

# Monetary Policy and the Housing Market in Indonesia: Evidence from Selected Regions

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## Monetary Policy and the Housing Market in Indonesia: Evidence from Selected Regions

**Abstract**

The housing market in Indonesia tends to have different characteristics in each region. Facing the credit risk in the housing market, the government has carried out macro-prudential policy concerning mortgage loan for housing and apartment through Loan to Value (LTV) policy. The aimed of this study analyze the effect of LTV policy and regional economic indicator on the house prices in Indonesia, compare the impact of LTV policy and indicator on the types of houses and regions. We used secondary data from eight regions which derived from residential property survey and statistics Indonesia at a monthly frequency. In processing estimated data using Generalized Least Square (GLS) Fixed Effect Model (FEM) to ascertain the effect of LTV policy in each region. The result showed most attributes had a significant effect on housing prices. However, LTV had no significant effect on every type of housing (small, medium, and large). The LTV policy spatial in accordance with housing market condition in each region.

**Keywords:** Houses Prices; Loan to Value; Macro-prudential Policy

**JEL Classification:** E52, O18, R31

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**Abstrak**

Pasar perumahan di Indonesia cenderung memiliki karakteristik yang berbeda di setiap daerah. Menghadapi risiko kredit di pasar perumahan, pemerintah telah melakukan kebijakan makroprudensial mengenai pinjaman hipotek untuk perumahan dan apartemen melalui kebijakan Loan to Value (LTV). Tujuan penelitian ini menganalisis pengaruh kebijakan LTV dan indikator ekonomi regional terhadap harga rumah di Indonesia, membandingkan dampak dari kebijakan LTV dan indikator ekonomi pada tipe-tipe rumah di setiap daerah. Kami menggunakan data sekunder dari delapan wilayah yang berasal dari survei harga properti residensial dan Badan Pusat Statistik Indonesia dengan frekuensi bulanan. Dalam mengolah data estimasi menggunakan Generalized Least Square (GLS) Fixed Effect Model (FEM) untuk memastikan pengaruh kebijakan LTV di masing-masing daerah. Hasilnya menunjukkan sebagian besar atribut memiliki pengaruh yang signifikan terhadap harga rumah. Namun, LTV tidak berpengaruh signifikan terhadap setiap jenis perumahan (kecil, menengah, dan besar). Kebijakan LTV secara spasial akan sesuai dengan kondisi pasar perumahan di masing-masing wilayah.

**Kata Kunci:** Harga Perumahan; Loan to Value; Kebijakan Makroprudensial

House is a basic need of every person as a shelter/place to live. The selection of a house as a place to live is influenced by many factors. Environmental factor becomes one of the factors that affect individual or household decision to purchase a house (Ioannides & Zabel, 2003). Besides that, the demand of housing is also affected by income, socio-economic factors, credit facility, and house specifications (Fontenla & Gonzalez, 2009).

O'Sullivan (2012) classified housing into three categories with different features from other products, such as housing is heterogeneous, housing is durable and will be depreciated based on the owner, and need more expense while moving. Housing is type of property between land and buildings. Therefore, the best policy varies depending on market conditions, whether the market is metropolitan areas or within metropolitan areas.

This study focuses on the housing market conditions and regional characteristic on the instruments of monetary policy that have been carried out by Indonesia government. The housing market in Indonesia tends to have different characteristics in several regions. From the price growth based on the housing price index of each type of house (Bank Indonesia, 2016), after 2011, in aggregate, housing price index for small housing category grows faster

compared to the previous year and with other types of housing. However, if we look into 16 regions (Bandung, Bandar Lampung, Banjarmasin, Denpasar, Palembang, Semarang, Yogyakarta, Padang, Medan, Makassar, Manado, Surabaya, Pontianak, Batam, Balikpapan, and Jabodetabek-Banten) the growth of price index is varying between types of houses and between regions. The rapid growth of the price index of small housing type is observed in the housing markets in Jabodetabek-Banten, while in other regions, the highest growing price index is observed in medium housing type.

Facing the credit risk in the housing market, the government has carried out macroprudential policy concerning mortgage loan for housing and apartment through Loan to Value (LTV) policy. This policy is implemented in 2012 and has been improved in the following years. This policy is implemented in all regions of Indonesia. Meanwhile, the characteristics of the housing market are diverse from region to region. Therefore, spatial or cluster approach is needed in order to make a policy that meets the condition in each region.

