Assessment Performance of the Property Tax in the Bogor City: Challenge of Tax Decentralization

Hartoyo, Didin S. Damanhuri, Asep Saefuddin and Gunadi[1]

Abstract **- Bogor City Government with the approval of the parliament has been managing and implementing the property tax since the beginning of 2013. In order to keep the establishment of the assessment accurately and fairly, it is necessary to do assessment-sales ratio study. Ratio study results on home transactions in 2011 and 2012 showed that the assessment performance (Sales Value of Tax Object/SVTO performance) decreased.**

Assessment rate was below the sales price and decreased from a median of 0.930 (2011) to 0.848 (2012), while the variability of COD was 7.08 percent (2011) and became wider to 18.10 percent (2012), the assessment was more under-assessment with the z-value of 17.114 (2011) to 23.746 (2012), and the assessment was more regressive with the t-value of -1.987 (2011) to -3.644 (2012). Ratio study results of all property groups (kecamatan/sub-districts) in 2012 showed that the central tendency (median) ranged from 0.77 to 0.94, and the variability was (COD) between 14 percent and 21 percent.

Testing assessment of all property groups (kecamatan) in the Bogor City in 2012 proved that the level of assessment in six property groups was under 100 percent, while two of the six property groups were regressive and a property group was progressive. To keep the assessment performance in each property group be uniform and fair, as well as to increase the potential tax, it is necessary to do a survey and valuation activities in order to make the assessment (SVTO) set to be more accurate and equity/fair. Since there is limited time, human resources and fund, it is necessary to set a priority for assessment corrective action; such as assessment adjustment, reassessment, reappraisal and possibility to review the land value zone and the building cost table.

Keywords: property tax, assessment performance, ratio study, fiscal decentralization.
JEL Code: H21, H71.

I. Introduction

Along with the political and administrative decentralization, the process of fiscal decentralization in Indonesia continues. Follow-up of the fiscal decentralization include, among others, the setting of local taxes and levies as well as the transfer of two central taxes to local taxes; transfer tax (Tax on Acquisition of Land and Buildings / BPHTB) and property tax (Land and Building Tax in Rural and Urban / PBB P2). The decentralization of the transfer tax started in 2011, while decentralization of property tax was done gradually from 2011 to 2014. As stipulated in Law 28/2009 on Regional Taxes and Levies, decentralization of property tax is done in stages, so that the regencies / cities have enough time to prepare facilities such as organizational management, funding, database, information technology, human resources as well as transfer knowledge.

Bogor city with an area of 103.59 km2 is located south of Jakarta metropolitan city, with a distance of 56 $\pm$ km from Jakarta. Bogor consists of 6 sub-districts (kecamatan) and 68 villages/suburbs and has a population of $\pm$ 920 thousands (2012). Until 2012, *both the local government and the central government (Bogor Primary Tax Office) managed the Property Tax in Bogor*. However, the central government performed most of the functions of

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taxation and property assessment, while Bogor City Revenue Office and all villages served as tax collectors. In 2012, the Bogor city has 251,923 tax objects with property tax revenue amounting to IDR 62.7 billion.

The local government prepared the regulation and all the things needed in 2012, and started to manage and implement the *property tax* in the beginning of 2013. Things prepared in 2012 among others were organization, database, information technology, funding and human resources; yet, updating the data and property values were relatively paid less attention. Question the arises on how far the performance in assessment determination declined (Sales Value of Tax Object / SVTO) in 2012, so that the property tax management can be prepared much better based on the previous year experience in terms of time, human resources, cost, and strategy for updating the data and the property value in the following year. Updating the data and the property value is necessary not only to improve the total of assessment and property tax revenues, but also to maintain the level of assessment performance and fairness for all taxpayers and stakeholders.

II. Literature Review

According to Aristovnik (2012), decentralization generally involves three interrelated components; political, fiscal and administrative. Political decentralization includes the transfer of political authority from central to local elected bodies. Fiscal decentralization leads to give authority to local governments with the capacity and the authority to set and collect taxes and other revenues, manage public resources and finance public services.

Kelly (2003) states that only a few countries, such as Indonesia and Chile, manage the property tax as a central tax (central level shared tax), in which the central government controls the policy and administration, while the revenues are distributed to local governments.

