FACTORS AND SPATIAL PATTERN ANALYSIS OF LAND PRICE

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INTRODUCTION

- The rapid economic development has stimulated the use of lands in urban area. Basically every human activities highly requires spaces on earth. In line with other substantial factors such as lands, become essential parameters to determine appropriate places for particular uses. Due to the rapid development, demands on land are increasingly arisen and these are the indicators of the urban economic movement. The high demands have to be offset by the availability of sufficient land for the development activities which tend to grow.

- *everything is related to everything else, but near things are more related than distant things*
  (Tobler, 1970)

INTRODUCTION

- Disparity between land market price and land tax value too high
- The existence of problems in the determination land value zone
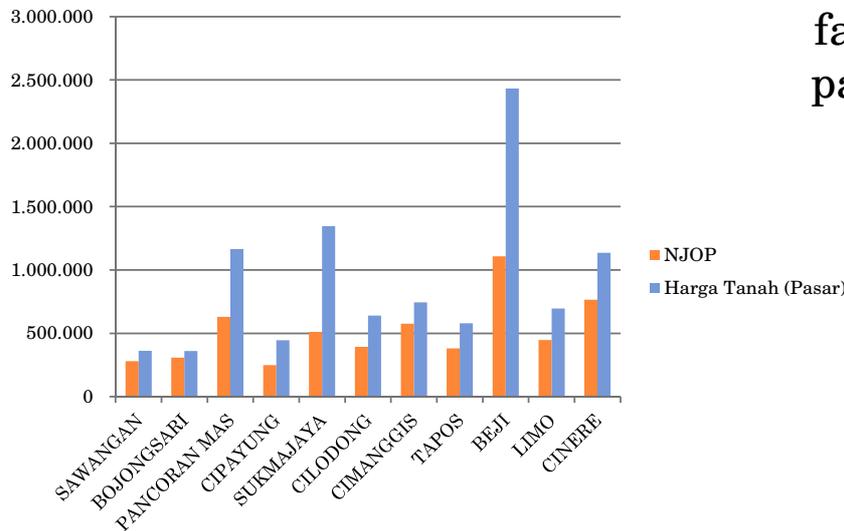
- Therefore necessary factors and spatial pattern analysis of land price

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RESEARCH FORMULATION

- How does the spatial pattern of land price based on market and NJOP in urban area?
- What are the factors that spatially can influence land price based on market and NJOP?
- Are there any spatial auotocorrelation which is positive and spatial dependency effect on land price based on market and NJOP in urban area?

RESEARCH HIPOTHESIS

- There are spatially significant impacts which are negative between distance variables of rural area to city center / Central Business District, rural area to the nearest university, rural area to the nearest station and moreover there are significant influences which are positive between average variables of space extents, the number of buildings toward land price based on market and NJOP;
- There are a positive spatial autocorrelation and a systematic spatial pattern or a clustering pattern on land price based on market and NJOP;
- There are spatial dependency effects of land price based on market and NJOP.

RESEARCH OBJECTIVES

- To identify spatial patterns of land price based on land market price and land tax value (NJOP) using *Global Moran's I* index;
- To identify the factors that influence land price based on land market price and land tax value (NJOP) spatially;
- To analyze the spatial relation of land price and land tax value (NJOP), and land price and land tax value (NJOP) on nearest neighbors.

RESEARCH METHODS

- Global Moran's Index

$$I = \frac{N \sum_{i=1}^{n} \sum_{j=1}^{n} w_{ij}(x_i - \bar{x})(x_j - \bar{x})}{S_0 \sum_{i=1}^{n} (x_i - \bar{x})^2}$$

- The value of I index is in a range of -1 to 1. Pattern identification uses the value criteria of I index, if , so it has systematic value or *cluster,* if , so it has disperse pattern unevenly (no autocorrelation), and , it has unsystematic pattern or *disperse.* is the expectation value of I as formulated: $E(I)= = -1/(n-1)$ (Lee dan Wong, 2001).