In 2016, Bank Indonesia have 3<sup>rd</sup> improvement the regulation on LTV ratio. The action is carried out to encourage the banking industry to perform

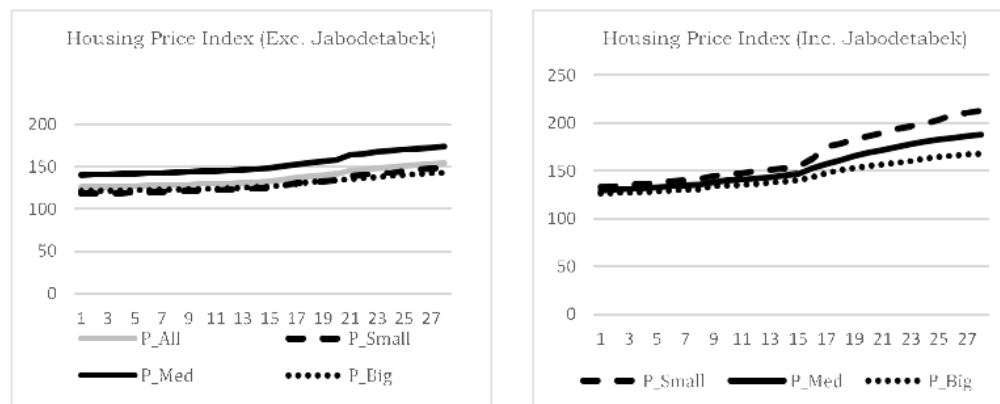


Figure 1. Comparison of Growth between Residential Property Price Index

Source: Bank Indonesia

its intermediation function while taking into account the principle of prudence and consumer protection. The improvement<sup>3</sup> conducted by issuing new provision, PBI Numb. 18/16/PBI/2016 concerning Loan to Value Ratio for Property Credit, Financing to Value Ratio for Property Financing, and Down Payment for Motorized Vehicles Credit or Financing (PBI LTV/FTV), which takes effect from August 29<sup>th</sup>, 2016. As a high-cost need for a household, majority housing purchases are made by credit. The result of a survey conducted by Bank Indonesia (2016) shows that housing purchase through mortgage loan for housing is 77.82 percent. People dependence on banks leads to a high number of financing through mortgage loan for housing and apartment, which reaches 1,407.99 billion rupiahs (in 2016). We have to pay attention that property market, in general, has three main cycles; Boom Market, Recession, and Recovery<sup>1</sup>.

Rahal (2016) uses VAR method from quarterly and monthly data of housing market assets from eight OECD countries (Canada, Euro area, Japan, Norway, Sweden, Swiss, English, and the USA). The result of the study provides evidence that unconventional monetary policy shock does not only affect the price of the house but also the supply and housing credit in the eight countries/regionals studied.

In line with the result, Xiao (2013) states that pricing of housing experiences unpredicted changes and is usually caused by the growth in economic structure. Determining monetary policy needs to be done optimally to avoid useless value. If there is a large credit, it will greatly respond to the price of a house.

Jacome & Mitra (2015) use a cross country panel setting and time series data for one-by-one country analysis in Brazilian, Hong Kong, Malaysian, Polish, and Romanian housing market. They found LTV might not effective<sup>2</sup> to restrain the growth of house price, but it is effective in reducing loan-growth and improving debt-services performance of borrowers.

In line with Jacome & Mitra, Pirgaip & Hepsen (2018) stated that LTV plays an important role in

financial system stability that affect credit growth and property prices. Their analysis in Turkey during January 2005 to December 2016 using Ordinary Least Square (OLS) regression analysis found LTV may not be as effective in restraining price acceleration in the property market as expected, especially in times housing when demand is strong.

Muellbauer (2007) analyses multi-countries data, he argues that credit liberalization contributes to the size of one's wealth due to housing price appreciation. In countries with efficient credit<sup>6</sup> market, the increase in housing price has high and positive effect on consumer spending as the value of the increase in collateral.

LTV policy is effective to avoid housing boom, when the ratio of LTV policy is tightened, the number of mortgage loan and housing price growths will slow<sup>5</sup> down, and vice versa (Krznar & Morsink, 2014). LTV as an indicator of mortgage demand, the variations in the LTV-ratio represent the demand side contribution to mortgage market variability<sup>5</sup> (Sorgersen, 2017). It serves a function between monetary policy and macro-prudential policy as supplementary or complementary measures for ensuring financial stability (IMF, 2013).

