu	Rawa lumbu	830	614,000	5.52	0	0	1
2	Pengasinan	Rawa lumbu	150	394,000	4.21	0	0	1
3	Pengasinan	Rawa lumbu	250	394,000	4.21	0	0	1
4	Pengasinan	Rawa lumbu	1,100	537,000	4.21	0	0	1
5	Bojong rawa lumbu	Rawa lumbu	913	614,000	5.50	0	0	1
6	Pengasinan	Rawa lumbu	642	537,000	4.49	1	1	1
7	Bojong rawa lumbu	Rawa lumbu	655	394,000	5.46	1	1	1
8	Pengasinan	Rawa lumbu	600	614,000	3.79	0	1	1
9	Pengasinan	Rawa lumbu	574	916,000	4.07	1	0	1
10	Bojong rawa lumbu	Rawa lumbu	11,470	1,032,000	6.41	0	0	1
11	Bojong rawa lumbu	Rawa lumbu	1,960	1,032,000	5.59	0	1	1
12	Sepanjang Jaya	Rawa lumbu	1,280	537,000	3.74	0	1	0
13	Pengasinan	Rawa lumbu	1,090	285,000	4.91	0	1	1
14	Pengasinan	Rawa lumbu	570	285,000	4.12	0	1	1
15	Sepanjang Jaya	Rawa lumbu	1,891	537,000	3.82	0	1	0
16	Bojong rawa lumbu	Rawa lumbu	600	335,000	5.71	1	1	1
17	Sepanjang Jaya	Rawa lumbu	21,076	802,000	3.80	1	1	0
18	Bojong rawa lumbu	Rawa lumbu	695	243,000	5.46	0	1	1
19	Jatimurni	Pondok Melati	800	243,000	12.50	0	1	0
20	Jatimelati	Pondok Melati	2,443	335,000	10.82	0	0	0
21	Jatimelati	Pondok Melati	2,943	243,000	10.95	1	1	0
22	Jatimurni	Pondok Melati	1,562	243,000	12.85	1	1	0
23	Jatimurni	Pondok Melati	740	394,000	13.16	1	1	0
24	Jatirahayu	Pondok Melati	2,204	1,032,000	12.73	0	0	0
25	Jati melati	Pondok Melati	7,789	243,000	11.70	1	0	0
26	Jati melati	Pondok Melati	10,270	243,000	11.50	1	0	0
27	Jatimakmur	Pondok gede	1,017	464,000	9.29	1	1	0
28	Jatimakmur	Pondok gede	1,216	394,000	8.26	1	1	0
29	Jatimakmur	Pondok gede	600	394,000	8.93	1	1	0
30	Jatibening Baru	Pondok Gede	715	394,000	5.85	1	0	0
31	Jatibening Baru	Pondok Gede	7,200	464,000	7.87	1	1	0
32	Jatimakmur	Pondok gede	500	394,000	8.95	1	1	0
33	Jatibening Baru	Pondok gede	1,125	394,000	7.65	1	1	0
34	Jatimakmur	Pondok gede	12,000	464,000	8.75	1	1	0
35	Jatimakmur	Pondok gede	1,175	394,000	9.51	1	1	0
36	Jatimakmur	Pondok gede	2,034	1,032,000	9.19	0	0	0
37	Jatibening Baru	Pondok gede	654	394,000	7.91	1	1	0
38	Jatibening Baru	Pondok gede	654	394,000	7.91	1	1	0
39	Jaticempaka	Pondok gede	845	2,279,000	8.27	1	0	0