EMPIRICAL MODEL AND DATA

- Spatial Lag Model

$$LogY_1 = \rho W LogY_1 + \beta_1 LogCBD + \beta_2 LogUniv + \beta_3 LogTrain + \beta_4 LogWide + \beta_5 LogBuild + \varepsilon$$

- Spatial Error Model

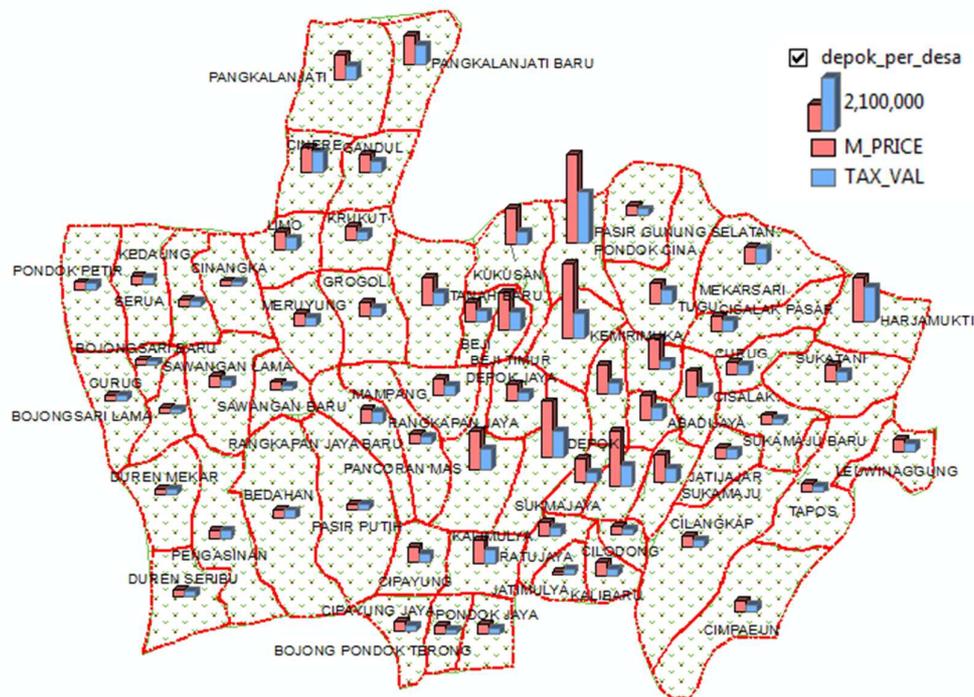$$Logy_3 = \beta_1 LogCBD + \beta_2 LogUniv + \beta_3 LogDensity + \beta_4 LogWide + \beta_5 LogBuild +$$

$$\varepsilon = \lambda W \varepsilon + \xi$$
$$\varepsilon = (I - \gamma W)^{-1} \xi$$

DATA

- 63 Kelurahan se Kota Depok

ANALYSIS METHOD

- Data collecting;
- Building *Weight Matrix* based on *rook contiguity* method;
- Calculating values and Moran's I index test *(I dan z value)*;
- Performing analysis of spatial pattern of land price based on market and NJOP using the results of Moran's I index value;
- Determining spatial model that defining variations of land price estimation using *Lagrange Multiplier with* ols regression's tool;
- Conducting lag spatial regression and or spatial error of land price based on market and NJOP;
- Testing spatial regression model using Breush-Pagan and *Likelihood Ratio* test;
- Analysing factors which affecting land price based on market and NJOP spatially;
- Creating *Moran's Scatterplot;*
- Performing linkage analysis of land price based on land price and NJOP using nearest neighborhood from the results of *Moran's Scatterplot;*
- Performing interpretation, discussion, result analysis and conclusion of the research.