Ioannides & Zabel (2003) show that contractionary monetary policy shock has direct influence on the number of new houses which is followed by a significant<sup>23</sup> decrease in housing construction. Besides that, contractionary monetary policy significantly increases material costs and house prices in a short time.

It was worth to emphasize, that some researcher argued that LTV policy has been ineffective as macroprudential tool in housing markets. On other hand, LTV has impact only in short-term cases (Allen & Carletti, 2013).

The financial crisis in US during 2008, showed that housing market is important for economic stabilization and policymakers should be careful in control housing market's policy. This study also aims to monetary transmission policy especially Loan-to-



Value ratio policy on direct and indirect housing market.

The motive for buying a house is not only as a consumer item, but also as an investment (Arrondel, Badenes, & Spradaro, 2010). The pattern of dualism in the motive for purchasing housing by the community has encouraged the government to regulate the housing market through the monetary channel. Policies that are carried out not only the interest rates applied, but also the required down payment regulated on LTV ratio. In addition, the property characteristics, which is sensitive to credit, one of the reasons for the government to carry out market control through the mechanism of LTV.

The geographical condition of Indonesia that consists of various islands and provinces cause differences in characteristic between one region and the other. Java has the highest concentration of property development compared to other regions. This condition is the rationale for conducting alternative policy scenarios with the aim of maintaining economic stability through monetary policy. Property is a combination of land and building, therefore property has a unique characteristic, such as immoveable.

## METHODS

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The dataset has information on the physical attributes of the monetary policy transmission, housing price, socioeconomic characteristics, and the financial conditions of the mortgage rate. Besides house price series, the data set for each region also include LTV ratio, GDP, mortgage rate, and population. This research used monthly data during 2012-2016 after LTV policy has been established in March 2012. We obtained information from the central bank in Indonesia called Bank Indonesia, Statistics Indonesia, and Financial Services Authority. Central Bank in Indonesia provides the price index of residential property in several regions in Indonesia.

This data includes 8 regions in Indonesia; Surabaya, Semarang, Bandar Lampung, Palembang,

Makassar, Bandung, Balikpapan, and Padang. Most of the metropolitan cities have a complicated local government to take care of, including spatial and territorial planning. Compared to the more specific "standard housing market", there is data limitation in Indonesia in which each region has a unique and different characteristic. Therefore, 8 regions are selected as research object because these cities have complete data needed in the analysis.

The difference in the time range of regional data is the consequence of house price data which is available the form an index and computed differently from one region to the other. Therefore, special explanation on housing price series for each region is needed due to methodology problem.

The empirical analysis was conducted by means of GLS fixed effects cross-region sample in Indonesia. We focus on the independent variable, which is the LTV ratio for each level; small housing, medium housing, and large housing in both cases for every region. We also conducted an estimate based on the factors that affect the housing market from previous literature, such as mortgage rate, gross regional domestic product growth, and population growth. Thus, we use three models in this research: (1) estimation for small housing; (2) estimation for medium housing; and (3) estimation for large housing.

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In order to reach the equilibrium of housing prices, the selection of the source of data is conducted under the consideration of the possibility of negative shocks on housing price. The house prices depend on housing market condition. The society consideration as consumer and housing supply from developer, should be counterbalanced with governmental policy, for example the number of downpayments that have to be paid and tiering set by the government through LTV ratio.

In order to find the difference in housing price between the regions, we use residential property index from Bank Indonesia survey. The data are obtained from several sources, we perform data

interpolation because the data is available on monthly basis. Residential property price index is a data published quarterly, while GDP, in several regions, is published quarterly or annually, and the population is published annually and is an administrative projection number.

After collected the required data, we processed it, including we combine and we choose the model. In the data processing, first we see descriptive statistics of the data. After that, we need to know the correlation between variable. After processed the data in panel regression, we dropped simple OLS regression from the process and employs Generalized Least Square (GLS) Fixed Effect estimations for the three models. The GLS method is an OLS method that is applied to the

transformed model that satisfies the classical assumptions (Gujarati & Porter, 2009). Based on the data estimation we found there's heteroscedasticity and autocorrelation. Therefore, needs to be inserted directly into the estimate by transforming the variable. This is why, GLS estimation is BLUE, which does not exist in OLS estimate. Greene also argues that the use of OLS with autocorrelation problem will bring out a consistent result; however, this result is inefficient (Greene, 2003). The use of GLS causes the data to indicate a significant influence between the variables.