35

40	Jatibening	Pondok gede	5,919	1,098,000	5.75	0	0	1
41	Jatibening	Pondok gede	732	916,000	6.21	0	0	1
42	Jati Cempaka	Pondok gede	868	335,000	6.99	1	1	0
43	Jatibening Baru	Pondok Gede	576	364,500	6.30	1	1	0
44	Jaticempaka	Pondok Gede	605	464,000	8.91	1	1	0
45	Jatibening	Pondok Gede	11,465	394,000	5.50	1	0	1
46	Jatibening	Pondok Gede	500	614,000	6.45	1	1	1
47	Cimuning	Mustika Jaya	553	285,000	9.47	0	0	0
48	Cimuning	Mustika Jaya	2,173	103,000	9.23	0	1	0
49	Pedurenan	Mustika Jaya	1,355	394,000	10.40	0	0	0
50	Cimuning	Mustika Jaya	112	128,000	9.17	1	1	0
51	Mustika Jaya	Mustika jaya	1,202	200,000	7.82	1	1	0
52	Mustika Jaya	Mustika jaya	706	285,000	7.61	1	1	0
53	Mustika Jaya	Mustika jaya	4,100	335,000	8.45	1	1	0
54	Cimuning	Mustika jaya	170,000	103,000	9.12	1	1	0
55	Pedurenan	Mustika jaya	965	394,000	10.32	0	0	0
56	Mustika Jaya	Mustika jaya	500	243,000	7.50	1	1	0
57	Cimuning	Mustika jaya	632	285,000	9.40	0	0	0
58	Padurenan	Mustika jaya	1,384	128,000	9.24	1	0	0
59	Mustikasari	Mustika Jaya	685	464,000	7.05	0	1	0
60	Cimuning	Mustika Jaya	1,054	128,000	10.47	1	1	0
61	Cimuning	Mustika Jaya	1,728	103,000	10.47	1	1	0
62	Mustikasari	Mustika Jaya	1,030	200,000	6.42	1	1	0
63	Mustikasari	Mustika Jaya	503	335,000	7.21	0	0	0
64	Pedurenan	Mustika jaya	1,039	160,000	8.46	0	1	0
65	Pedurenan	Mustika jaya	1,039	128,000	9.43	0	1	0
66	Mustikasari	Mustika jaya	503	537,000	7.17	0	1	0
67	Cimuning	Mustika Jaya	5,186	394,000	10.31	0	0	0
68	Mustikasari	Mustika Jaya	1,152	335,000	6.70	0	1	0
69	Pedurenan	Mustika Jaya	550	103,000	8.56	0	0	0
70	Mustikasari	Mustika Jaya	1,011	240,000	6.55	0	1	0
71	Mustikasari	Mustika jaya	1,036	200,000	6.55	0	1	0
72	Mustikasari	Mustika jaya	8,065	200,000	7.67	0	1	0
73	Pedurenan	Mustika Jaya	500	180,000	10.56	1	1	0
74	Pejuang	Medan satria	723	916,000	5.11	1	1	1
75	Pejuang	Medan satria	1,000	1,032,000	4.59	0	0	1
76	Harapan Mulya	Medan satria	1,444	300,000	2.54	0	0	1
77	Medan satria	Medan satria	550	1,147,000	5.87	0	0	1
78	Medan satria	Medan satria	12,760	614,000	6.25	0	0	1
79	pejuang	Medan satria	950	285,000	4.54	0	1	1
80	Kalibaru	Medan satria	870	1,274,000	2.77	0	1	1
81	Jatiraden	Jatisampurna	835	614,000	15.73	0	0	0
82	Jatikarya	Jatisampurna	947	285,000	18.53	1	1	0
83	Jatikarya	Jatisampurna	4,578	285,000	18.02	1	1	0
84	Jatiranggon	Jatisampurna	2,775	448,115	13.81	1	1	0
85	Jatisampurna	Jatisampurna	1,369	200,000	16.95	1	0	0