SPATIAL PATTERN

Land Price

Nilai Morans	Estimasi
Moran's Index	0.3780
Expected Index	-0.0161
Variance	0.0066
z-score	4.6768
p-value	0.0000
Pola	**Mengelompok (Clustered)**

$$I > I_0 \quad \text{Mengelompok}$$

Land Tax

Nilai Morans	Estimasi
Moran's Index	0.2971
Expected Index	-0.0161
Variance	0.0065
z-score	3.3553
p-value	0.0007
Pola	**Mengelompok (Clustered)**

$$I > I_0 \quad \text{Mengelompok}$$

SPATIAL LAG MODEL

Land Price

Variabel	Koef	(Sig)
W_LOGPRICE	0.1962	0.1377
CONSTANT	4.4539	0.0000
LOGCBD	-0.5128	0.0000***
LOGUNIV	-0.1821	0.0550**
LOGTRAIN	-0.2429	0.0485**
LOGWIDE	0.0846	0.4634
LOGBUILD	0.2483	0.0292**
R-square	0.5754	

Land Tax

Variabel	Koef	(Sig)
W_LOGTAX	0.2031	0.1568
CONSTANT	3.8260	0.0000
LOGCBD	-0.2498	0.0041***
LOGUNIV	-0.1720	0.0356**
LOGTRAIN	-0.2152	0.0344**
LOGWIDE	0.1300	0.1913
LOGBUILD	0.2737	0.0052***
R-square	0.4290	

$$LogPrice = 0.1962WLogPrice + -0.5128LogCBD + -0.1821LogUniv$$
$$+ -0.2429LogTrain + 0.0846LogWide + 0.2483LogBuild + \varepsilon$$

$$LogTax = 0.2031WLogTax + -0.2496LogCBD + -0.1720LogUniv + -0.2152LogTrain$$
$$+ 0.1300LogWide + 0.2737LogBuild + \varepsilon$$

SPATIAL ERROR MODEL

Land Price

Variabel	Koef	(Sig)
CONSTANT	5.6200	0.0000
LOGCBD	-0.5122	0.0000***
LOGUNIV	-0.1490	0.1228
LOGTRAIN	-0.3429	0.0063***
LOGWIDE	0.0709	0.5321
LOGBUILD	0.2650	0.0177**
LAMBDA	0.2496	0.1178
R-square	0.5758	

Land Tax

Variabel	Koef	(Sig)
CONSTANT	4.9688	0.0000
LOGCBD	-0.2570	0.0027***
LOGUNIV	-0.1457	0.0791*
LOGTRAIN	-0.2739	0.0113**
LOGWIDE	0.1303	0.1811
LOGBUILD	0.2844	0.0030***
LAMBDA	0.2551	0.1088*
R-square	0.4345	

$$LogPrice = -0.5122 LogCBD + -0.1490 LogUniv + -0.3429 LogTrain + 0.0709 LogWide + 0.2650 LogBuild + 0.2496 W\varepsilon + \xi$$

$$LogTax = -0.2570 LogCBD + -0.1457 LogUniv + -0.2739 LogTrain + 0.1303 LogWide + 0.2844 LogBuild + 0.2551 W\varepsilon + \xi$$