According to IAAO (2010), for local jurisdictions, ratio study is used as a generic term for a sales-based studies designed to evaluate appraisal performance. The ratio study can help to improve appraisal methods or identify areas within the jurisdiction that need attention. Some key uses of ratio studies are internal quality assurance and identification of appraisal priorities, adjustment of appraised values between reappraisals.

An assessment ratio is the ratio of an assessment to a proxy for fair cash or market value represented by sales price (Almy *et al.*, 1978; IAAO, 2013). Probably the most effective means of detecting a systematic relationship between the level of assessment and property values is a linear regression of assessment ratios (A/S) on sales price (S): $A/S = b_o + b_1S$

In keeping with the spirit of regional autonomy, fiscal decentralization is implemented in the Bogor city, including in the management of the property tax as a local tax. Besides the preparation of human resources to manage the property tax, the local government should also prepare the organization, data base, and equipment. In the following years, after the early years, the government of the city will conduct data collection and assessment, on reappraisal, reassessment or other corrections. The corrections require description of the assessment performance of property tax, as well as carry out data collection and assessment based on priorities because of limited time, human resources, and funds.

III. Empirical Data

Two separate databases are utilized in this study. The first database comprises of 588 home sales in the Bogor City from January to December 2011. The second database comprises of 808 home sales from January to December in 2012. Sales data supplied by local assessors were collected from the sales price reported by PPAT's (The Land Deed Officer) and Bogor Land Service Office, whereas assessed value were supplied by Bogor Tax Service Office as part of Directorate General of Taxes and Bogor Revenue Office of Bogor city government.

The database consists of 3,086 property transactions in the Bogor city from January to December 2011. After sales that are not appear to be in arm's length transactions (such as sales between family members, estate sales and foreclosures) and sales of commercial properties were removed, the database contained 588 home sales. The 2012 database started with 1,718 property transactions from January to December 2012. After being removed, using the same procedure as the 2011 database, the 2012 database contained 808 home sales.

IV. Assessment Analysis for 2011 and 2012 Databases

4.1 Measures of Central Tendency and Their Comparison

The 2011 database and the 2012 database in Table 1 suggest that the mean and the median of sales price and assessment have increased. Measures of central tendency of assessment sales ratios used were

mean, median and weighted mean. Since all measures of central tendency have decreased, it seems that the potential property tax has already decreased and needs adjustment or reassessment to increase the central tendency.

Two comparisons of measures of central tendency have also been used to gain some useful insights with respect to the distribution of assessment ratios—those comparisons are mean versus median and mean versus weighted mean which is often called as "Price-related Differential (PRD)". Table 1 shows that the comparisons did not exceed the number between 0.95 and 1.10. Thus, both of the databases did not indicate over / under assessment or progressivity / regressivity existence.

Table 1
Assessment Performance of the Property Tax
in Bogor City, 2011–2012

No.	Description	Year 2011	Year 2012	Δ	Δ%
1	Number of sales	588	808		
2	Selling Price (IDR)				
	Mean	274,242,836	341,414,568	67,171,732	24.5
	Median	171,922,000	180,000,000	8,078,000	4.7
3	Assessment (IDR)				
	Mean	254,487,981	433,455,923	178,967,942	70.3
	Median	151,560,000	164,150,000	12,590,000	8.3
4	Measures of Central Tendency				
	Mean	0.926	0.817	- 0.109	-11.8
	Median	0.930	0.848	- 0.081	- 8.8
	Weighted Mean	0.923	0.812	- 0.111	-12.0
5	Comparing Measures of Central Tendency				
	Mean / Median	0.996	0.963		
	Mean / Mean Weighted (Related Price Differentials)	1.004	1.006		
6	Measures of Variability (%)				
	Coefficient of Dispersion (COD)	7.08	18.10	11.01	155.5
	Coefficient of Variation (COV)	8.97	24.08	15.11	168.5

Source: Compiled and processed by the authors from the data obtained from Bogor Tax Service Office, Bogor Government, Land Service Office and PPAT's (July 2013)

4.2 Variability

Measures of variability which used in this analysis are coefficient of dispersion (COD) and coefficient of variation (COV). The lower the value of COD or COV, the better the assessments are. The variability of the 2011 database, coefficient of dispersion (COD), and coefficient of variation (COV) is less than 15 percent and it means that similar properties in 2011 have been assessed at similar levels. Thus, it tends to be associated with good assessment uniformity.