86	Jatikarya	Jatisampurna	610	243,000	18.11	1	1	0
87	Jatiraden	Jatisampurna	41,603	200,635	16.12	1	0	0
88	Jatiranggon	Jatisampurna	4,605	243,000	14.61	1	1	0
89	Jatiraden	Jatisampurna	46,000	200,000	16.12	1	0	0
90	Jatisampurna	Jatisampurna	1,592	641,000	17.44	0	0	0
91	Jatikarya	Jatisampurna	89,436	335,000	17.81	1	0	0
92	Jatiranggon	Jatisampurna	1,200	464,000	14.11	1	0	0
93	Jatiranggon	Jatisampurna	6,093	200,000	13.30	1	1	0
94	Jatiranggon	Jatisampurna	1,405	335,000	13.80	1	1	0
95	jatiluhur	Jatiasih	1,023	285,000	9.71	1	1	0
96	Jatikramat	Jatiasih	4,105	1,032,000	7.98	0	0	0
97	Jatiasih	Jatiasih	1,995	464,000	6.61	1	1	0
98	Jatisari	Jatiasih	1,268	464,000	7.40	0	1	0
99	Jatiasih	Jatiasih	621	916,000	8.04	0	0	0
100	Jatimekar	Jatiasih	3,324	285,000	9.89	1	1	0
101	Jatiasih	Jatiasih	753	285,000	8.13	1	1	0
102	Jatiluhur	Jatiasih	575	464,000	9.37	0	1	0
103	Jatimekar	Jatiasih	534	335,000	7.97	1	0	0
104	Jatisari	Jatiasih	1,268	537,000	11.60	0	0	0
105	Jatikramat	Jatiasih	2,130	802,000	7.59	0	0	0
106	Jatirasa	Jatiasih	2,000	335,000	7.32	1	0	0
107	Jatiluhur	Jatiasih	1,092	200,000	7.30	1	1	0
108	Jatikramat	Jatiasih	1,000	464,000	7.38	0	0	0
109	Jatiluhur	Jatiasih	5,097	205,000	11.35	1	1	0
110	Jatiasih	Jatiasih	2,140	916,000	7.89	0	0	0
111	Jatiluhur	Jatiasih	866	160,000	10.60	1	1	0
112	Jatisari	Jatiasih	800	160,000	12.04	1	1	0
113	Jatiasih	Jatiasih	840	537,000	8.12	1	0	0
114	Jatisari	Jatiasih	9,177	243,000	14.27	1	1	0
115	Jatiasih	Jati asih	1,700	243,000	7.81	0	0	0
116	Jatiluhur	Jati asih	924	394,000	9.37	0	0	0
117	Jatikramat	Jati asih	1,208	702,000	7.15	1	0	0
118	Jati asih	Jati asih	600	243,000	6.81	1	0	0
119	Jatiasih	Jati asih	2,350	335,000	9.21	0	1	0
120	Jatisari	Jati asih	5,525	464,000	11.69	1	1	0
121	Jatiluhur	Jati asih	1,165	916,000	9.91	0	0	0
122	Jatimekar	Jati asih	1,025	285,000	9.89	1	0	0
123	Jati asih	Jati asih	500	394,000	6.64	1	1	0
124	Jatikramat	Jati asih	1,436	464,000	7.59	1	1	0
125	Jatikramat	Jati asih	2,475	394,000	7.13	1	1	0
126	Jatirasa	Jati asih	8,155	916,000	7.50	0	0	0
127	Jatiasih	Jati asih	1,263	335,000	7.41	0	0	0
128	Jati asih	Jati asih	2,627	200,000	8.13	0	1	0
129	Jati Mekar	Jati asih	500	285,000	8.26	1	0	0
130	Kaliabang tengah	Bekasi utara	1,000	285,000	3.68	0	0	1
131	Harapan baru	Bekasi utara	2,246	120,000	3.30	0	1	1