SPATIAL PATTERN OF LAND TAX



Kelurahan Pondok Petir, Serua, Kedaung, Cinangka, Curug, Bojongsari Lama, Bojongsari Baru, Sawangan Lama, Duren Mekar, Pengasinan, dan Pasir Putih
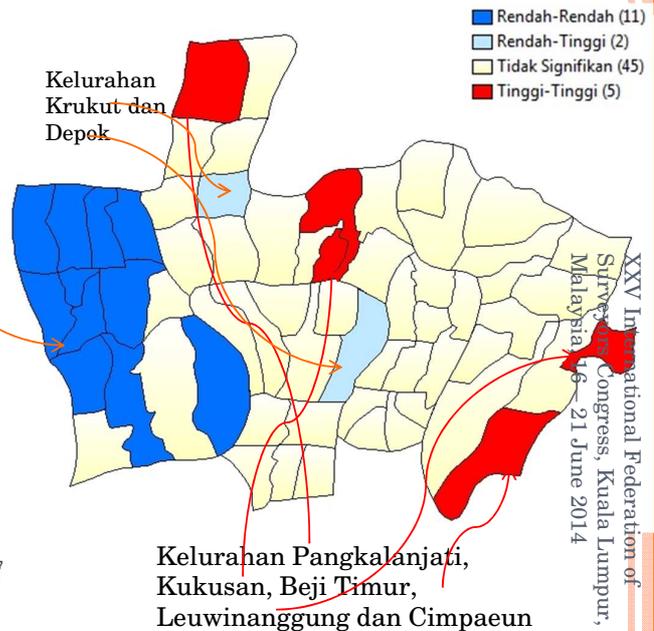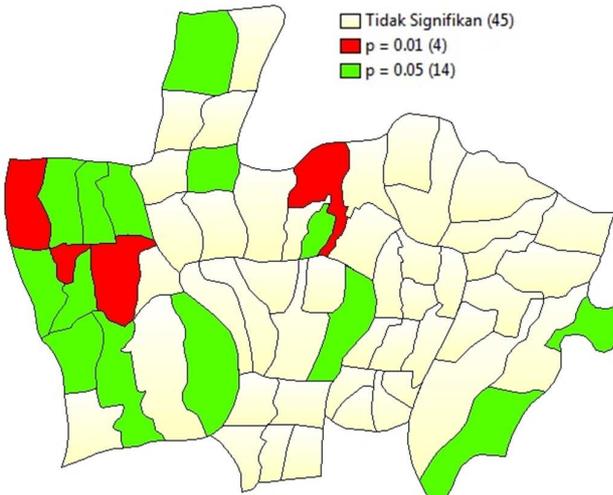
Tidak Signifikan (45)
p = 0.01 (4)
p = 0.05 (14)

Rendah-Rendah (11)
Rendah-Tinggi (2)
Tidak Signifikan (45)
Tinggi-Tinggi (5)

Kelurahan Krukut dan Depok

Kelurahan Pangkalanjati, Kukusan, Beji Timur, Leuwinanggung dan Cimpaeun

SPATIAL PATTERN OF LAND PRICE

- Rendah-Rendah (9)
- Rendah-Tinggi (1)
- Tidak Signifikan (44)
- Tinggi-Rendah (1)
- Tinggi-Tinggi (8)

Kelurahan Krukut

Kelurahan Bakti Jaya

Kelurahan Tanah Baru, Kukusan, Beji, Beji Timur, Kalimulya, Jatimulya, Cilodong dan Kalibaru

- Tidak Signifikan (44)
- p = 0.01 (5)
- p = 0.05 (24)

Kelurahan Pondok Petir, Kedaung, Bojongsari Lama, Bojongsari Baru, Sawangan Lama, Duren Mekar, Pengasinan, Bedahan dan Pasir Putih