The variability of the 2012 database, COD and COV are 18.10 percent and 24.08 percent respectively. Therefore, according to the IAAO standard, systematic variations can be suggested to exist. The 2012 assessed value should be corrected by reappraisal in order to decrease variability, not more than 15 percent for COD and 20 percent for COV.

4.3 Testing the Level of Assessment

Two nonparametric tests, binomial test and chi square test, can be employed to determine whether assessment ratios can be statistically regarded as normally distributed at a specified confidence level. Since the number of assessment ratios was more than 100 (588 in 2011 and 808 in 2012), we used χ^2 (chi-squared) test. χ^2 calculated for the assessment ratios are 62.738 in 2011 and 161.310 in 2012. The critical value of χ^2 for two-

tailed test with 7 degrees of freedom at 95 percent confidence level is 14.07.

The region of rejection consists of all values of χ^2 greater than 14.07. Since the calculated χ^2 of 62.738 and 161.310 lie in the region of rejection, we reject the statement that assessment ratios are normally distributed.

The level of assessment of the 2012 database decreased, since all measures of central tendency (mean, median and weighted Mean) decreased approximately 8 to 12 percent compared to the 2011 database. We need to test whether the central tendency of assessment ratios are 100 percent. Since assessment ratios are regarded as not normally distributed, we use a non-parametric approach to test the level of assessment. The binomial test statistically determines at a specified confidence level whether the number of observations falling in each of the two categories follows a hypothesized distribution.

The region of rejection at the 95 percent confidence level for a two-tailed test consists of all values more extreme than the critical values of $\pm$ 1.96. Table 2 suggests that calculated z is 17.114 in 2011 and 23.746 in 2012. Since z for both the databases lie in the region of rejection, thus, we reject the hypothesis stating that assessments median is 100 percent of the market value.

4.4 Testing for Progressivity / Regressivity

Since assessment ratios are regarded as not normally distributed, we use a non-parametric approach to test the vertical inequity of assessments. A non-parametric test for assessment bias respecting to property values is provided by the Spearman rank test. The region of rejection for two-tailed test at the 95 percent confidence level consists of all values more extreme than $\pm$ 1.96. The evidence from Table 2 suggests that the regressive vertical inequity present not only in the 2011 data, but also in the 2012 data, since the t-values calculated were -1.987 and -3.644 respectively. Since the t-value calculated for both databases lie in the region of rejection, more than the t-table of $\pm$ 1,960, thus, assessment ratios are dependent on the sale price. The assessed value in the next year should be adjusted, by reassessment, reappraisal, or review on the land value zone and the building cost table. The results of the hypothesis testing of assesment in the Bogor City are described in Table 2.

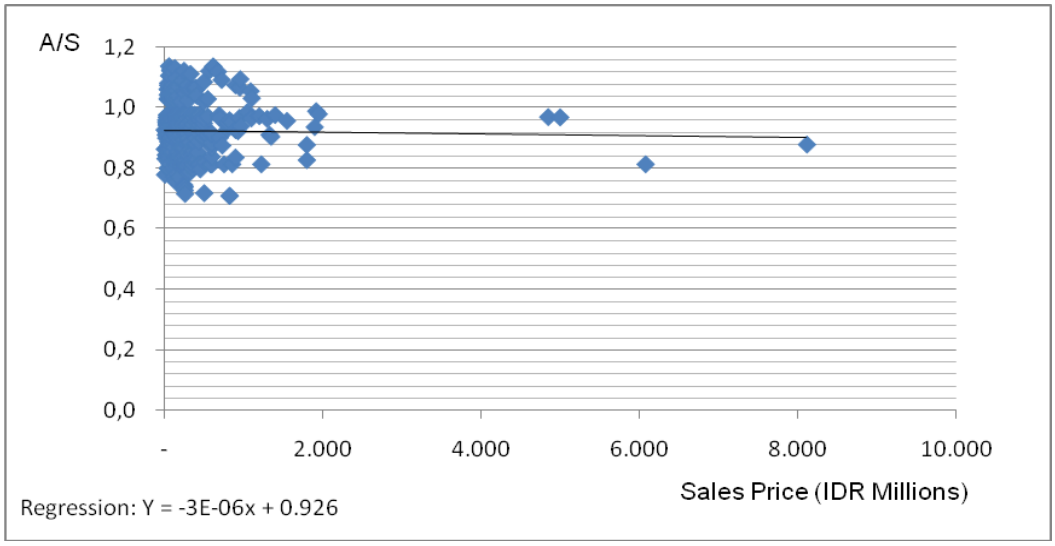
Table 2
Hypothesis Testing of Property Tax Assessment
in the Bogor City, 2011–2012