132	Harapan Jaya	Bekasi Utara	625	285,000	3.55	1	1	1
133	Marga mulya	Bekasi Utara	632	802,000	1.63	0	0	1
134	Marga mulya	Bekasi Utara	1,121	335,000	2.10	1	0	1
135	Marga mulya	Bekasi Utara	1,121	335,000	2.10	1	0	1
136	Kaliabang tengah	Bekasi Utara	19,917	200,000	5.18	1	1	1
137	Perwira	Bekasi Utara	7,145	200,000	3.67	0	0	1
138	Harapan baru	Bekasi Utara	4,100	464,000	3.55	0	0	1
139	Kaliabang tengah	Bekasi Utara	2,332	243,000	6.27	0	0	1
140	Kaliabang tengah	Bekasi Utara	83,791	160,000	5.92	0	0	1
141	Harapan Jaya	Bekasi Utara	350,000	285,000	2.17	1	1	1
142	Duren Jaya	Bekasi Timur	640	1,722,000	1.99	0	0	1
143	Bekasi jaya	Bekasi Timur	732	194,400	2.36	1	0	1
144	Margahayu	Bekasi Timur	500	537,000	3.87	1	1	1
145	Aren Jaya	Bekasi Timur	1,023	243,000	3.62	1	1	1
146	Duren Jaya	Bekasi Timur	9,500	614,000	3.80	0	0	1
147	Margahayu	Bekasi Timur	2,015	1,274,000	2.09	0	0	1
148	Margahayu	Bekasi Timur	718	1,274,000	1.65	0	0	1
149	Margahayu	Bekasi Timur	3,645	2,640,000	2.99	0	0	1
150	Duren Jaya	Bekasi Timur	507	537,000	3.19	1	1	1
151	Duren Jaya	Bekasi Timur	1,620	335,000	3.08	1	0	1
152	Bekasi Jaya	Bekasi Timur	691	1,032,000	2.67	0	0	1
153	Pekayon jaya	Bekasi selatan	560	294,000	2.82	1	1	1
154	Jakasetia	Bekasi selatan	3,979	1,274,000	4.58	0	0	1
155	Jakasetia	Bekasi selatan	1,116	394,000	3.97	0	1	1
156	Pekayon jaya	Bekasi selatan	3,135	1,416,000	2.48	0	0	1
157	Jakamulya	Bekasi Selatan	4,776	702,000	5.65	0	1	1
158	Marga Jaya	Bekasi Selatan	590	1,274,000	1.50	1	1	1
159	Pekayon jaya	Bekasi Selatan	4,872	702,000	2.75	1	0	1
160	Jakasetia	Bekasi Selatan	2,000	394,000	3.30	1	1	1
161	Margajaya	Bekasi Selatan	1,295	1,147,000	0.76	0	1	1
162	Jakamulya	Bekasi selatan	3,776	335,000	5.75	0	1	1
163	Pekayon jaya	Bekasi Selatan	670	614,000	2.55	0	0	1
164	Jakamulya	Bekasi Selatan	540	702,000	5.15	0	0	1
165	Jakasampurna	Bekasi Barat	1,643	335,000	1.80	0	1	1
166	Jakasampurna	Bekasi Barat	3,225	1,274,000	2.24	0	1	1
167	Bintara Jaya	Bekasi Barat	596	916,000	4.15	0	0	1
168	Bintara Jaya	Bekasi barat	600	335,000	4.96	1	1	1
169	Jakasampurna	Bekasi Barat	1,855	516,000	3.07	0	1	1
170	Jakasampurna	Bekasi Barat	3,225	1,416,000	2.85	0	1	1
171	Bintara Jaya	Bekasi barat	857	285,000	5.04	1	1	1
172	Kranji	Bekasi barat	647	702,000	2.64	0	0	1
173	Jakasampurna	Bekasi Barat	525	335,000	1.82	1	1	1
174	Bintara Jaya	Bekasi Barat	925	802,000	5.10	0	1	1
175	Jakasampurna	Bekasi barat	2,160	464,000	3.01	0	1	1
176	Jakasampurna	Bekasi Barat	14,335	335,000	3.22	1	1	1
177	Cikiwul	Bantar Gebang	1,283	243,000	10.77	0	1	0