## RESULTS

The descriptive information has been provide in Table 1 with respect to housing prices in housing

**Table 1.** Descriptive Information

Small Housing					
	LNP	LNGRDP	MR	LTV	LNPOP
Mean	5.372509	18.33412	10.70344	91.44796	14.71586
Median	5.391785	18.38	10.745	100	14.23
Maximum	6.051666	19.93	10.96	100	18.56
Minimum	3.5332	17.06	10.31	70	13.3
Std. Dev.	0.295951	0.767805	0.240865	13.55875	1.516704
Sum	2374.649	8103.68	4730.92	40420	6504.41
Sum Sq. Dev.	38.62594	259.9801	25.58497	81073.3	1014.472
Medium Housing					
	LNP	LNGRDP	MR	LTV	LNPOP
Mean	5.292077	18.33007	10.71069	77.33403	14.71629
Median	5.259706	18.38	10.78	77	14.23
Maximum	5.766361	19.92	10.96	88.33	18.56
Minimum	3.523808	17.06	10.31	70	13.3
Std. Dev.	0.276282	0.767344	0.237013	5.710862	1.51632
Sum	2296.761	7955.25	4648.44	33562.97	6386.87
Sum Sq. Dev.	33.05165	254.9575	24.32379	14121.84	995.5653
Large Housing					
	LNP	LNGRDP	MR	LTV	LNPOP
Mean	5.167195	18.33412	10.70344	67.19457	14.71586
Median	5.2	18.38	10.745	70	14.23
Maximum	5.65	19.93	10.96	80	18.56
Minimum	3.52	17.06	10.31	60	13.3
Std. Dev.	0.234162	0.767805	0.240865	6.19437	1.516704
Sum	2283.9	8103.68	4730.92	29700	6504.41
Sum Sq. Dev.	24.18092	259.9801	25.58497	16921.27	1014.472

Sources: Descriptive Statistics (processed)

markets and regulation in Loan to Value policy change terms throughout the sample period of 2012:03-2016:12. During that time, LTV ratio was tightened or lighted improvement 3<sup>rd</sup> times by the government. On the other hand, positive data prove that property prices have also been rising over the years.

The correlation coefficient used to explain the relationship between the variables. Two variables correlate if in one variable change will be followed by the other variables regularly in the same direction (positive correlation) or opposite (negative correlation). Then, Table 2 the correlation in this data showed.

In conducting panel regression analysis using GLS Fixed Effect with three estimates, consist of each type of housing with the different price of a house in each level. The result of this research is not surprising; all variables are statistically significant for house prices, except Loan to Value ratio indicating persistence housing prices. The result of panel data regression shows that economic growth reflected in GRDP rate, mortgage rate, and population growth are significantly affecting housing price in all studied areas (eight regions). However, the LTV ratio does not have a significant effect on all types of housing; small housing, medium housing, and large housing.