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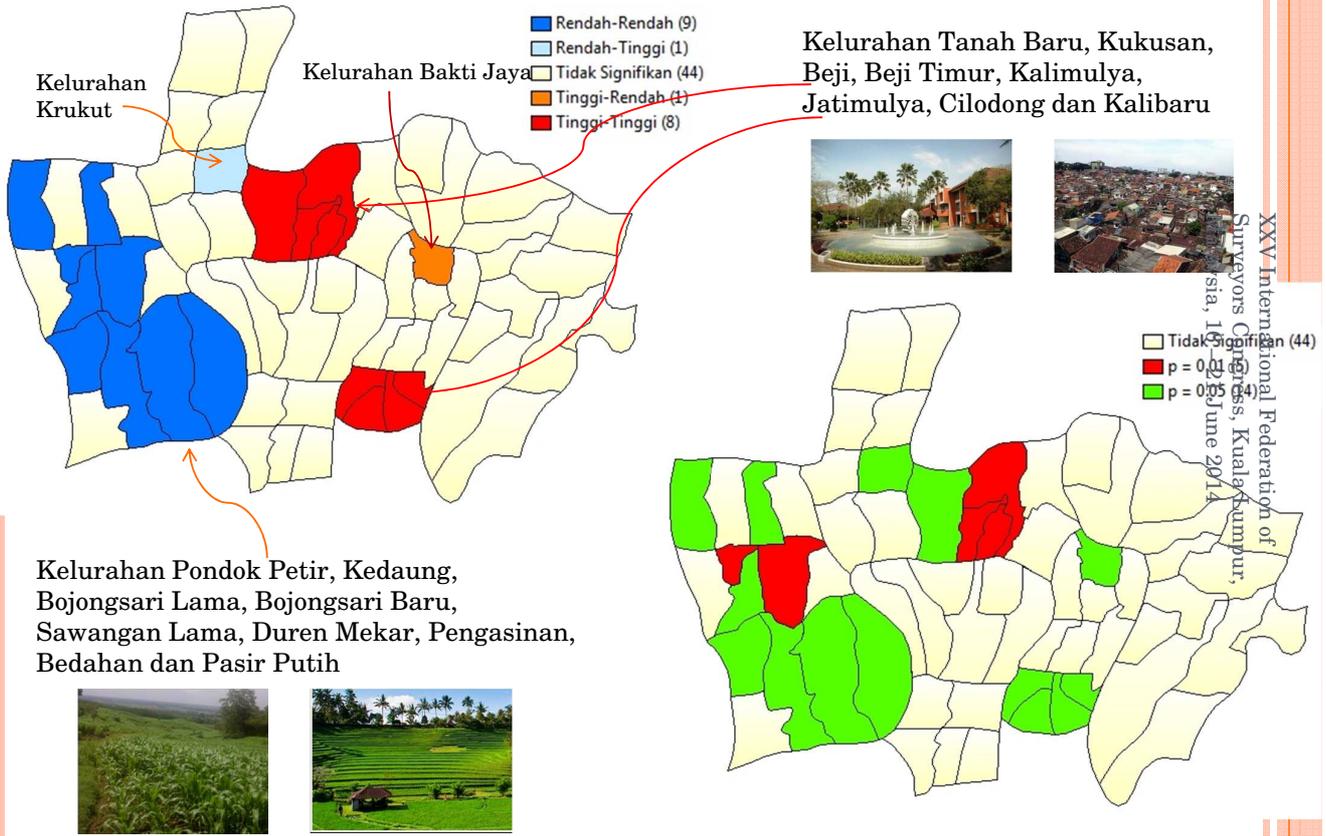
CONCLUSION

- The spatial pattern of land price based on market and NJOP on *Kelurahan* of Depok City indicates a systematic or clustered spatial pattern in which its pattern has a positive spatial autocorrelation and spatial dependence effects although the effects are not strong enough influencing. Furthermore, factors that have significant effects on land price based on market and NJOP spatially are distances such as distance to the city center, distance to the nearest university, distance to the nearest train station and the number of buildings while the variables of the average size of buildings havr no significant effects spatially. These findings confirm that the factor of accessibility, infrastructure and facilities affects the price of land based on market and NJOP, whereas amenities factors have no significant effects. The government should give special pattention to these factors to reduce the disparity of land price based on market and NJOP at an appropriate level.

CONCLUSION

- Thus, the evidences that can clarify the variation of land price based on market and NJOP in 'kelurahan' of Depok City are the existence of educational facilities, infrastructure facilities such as train station, commercial facilities. These are the factors of the emergence of the high demand on lands, the overlapping on land uses, the speculation of land price, and the determined time of the inflation on land price based on NJOP which is longer than the inflation of land price based on market.

- With regard to the results of this research, the model that can explain more on the variation of land price based on market is Spatial Lag Model, while the variation of land price based on NJOP is Spatial Error Model. These findings address on the affirmation that land price based on market tends to be affected by land price in the surrounding administration area ('kelurahan') while land price based on NJOP is affected by the subjectivity of land appraiser. Therefore, the government should perform evaluation on the establishment of NJOP to alleviate horizontal conflicts due to the high disparity between land price based on market and NJOP.

THANK YOU