178	Bantar Gebang	Bantar Gebang	7,606	860,600	10.45	0	0	0
179	Bantar Gebang	Bantar Gebang	6,600	614,000	10.10	1	0	0
180	Cimuning	Bantar Gebang	548	394,000	12.55	0	0	0
181	Cikiwul	Bantar Gebang	1,458	128,000	11.70	1	0	0
182	Cikiwul	Bantar Gebang	972	128,000	11.06	0	1	0
183	Cikiwul	Bantar Gebang	36,180	285,000	11.52	0	1	0
184	Bantar Gebang	Bantar Gebang	780	464,000	11.12	0	1	0
185	Cikiwul	Bantar Gebang	1,480	200,000	11.90	0	1	0
186	Cikiwul	Bantar Gebang	2,680	200,000	12.45	0	1	0
187	Ciketing Udik	Bantar Gebang	1,696	200,000	13.30	0	1	0
188	Ciketing Udik	Bantar Gebang	571	243,000	13.30	0	1	0
189	Bantar Gebang	Bantar Gebang	1,603	128,000	10.23	0	1	0

Source : analysis 2012

Note

Type of building

1	Housing
0	Non Housing

Type of Road

1	Local
0	Non local (Arteri/ collector)

Water Pipe

1	PDAM
0	Non PDAM

Appendix 2 Regresion result between Land Price and Distance to CBD

```
. reg llandprice ldistance typeofbuilding typeofroad waterpipe
```

Source	SS	df	MS
Model	22.0439986	4	5.51099964
Residual	57.2501867	184	.311142319
Total	79.2941852	188	.421777581

Number of obs = 189
$F(4, 184)$ = 17.71
Prob > F = 0.0000
R-squared = 0.2780
Adj R-squared = 0.2623
Root MSE = .5578

llandprice	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
ldistance	-.3685202	.1133277	-3.25	0.001	-.592109	-.1449313
typeofbuil~g	-.1764037	.0862709	-2.04	0.042	-.346611	-.0061964
typeofroad	-.3405259	.0857637	-3.97	0.000	-.5097326	-.1713192
waterpipe	.0568288	.139032	0.41	0.683	-.217473	.3311306
_cons	13.83058	.2687378	51.46	0.000	13.30037	14.36078

Appendix 3 Regeresion Result without Water Pipe

```
. reg llandprice ldistance typeofbuilding typeofroad
```

Source	SS	df	MS
Model	21.9920149	3	7.33067165
Residual	57.3021703	185	.309741461
Total	79.2941852	188	.421777581

Number of obs = 189
F(3, 185) = 23.67
Prob > F = 0.0000
R-squared = 0.2773
Adj R-squared = 0.2656
Root MSE = .55654

llandprice	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]
ldistance	-.405011	.0696505	-5.81	0.000	-.5424225 -.2675996
typeofbuil~g	-.1794702	.0857504	-2.09	0.038	-.3486446 -.0102959
typeofroad	-.3439086	.0851711	-4.04	0.000	-.5119401 -.175877
_cons	13.9243	.139867	99.55	0.000	13.64836 14.20023

Appendix 4 Regeresion Resut without Type of Road

```
. reg llandprice ldistance typeofbuilding waterpipe
```

Source	SS	df	MS
Model	17.1388504	3	5.71295014
Residual	62.1553348	185	.335974783
Total	79.2941852	188	.421777581

Number of obs = 189
F(3, 185) = 17.00
Prob > F = 0.0000
R-squared = 0.2161
Adj R-squared = 0.2034
Root MSE = .57963

llandprice	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]
ldistance	-.337413	.1174816	-2.87	0.005	-.5691888 -.1056371
typeofbuil~g	-.2657761	.0865423	-3.07	0.002	-.4365129 -.0950394
waterpipe	.1100968	.1437994	0.77	0.445	-.1736008 .3937943
_cons	13.60018	.2726681	49.88	0.000	13.06224 14.13812

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