No.	Description	Year 2011	Year 2012
1	Number of sales	588	808
2	Testing the normality of Assessment Ratios *(Kruskal-Wallis test)*		
	Chi-Square (χ^2) calculated	62.738***	161.310***
	Normal or Abnormal distribution	Not normal	Not normal
3	Testing the Level of Assessment *(Binomial Test)*		
	Z-value calculated	17.114	23.746
	Reject / Accept Median of 100%	Reject	Reject
	Under / Over assessment	Under-assessment	Under-assessment
4	Testing for Assessment Progressivity /Regressivity *(Spearman rank test)*		
	t-value calculated	-1.987*	-3.644***
	Progressivity / Regressivity / Independency existence	Regressivity	Regressivity

Source:
Compiled and calculated by the authors from data obtained from Bogor Tax Service Office, Bogor Government, Land Service Office and PPAT's (July 2013)
Notes:
Asteriks denote significance at *0.5, **0.01, and ***0.001

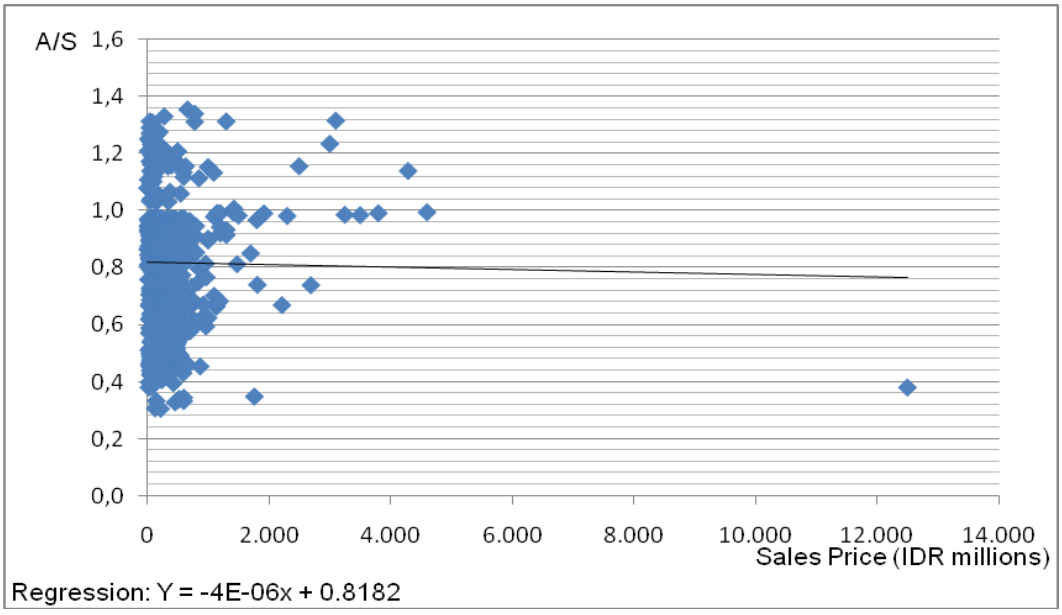
Assessment rate was below the sales price and decreased from a median of 0.930 (2011) to 0.848 (2012), while the variability of COD was 7.08 percent (2011) and became wider to 18.10 percent (2012), and the 2012 assessment was more under-assessment with the z-value of 17.114 (2011) to 23.746 (2012). Furthermore, a mean of 0.926 (2011) to 0.817 (2012), while the variability of COV was 8.97 percent (2011) and became wider to 24.08 (2012), and the assessment was more regressive with the t-value of -1.987 (2011) to -3.644 (2012). Figure A and figure B showed scatter diagrams of 2011 database and 2012 database assessment performances.