Table 2. Correlation Table

Small Housing								
	SBY	SMG	BL	PLG	MKS	BDG	BLP	PDG
SBY	1.000000	-0.648814	-0.505148	-0.653141	0.664464	-0.89027	0.009239	0.419875
SMG	-0.648814	1.000000	0.029827	0.067342	-0.079526	0.483636	0.067754	-0.566948
BL	-0.505148	0.029827	1.000000	0.705514	-0.898377	0.514763	-0.21638	0.508888
PLG	-0.653141	0.067342	0.705514	1.000000	-0.747589	0.655046	-0.049491	0.124033
MKS	0.664464	-0.079526	-0.898377	-0.747589	1.000000	-0.701243	0.201936	-0.247008
BDG	-0.89027	0.483636	0.514763	0.655046	-0.701243	1.000000	-0.050504	-0.427991
BLP	0.009239	0.067754	-0.21638	-0.049491	0.201936	-0.050504	1.000000	-0.165303
PDG	0.419875	-0.566948	0.508888	0.124033	-0.247008	-0.427991	-0.165303	1.000000
Medium Housing								
	SBY	SMG	BL	PLG	MKS	BDG	BLP	PDG
SBY	1.000000	-0.715188	-0.850056	-0.425234	0.862792	-0.564273	0.017879	0.139970
SMG	-0.715188	1.000000	0.901657	0.775696	-0.846176	0.109773	-0.239397	0.449846
BL	-0.850056	0.901657	1.000000	0.639148	-0.906478	0.336321	-0.210739	0.284203
PLG	-0.425234	0.775696	0.639148	1.000000	-0.589333	-0.281793	-0.223065	0.649448
MKS	0.862792	-0.846176	-0.906478	-0.589333	1.000000	-0.354996	0.192068	-0.098528
BDG	-0.564273	0.109773	0.336321	-0.281793	-0.354996	1.000000	0.148346	-0.458852
BLP	0.017879	-0.239397	-0.210739	-0.223065	0.192068	0.148346	1.000000	-0.209791
PDG	0.139970	0.449846	0.284203	0.649448	-0.098528	-0.458852	-0.209791	1.000000
Large Housing								
	SBY	SMG	BL	PLG	MKS	BDG	BLP	PDG
SBY	1.000000	0.210890	-0.391609	0.380041	0.887236	-0.836639	0.031721	-0.715739
SMG	0.210890	1.000000	0.610951	0.117404	-0.07098	-0.011378	-0.146818	0.131823
BL	-0.391609	0.610951	1.000000	-0.264447	-0.573242	0.428450	-0.258627	0.477696
PLG	0.380041	0.117404	-0.264447	1.000000	0.322915	-0.38937	-0.013389	0.174080
MKS	0.887236	-0.07098	-0.573242	0.322915	1.000000	-0.807518	0.133440	-0.773263
BDG	-0.836639	-0.011378	0.428450	-0.38937	-0.807518	1.000000	-0.017446	0.662323
BLP	0.031721	-0.146818	-0.258627	-0.013389	0.133440	-0.017446	1.000000	-0.093505
PDG	-0.715739	0.131823	0.477696	0.174080	-0.773263	0.662323	-0.093505	1.000000

Notes: SBY: Surabaya; SMG: Semarang; BL: Bandar Lampung; PLG: Palembang; MKS: Makassar; BDG: Bandung; BLP: Balikpapan; PDG: Padang (Source: Residual Correlation Matrix Table)



Table 3 shows the result of panel data regression using GLS FEM. Mortgage rate and Gross Regional Domestic Product (GRDP) as the variables used in this study show similar results on each housing type. The results show that these variables are statistically significant on 5% level with a positive direction. The demographic factors proved significant in every type of housing. However, the number of populations has opposite implication for the increasing housing price. This might be caused by the available data only shows the administrative number of the populations, while house ownership is not limited to the people are native to the area. The “free” characteristic of housing market shows that house a house is not just a place to live and enough to have one house for one family, but a house is also an investment.

In an analysis was conducted on March 2012 to December 2016, the variability of independent variables explains the variability that observed in

the dependent variable. There are several data variables that are the same between variables, such as LTV ratio and mortgage rates. The result showed on small housing type, the independent variables explain 94.26 percent of the variability in the dependent variable, while on medium housing type, the 98.33 percent variability is explained, and on large housing type, 97.98 percent of the variability is explained. Every region has been unique, besides that the region that we choose in this study has their various economic indicators that makes a good result to explain. It could be driven from GRDP, mortgage rate, and population has been significant. People’s purchasing power can be seen from GRDP, the higher GRDP, the ability of people’s purchasing power will increase. Thus, this result can be explained housing price in the housing market for each type, especially in explaining the condition of the housing market in each studied region.

**Table 3.** Result of Estimation using GLS Fixed Effect Model

Variable	Small Housing		Medium Housing		Large Housing	
	Coefficient	Probability	Coefficient	Probability	Coefficient	Probability
C	-15.64706	0.0000	-1.857427	0.0000	-0.320509	0.2928
LNGRDP?	0.568581	0.0000	0.692503	0.0000	0.555909	0.0000
MR?	0.030358	0.0086	0.043786	0.0000	0.014904	0.0414
LTVB?	4.02E-05	0.9013	-0.000378	0.3572	-0.000122	0.6717
LNPOP?	0.697651	0.0000	-0.406615	0.0000	-0.329965	0.0000
Weighted Statistics						
R-squared	0.944056		0.983678		0.980276	
Adjusted R-squared	0.942625		0.983252		0.979771	

Source: Panel regression analysis (processed)