Figure A
Assessment Ratios in the Bogor City, Year 2011



Source: Calculated by author using excel

Figure B
Assessment Ratios in the Bogor City, Year 2012



Source: Calculated by author using excel

4.5 Assessment Analysis Among Groups Within the Bogor City In 2012

Measures of Central Tendency and Their Comparison

All of the property groups have central tendencies between .77 and .95, and no group has central tendency above 1.00, as shown in Table 3. It means that no group has a property assessment level above 100 percent of the market value. All of the groups have no good evidence of over-assessments, because their ratios of the mean to the median are not more than 1.10. Three groups, East Bogor, Central Bogor and Tanah Sereal, have good evidence of underassessment, since their ratios of the mean to the median are less than 0.95. Relating to vertical inequity, four groups have no good indication that progressivity or regressivity exists, since their ratios of the mean to the weighted mean or price related differential (PRD) are neither more than 1.10 nor less than .95. Furthermore, progressivity exists in Tanah Sereal with the comparison of less than .95. Otherwise, regressivity exists in Central Bogor with the comparison of more than 1.10. The results of central tendencies and their comparisons are illustrated in Table 3.

Table 3
Measures of Central Tendency of Assessment Ratios and their Comparisons for each Property Group in the Bogor City, Year 2012

No.	Property Group (Kecamatan)	Sample (n)	Central Tendency			Comparison	
			Median	Mean	Weighted Mean	Mean/ Median	Mean/ Weighted Mean
1	North Bogor	212	0.833	0.808	0.792	0.969	1.019
2	East Bogor	70	0.873	0.815	0.842	0.934	0.968
3	South Bogor	171	0.779	0.794	0.774	1.018	1.024
4	West Bogor	150	0.839	0.833	0.851	0.994	0.979
5	Central Bogor	41	0.944	0.886	0.776	0.938	1.143
6	Tanah Sereal	164	0.898	0.821	0.890	0.914	0.922
	Bogor City	808	0.848	0.817	0.812	0.963	1.006

Source:
Compiled and calculated by the authors from data obtained from Bogor Tax Service Office, Bogor Government, Land Service Office and PPAT's (July 2013)

Variability

Five property groups (kecamatan) have COD above 15 percent, and only West Bogor has COD below 15 percent, i.e. 14.6 percent. All groups have COV above 20 percent. This means all areas need reappraisal. Reappraisal needs to be done based on COD rank, started with South Bogor (20.67), East Bogor (18.26), Tanah Sereal (18.17), North Bogor (17.62), Central Bogor (17.62) and West Bogor (14.68). If the property tax managers have limited time, human resources, and funds, then COD or COV can be used to formulate reappraisal priorities. The results of variability are shown in Table 4.

Table 4
Measures of Variability of Assessment Ratios for each Property Group in the Bogor City, Year 2012

No.	Property Group (Kecamatan)	Coefficient of Dispersion / COD (%)	Coefficient of Variation / COV (%)
1	North Bogor	17.62	22.18
2	East Bogor	18.26	23.81
3	South Bogor	20.67	25.22
4	West Bogor	14.68	21.17
5	Central Bogor	17.62	25.03
6	Tanah Sereal	18.17	27.11
	Bogor city	18.10	24.08

Source:
Compiled and calculated by the authors from data obtained from Bogor Tax Service Office, Bogor Government, Land Service Office and PPAT's (May 2013)

Testing the Level of Assessment

Four property groups (kecamatan) have assessment ratio exceeding 100 transactions, so the Kruskal-Wallis test was used in test of normal distribution. Two other groups have assessment ratios below 100 transactions, so the normality of distribution was tested using the binomial test.

Two of the six property groups have normally distributed data, so they were tested by a parametric test (t-test), while the other four groups have the abnormally distributed data, so they need to be tested with a non-parametric test (z-test). The results of normality tests are illustrated in Table 5.