**Table 4.** The Coefficient of Estimation Result using GLS Fixed Effect Model (selected region)

Variable	Small Housing	Medium Housing	Large Housing
Fixed Effects (Cross)			
_SURABAYA--C	-0.720165	-0.618201	-0.367465
_SEMARANG--C	-2.821743	1.220872	0.933850
_BANDAR LAMPUNG--C	1.127378	0.192017	0.258623
_PALEMBANG--C	0.443573	-0.091347	-0.059318
_MAKASSAR--C	0.764794	0.011036	-0.136723
_BANDUNG--C	-0.382782	-0.211861	-0.192821
_BALIKPAPAN--C	0.408449	-1.013698	-0.807653
_PADANG--C	1.335425	0.11993	0.065155

Source: Panel Regression Analysis (processed)



In general, this estimation shows that the development of housing price in each region take place at the different <sup>36</sup>te. As the result (see Table 4), statistically, the growth of small housing price in Semarang is higher than in Balikpapan, and contrary, large and medium housing has higher price growth in Balikpapan compared to Semarang. In each region, we can see that the characteristic or housing type demanded and developed by the housing market in that specific region will be different from the other region.

## DISCUSSION

In the Section 1 we argue that housing price is affected by various factors that can lead to housing bubble. Housing bubble is a part of housing price that can be explained by factors other than macro-economic factor. The omission of some potentially significant factor of housing prices could lead to a bubble being identified even in a situation where prices could easily be explained by this factor (Hlaváček, 2011).

Basically, LTV is a monetary transmission that affects housing price and inflation rate (Walentino & Sellin, 2010). House price boom usually happen in the countries with high LTV ratio, thus when LTV ratio decrease, housing price will increase slowly (Blanchard et al., 2010). Moreover, monet<sup>41</sup> policy is associated with short-term interest rate, long-term interest rate and housing market-price during housing crisis (Spencer & Huston, 2013).

This research shows that LTV is more appropriately to be implemented spatially. This is supported by the result of trial and error test for each region that shows if the implementation of LTV has various impacts in different region. This in line with Vandebussche, Vogel, & Detragiache (2012), who find that LTV does not have a significant effect on housing price, whereas it is expected that there is a high influence occurs in several region with different response. Moreover, the estimation shows that

LTV has not significant effect. This is caused by several factors such as it is easier to purchase house using credit facility. By using credit facility people can pay lower down payment in accordance with the applicable regulation on down payment. This condition is not only useful for the customer but also profitable for the developers. It will be easier for developer to sell the property they offer, as it will accelerate the sale of housing unit. Furthermore, the data used in the residential research is based on primary market data, while the price is determined by developer. As the developer act as the price maker and society act as buyer, thus the price tends to be fixed. Meanwhile, the housing type will be relatively similar. Liow, Ibrahim, & Huang, (2005) states that interest rate affect capital flow, capital supply and demand, as well as investor, thus it requires the return on investment to encourage interest or influence the real estate price through several methods.

In other hand, LTV policy has been ineffective as macro prudential tool in housing markets because the characteristic of property is unique. Might be this is the factor that affect Loan to Value as the policy doesn't significant in housing market. As well as before the implementation LTV policy in Turkey has better property prices than after the policy implemented (Pirgaip & Hensen, 2018).

Those factors are the main cause of the non-significant effect, even more negative significant effect. It will be different when the analysis is based on the secondary market, because the factors that affect price will be greater. This will lead to another question whether LTV will affect individual who live in a specific area. Therefore, LTV that initially set as national policy will have impact in each region. Based on sample from the 8 (eight) cities, the result proves that each region has different characteristics.

Housing market derived by demand and supply side. The society consideration as consumer and housing supply from developer, should be coun-

terbalanced with governmental policy, for example the number of down-payments that have to be paid and tiering set by the government through LTV ratio.

Taylor (2007) argues that nominal interest rate gives weak respond toward inflation price and housing price from 2002-2005, and contributes to the housing 'booming' failure cycle.