Table 5
The Normality of Assessment Ratios for Each Property Group in the Bogor City, Year 2012

No.	Property Group (Kecamatan)	Sample (n)	Chi-Square test [1)] χ^2 value	Binomial test z-value	Distribution Normal / Not Normal
1	North Bogor	212	179. 993*	-	Not normal
2	East Bogor	70	-	1.554	**Normal**
3	South Bogor	171	32.333*	-	Not normal
4	West Bogor	150	47.611*	-	Not normal
5	Central Bogor	41	-	0	**Normal**
6	Tanah Sereal	164	80.807*	-	Not normal
	Bogor city	808	161.308*	-	Not normal

Source:
Compiled and calculated by the authors from data obtained from Bogor Tax Service Office, Bogor Government, Land Service Office and PPAT's (July 2013)
Notes:

The binomial test is appropriate when the number of ratios is less than 100.
χ^2 test is preferred when there are 100 or more ratios. Asteriks denote significant at * 0.001.
[1)] Confidence level for two-tailed test and 7 degrees of freedom.

Testing the level of assessment on home sales transaction in six property groups (kecamatan) proved that assessment mean or assessment median is not the same as 100 percent of the market value. That is, the level of assessment in the entire city of Bogor needs to be adjusted through assessment adjustment, reassessment or reappraisal, so that the level of assessment is close to 100 percent of the market value. When adjustment, reassessment or reappraisal is done, then the potential tax or realization may be increased. The result of the assessment level test is shown in Table 6.

Table 6
Testing the Level of Assessment (100 Percent of the Market Value)
for each Property Group in the Bogor City, Year 2012

No.	Property Group (Kecamatan)	Sample (n)	Binomial test (median = 1)		t-test [1)] (Mean = 1)	
			z-value	Accept / Reject	t-value	Accept / Reject
1	North Bogor	212	12.294	Reject		
2	East Bogor	70	7.052	Reject	-7.954 **	Reject
3	South Bogor	171	10.706	Reject		
4	West Bogor	150	10.696	Reject		
5	Central Bogor	41	4.685	Reject	-3.283 *	Reject
6	Tanah Sereal	164	10.385	Reject		
	Bogor City	808	23.746	Reject		

Source:
Compiled and calculated by the authors from data obtained from Bogor Tax Service Office, Bogor Government, Land Service Office and PPAT's (July 2013)
Notes:
[1)] Two tailed test. Asteriks denote significant at *0.01 and ** 0.001.
East Bogor and Central Bogor have normally distributed data, so we used both the parametric test (t-test) and non-parametric test (binomial test).

Testing for Progressivity/Regressivity

As the standards set out in the ratio study, if Price Related Differential (PRD) is above 1.10 it tends to indicate assessments regressivity, whereas PRD that is below 0.95 tends to indicate assessment progressivity. Tanah Sereal has PRD of 0.922, and based on the standards, it tends to indicate assessment progressivity. After testing the hypothesis, it turns out that assessment in Tanah Sereal is progressive (t-calculated 3.404). Otherwise, PRD in Central Bogor is 1.143 as shown in Table 3, and based on the standards, it tends to indicate assessment regressivity. After testing the hypothesis, it turns out that assessment in Central Bogor is independent (t-calculated –1.545), and it is neither progressive nor regressive. The results of testing for vertical inequity are illustrated in Table 7.

Table 7
Testing for Progressivity and Regressivity for Each Property Group in the Bogor City, Year 2012

No	Property Group (Kecamatan)	Sample (n)	Spearman Rank Test [1)]		Regression Analysis [1)]	
			t-value	Progressivity/ Regressivity/ Independent	t-value	Progressivity/ Regressivity/ Independent
1	North Bogor	212	-5.414**	Regressive		
2	East Bogor	70	-0.462	Independent	1.004	Independent
3	South Bogor	171	-5.209**	Regressive		
4	West Bogor	150	-0.566	Independent		
5	Central Bogor	41	0.853	Independent	-1.545	Independent
6	Tanah Sereal	164	3.404**	Progressive		
	Bogor City	808	-3.644**	Regressive		

Source:
Compiled and calculated by the authors from data obtained from Bogor Tax Service Office, Bogor Government, Land Service Office and PPAT's (July 2013)
Notes:
[1)] Two tailed test. Asteriks denote significant at **0.001 and *0.01.
East Bogor and Central Bogor have normally distributed data, so we used both the parametric test (t-test) and non-parametric test (binomial test).

Based on vertical inequity test for six property groups (kecamatan) in Bogor, it is proven that three of them—East Bogor, Central Bogor, and West Bogor—are independent (neutral). Assessment ratio in two groups, North Bogor and South Bogor, are regressive, while Tanah Sereal is the only one that is progressive. Furthermore, the three property groups having progressive or regressive assessments need reassessment or adjustment for vertical inequity, with the priority based on the t-value, i.e. North Bogor (-5.415), South Bogor (-5.209) and Tanah Sereal (3.404).

Corrective Actions

Bogor City Government regards IAAO's ratio study standard as a reference of the assessment performance measures. Property tax in the Bogor City has already been set up using 100 classes of land and 40 classes of building, hence the COD standard is 20%. Appraisers have already used mass appraisal technique, hence the standard of minimum median is 85%.

In South Bogor, most of the properties should be reappraised and adjusted for vertical inequity, because COD is more than 20%, median is under 85%, and regressivity exists. In North Bogor, both reassessment and adjusting for vertical inequity should be done, because median is under 85% and regressivity exists. Whereas, properties in West Bogor need to be reassessed only, to increase median to be more than 85%. Furthermore, assessments in Tanah Sereal would not be progressive, if adjusting for vertical inequity has been done.

Table 8
Corrective Actions for each Property Group in Bogor City
(based on Median, COD, Level of Assessments and Vertical Inequity)

No.	Property Group (Kecamatan)	Median	COD	Binomial test (median = 1) Accept / Reject	Spearman Rank Test Progr/Regr/ Independent	Corrective Actions	
						Reassessment/ Reappraisal	Adjusting vertical Inequity
1	North Bogor	0.833	17.62	Reject	Regressive	Reassessment	Adjusting
2	East Bogor	0.873	18.26	Reject	Independent	-	-
3	South Bogor	0.779	20.67	Reject	Regressive	Reappraisal	Adjusting
4	West Bogor	0.839	14.68	Reject	Independent	Reassessment	-
5	Central Bogor	0.944	17.62	Reject	Independent	-	-
6	Tanah Sereal	0.898	18.17	Reject	Progressive	-	Adjusting
	Bogor City	0.848	18.10	Reject	Regressive		

Source : Elaborated by authors (December 2013)
Note : Adjusting = Adjusting for vertical inequity

Based on the data presented on the Table 8 above, there are some follow-up steps in order to improvement or correction for assessment performance in the short term as follows:

1. Reappraisal; through data collection activities in the area of the property that has variability beyond the specified tolerance. IAAO (2013) recommends reassessment activities (or in other word is reappraisal) in the region that has exceeded the 15% of COD and / or COV exceeds 20%. Regarding that Indonesia uses mass appraisal and NJOP classification of land in 100 classess and buildings in 40 classes, the limits of acceptable variability was 20% for COD and / or 25% for COV. Reappraisal, at once, can fix the central tendencies; mean and / or median.
2. Reassessment; appraisal activities that do not have to perform data collection as reappraisal, but it is enough through verification on a number of specific properties or certain areas based on the needs. This activity aims to improve / increase assessment in mass, and at the same time it also increases central tendency of ASR; mean and median, so that taxes can be levied as optimum as possible. Optimum mean and median were around 85%-100%. If it is less than 85%, it can be concluded that the tax potency will be lost; otherwise if it is equal to or exceeds 100%, it is believed to increase the number of taxpayers who will submit an objection.
3. Adjusting for inequity; the adjustment activity to the inequity of assessment performance in the short term, in order to be fair and does not lead to performance become regressive or progressive.

Conclusion and Recommendation

1. Along with the political and administrative decentralization in Indonesia, the fiscal decentralization is followed by the establishment of Regency Taxes and Levies law, and the decentralization of two central taxes to local taxes; transfer tax and property tax. The transfer tax started to be decentralized to all of regencies/cities in 2011, while property tax started to be decentralized and conducted in stages from 2011 to 2014. Bogor city government began to manage and implement property tax in the beginning of 2013.