Various regions in Indonesia have the same interest rate in common. The regulation of credit interest rate is determined by Bank Indonesia while the other banks will adjust their rate according to the basic rate and their bank's inherent risk. Interest rate, basically can affect the property price rate, which in line with to Tem & Yelmas (2018) who states that interest rate is the main affects residential market. Monetary policy by increasing or decreasing interest rate will lower or increase the market price of property (Mishkin, 2007). Thus, most of the housing purchase is conducted through credit facility. By taking this consideration into account, the determination of housing credit interest rate is an important aspect for the property purchase decision making. Today, the motives that underlying housing purchase are the consumption and investment. The rising in housing price and low interest rate will increase the housing credit capacity and enable the community to purchase a house according to their income (Walterskirchen, 2006).

In the developing countries, generally the change in interest rate can explain a country capability in successfully develop their housing market. This shows that, in general, when there is a decrease in interest rate the mortgage fee will increase, thus reducing property price. Community's preference will lead to a few housing purchases due to low mortgage payment provided by lender or developer.

Moreover, housing price changes can be caused due to change in economics structure (Xiao, 2013). This supports the argument that LTV policy is not the only main factors that affect housing market. This in line with Negro & Otrok (2007), who

states that monetary policy, has a small impact on house price boom, when comparing the housing market among regions.

As the result (see Table 4) suggests that, based on the coefficient value, the rank from the smallest to the highest growth for the rate of property price index in small housing (influenced by the variation of research variable) is Semarang, Surabaya, Bandung, Balikpapan, Palembang, Makassar, Bandar Lampung, and Padang. This result is different for big housing type; the smallest price growth is Balikpapan, Surabaya, Bandung, Palembang, Makassar, Padang, Bandar Lampung, and Semarang. The result for big housing type is similar with the result for middle housing type: Balikpapan, Surabaya, Bandung, Makassar, Palembang, Padang, Bandar Lampung, and Semarang.

Figure 2 illustrates the total GRDP and total population for each region. The comparison of each region is clearly depicted in the figure; which region has the highest GRDP and population growth. Based on the illustration the highest GRDP is Surabaya, while the smallest is Padang. The amount of GRDP can be an indicator for the prosperity of a region. Surabaya as the capital city of East Java Province and the second largest metropolitan city in Indonesia has a high density. Furthermore, according to its geographical condition, this city is categorized as a relatively secure area from earthquake or other natural disasters. This city becomes a center for various activities such as economics, finance, and business in East Java and its surrounding. As one of trade center, Surabaya not only serves as a trade center for East Java region, but also facilitates other area in Central Java, Borneo, and East Indonesia region. Surabaya and its surrounding area is the region with fastest economic development in East Java and one of the most advanced in Indonesia. Moreover, Surabaya also one of the most important city that support Indonesia's economy. Most of its citizens work in service, industrial, and trading sector. However, as the result suggest, the housing price

growth in Surabaya is relatively small compared to other cities. This indicates that the land in Surabaya is shrinking, which reduce the apartments supply (offer) and demand. This research focused on landed housing and not apartment housing.

Semarang, almost similar with Surabaya, as the capital city of Central Java Province becomes one of the most populated cities in the province. The high population growth in this city creates a severe traffic jam. The growth center in Semarang has developed as community's activity center and population agglomeration has formed a new town. Public and social facility in this city is provided to support community daily activities and is supported by satellite city such as Semarang regency and Salatiga city. The small housing price growth in Semarang is the lowest compared to other cities in our observation. This is in contrast with the growth for medium and big housing price growth in this city that shows the highest growth than other cities. We assume that this condition occurs due to the high number of industries and companies located within this city, which make the housing developers or middle-upper community can afford to buy the lands in Semarang that getting more expensive.

The workers buy housing at high price but closer to their workplace.

Geographically, Bandar Lampung is the gateway to the Sumatra Island; this city located approximately 165 km northwest of DKI Jakarta, and has an important role in land and sea transportation lines for logistic distribution either from or to Java Island. This encourages the housing market price growth has experienced faster growth compared to other cities. Every region has their own characteristics and excellence, such us the condition of economy, environment, community, etc.

Compared to other cities, Balikpapan shows the smallest housing prices growth. Balikpapan is not a capital city (central governor city), unlike other cities in this research. Therefore, the position of a city as the capital of governmental become one of the factors in determining the development of housing market or in this research the velocity of property's price growth.