2. Assessment Performance of the Bogor City in 2011− 2012
    a. The database consists of 3,086 property transactions in the Bogor city from

January to December 2011. After sales that are not appear to be in Arm's length transactions (such as sales between family members, estate sales and foreclosures) and sales of commercial properties were removed, the database contained 588 home sales. The 2012 database started with 1,718 property transactions from January to December 2012. After being removed, using the same procedure as the 2011 database, the 2012 database contained 808 home sales.

b. All measures of central tendency have decreased in 2012 compared to the 2011 performance assessment, and below 100 percent of the market value. It seems that the property tax potential has already decreased and needs reassessment to increase the central tendency.
c. The comparisons of central tendencies did not exceed between 0.95 and 1.10 in 2011 and 2012. Thus, both of the databases did not indicate over / under assessment or progressivity / regressivity existence.
d. The variability of the database increases in 2012 compared to the 2011 variability. In 2012, COD and COV are 18.10 percent and 24.08 percent respectively, so according to the IAAO standard, systematic variations are suggested to exist. The 2012 assessed value should be corrected through reappraisal in order to decrease variability, which is not more than 15 percent for COD and 20 percent for COV.
e. The level of assessment of the 2012 database decreased, since all measures of central tendency (mean, median and weighted mean) have decreased approximately from 8 percent to 12 percent compared to the 2011 database. Hypothesis testing for the level of assessments showed that the z-values are 17,114 (2011) and 23.746 (2012); thus, we reject the hypothesis stating that median assessments are 100 percent of the market value
f. The evidence suggests that the regressive vertical inequity presents not only in the 2011 data, but also in the 2012 data, since the t-values were -1.9874 and -3.6444 respectively. The assessed value in the next year should be adjusted, by reassessment and review on the land value zone and / or the building cost table or reappraisal.

3. Assessment Performance among Groups within the Bogor City in 2012
   a. All of the property groups have central tendencies between .77 and .95, and no group has central tendency above 1.00, as shown in Table 3. It means that no group has a property assessment level above 100 percent of the market value. All of the groups have no good evidence of over-assessments, because their ratios of the mean to the median are not more than 1.10. Three groups, East Bogor, Central Bogor and Tanah Sereal, have good evidence of underassessment, since their ratios of the mean to the median are less than 0.95. Relating to vertical inequity, four groups have no good indication that progressivity or regressivity exists, since their ratios of the mean to the weighted mean or price related differential (PRD) are neither more than 1.10 nor less than .95. Furthermore, progressivity exists in Tanah Sereal with the comparison of less than .95. Otherwise, regressivity exists in Central Bogor with the comparison of more than 1.10.
   b. Five property groups have COD above 15 percent, and only West Bogor has COD of 14.6 percent. All groups have COV above 20 percent. This means all areas need reappraisal. Reappraisal needs to be done based on COD rank, started with South Bogor (20.6), East Bogor (18.3), Tanah Sereal (18.2), North Bogor (17.6), and Central Bogor (17.6).
   c. Tests on the level of assessment in six groups show that no assessment medians are equal to 100 percent of the market value. It means that the level of assessment in the whole of the Bogor city needs adjustment, reassessment or reappraisal, in order to increase not only the level of assessment to close to 100 percent but also the tax potency in the city.
   d. Based on testing for vertical inequity, it was found out that three of the six groups, namely East Bogor, Central Bogor, and West Bogor, have independent (neutral) assessments. Assessment in the other two groups, North Bogor and South Bogor, are regressive, whereas assessment in Tanah Sereal results in progressive assessment.

It means that three groups who have progressive or regressive assessment need reassessment or readjustment for vertical inequity, with priority scale based on the t-value that is North Bogor (-5.415), South Bogor (-5.209) and Tanah Sereal (-3.404).

4. Updating the data and the property value is necessary not only to improve the total assessment and property tax revenues, but also to maintain the level of assessment performance and fairness for all taxpayers and stakeholders. Activities to correct and improve assessment performance need to be done in order to create such fair and equitable assessment, through adjustment, reassessment, or reappraisal in the short term, and review on the Land Value Zone or the Building Cost Table in the medium term. Due to limitations of time, human resources, and funds, corrective action options need to be selected based on the priority scale of assessment level, variability level, and progressivity / regressivity level.

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