One of the characteristic housing is immobile, when people want to move or buy a house; they need to prepare a large amount, because it takes costly. It related of consumer substitution in the demand side (O'Sullivan, 2012). A policy affected

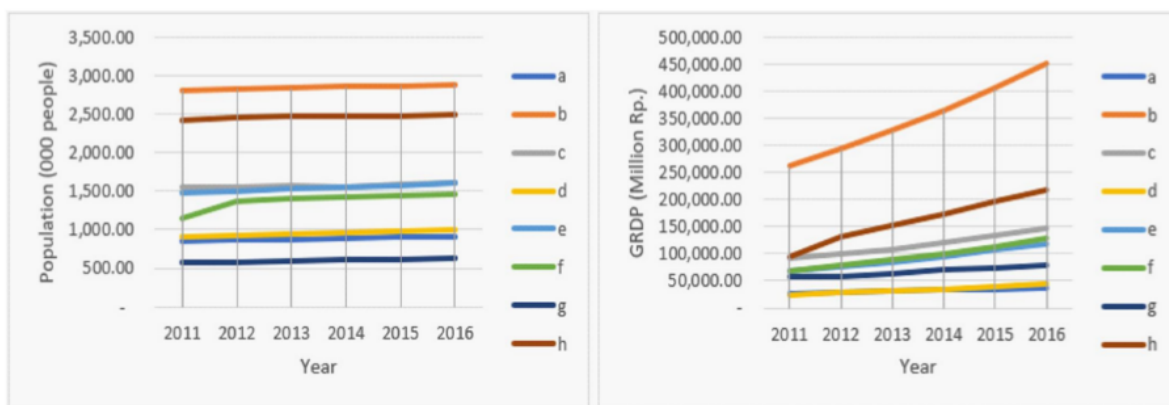


Figure 2. Total Population and Gross Regional Domestic Product

Sources: Statistics Indonesia (2010)



on affordability housing, cause of the quantity of new housing will change so if high-quality house increases all of prices levels changed. So that dualism in housing motives will be seen, whether house as a consumption or investment product. Yunus (1994) stated four housing dimension, they are location, housing, life cycle, and income dimension. Income dimension itself related with the amount of a person's income multiplied by the duration of their stay in a city. In line with Yunus, Arrondel, Badenes, & Spradaro (2010) stated besides the allocation people expenditures to buy as a house as consumer product, also as an investment asset.

Salins (1993) most commentators attribute the elevated prices to high demand for scarce land. A number of economists, however, point to another explanation. High prices may not be due to intrinsically valuable land but, instead, to housing regulations such as restrictions on density, height, and design; building fees; slow approval processes; restrictions on growth; and preservation laws. One way of measuring whether high prices are due to regulations or high demand for land is to look at how much increased lot size increases the value of a home. If land scarcity drives housing prices, doubling the lot size would increase the difference between construction costs and home value by 100 percent. But Glaeser & Gyourko (2002) found that consumers in most cities value homes on twenty-thousand-square-foot lots by only ten to twenty thousand dollars more than they do equivalent homes on ten-thousand-square-foot lots.

## CONCLUSION AND SUGGESTIONS

### Conclusion

In this paper we focused on analyzing the effect of LTV policy and regional economic indicator on the house prices in Indonesia in every type of houses each region. To the best of our knowledge,

this is one of the first applications of economic technique to analyze property price in each region, thus this research using regional data. Furthermore, the difficulties associated with the properties of the analytical methods applied and with the relatively short time series used, the results of the analysis should be interpreted with caution.

LTV ratio policy is one of the most common macro prudential tools, especially to control housing market (Claessens, 2014). Some researcher argued that LTV policy has been different effect depend on the region or economic condition (Ascarya, 2009; Suh, 2012; Vandenbussche, Vogel, & Detragiache, 2012; Allen & Carletti, 2013). Duffy (2012) states that LTV effectiveness as policy tool is not conclusive, considering that this policy is implemented along with monetary and fiscal policy. Utama (2012) mentions that the implementation of monetary policy transmission can be observed from the influence of changes in interest rates that affect the real GDP and inflation, including the monetary policy transmission to control housing market. In line with Cadil (2009) and Takatz (2012) demographics factor has a positive effect of population growth on property price.

### Suggestions

This study shows that LTV policy that government implements since March 2012 to control housing market in Indonesia should be done spatially based on the characteristic of each region. Regional government or policy makers have an authority to control the housing market such as by developing additional tool to effectively regulate LTV policy, due to Indonesia's characteristics as archipelago country and different condition in every region. So, LTV policy should be accordance with the characteristic property, which is unique in every region. We leave the possibility of LTV can be done in spatial policy in future research.



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