Conference Paper

Econometry Model of the Impact of Macroprudential Policy on Poverty in Indonesia

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Abstract

This study is about the econometric model of the influence of macroprudential policy through control of the Net Performance Loan and BPR Assets on Poverty in the balance of the goods market and money market involving the variable growth in Gross domestic product Regional Per capita, Regional Minimum Wages and Gini Ratio. Using the Regression model with panel data for 33 provinces from 2014-2016 in Indonesia. The results of the study reveal macroprudential policies through the control of Net Performance Loans will increase poverty, while macroprudential policies on BPR asset control will reduce poverty. The policy of increasing Regional Minimum Wages and regional economic growth will reduce poverty, but the increase in inequality in income distribution results in an increase in poverty

Keywords: Poverty, gini ratio, Provincial Minimum Wages, Asset of Rural Banks, Net Performing Loans, economic regional growth, macroprudential policy

1. Introduction

Poverty is a condition in which the inability to fulfill basic needs and policy solutions can alleviate poverty in various perspectives, especially how to increase the income of the poor and escape the poverty trap. various poverty alleviation policies carried out simultaneously from various approaches, both government approaches and sectoral and macro sectoral approaches. on the other hand, poverty reduction strategies and income distribution can also be done with a complex multi-policy approach as a solution to poverty.

Poverty reduction strategies through a multidimensional approach between the government sector, structural approaches, macro and structural approaches and other approaches to achieving economic growth targets, controlling inflation and strengthening the acquisition of international reserves. A quantitative framework is needed to

estimate the distributional influence of an economic growth on poverty alleviation as a trickle down effect, where economic growth followed by inequality in income distribution is certainly very influential on poverty reduction.

The link between income inequality and economic growth shows different results, the classic approach (Karldor, 1957 and Bourguignon, 1981) reveals that the tendency to save the rich is greater than the poor, implying that the higher the level of income inequality will result in higher aggregate savings, accumulation capital and economic growth. Poverty reduction is expected to occur when economic growth is getting higher. So that there is a link between income inequality (gini ratio) and economic growth and poverty, the gini coefficient has a range of 0 and 1, becoming the perfect equality when it has a value of 0 and 1 indicating perfect inequality.

Economic growth followed by even distribution of income is expected to alleviate poverty, and vice versa if income evenness is more unequal will be a problem for poverty. In addition, the role of banking institutions is needed as a financial institutional institution that can encourage sectoral investment activities, especially the informal sector which is expected to develop small and medium enterprises (SMEs) to grow to improve the welfare of the poor. The use of macroprudential policies as a safeguard of financial stability and reducing systemic risk through various policies relating to control of credit growth, so that credit control will affect the fluctuations in non-performing loans (NPLs). In addition, it is also directed towards the liquidity and capital side and its growth that has an effect on banking assets. Therefore, macroprudential policies through bank credit and asset control are expected to be able to strengthen poverty alleviation through the path of money target mechanisms and sectoral development through the development of the role of bank credit in various sectors.

The problem is how to formulate a macroprudential econometric policy model through supervision of troubled credit and control of BPR assets strengthened by regional minimum wages per province, per capita regional domestic products and gini ratio inequality towards efforts to reduce the number of poor people who guarantee a balance between markets goods with the money market and labor market. This study will form an econometric model of the influence of macroprudential policies through controlling non-performing loans (net Performance Loans) and Rural Bank Assets against poverty, and how the effects of Gross Regional Domestic Product percapita, regional minimum wages and gini ratio on poverty.

2. Macro-prudential Policy, Economic Growth and Poverty

Macroprudential policy debate at the theological level, the macroprudential policy framework is associated with financial stability (Financial Stability Board FSB). The IMF (the international monetary fund) defines macroprudential policy as a policy that carefully uses instruments to limit the widening of financial risk, and limits the shift in damage in the provision of financial services that can be a serious cause for the real economy. While the microprudential policy is different because it is aimed at specific financial institutional security. So both policies (micro and macroprudential) are very important to reduce systemic risk..

The important role of macroprudential policy is to reduce systemic risk and financial risk through control of credit development, and specifically for non-performing loans (Net Performance loans) which are used as a means to reduce uncertainty and minimize systemic risk. The decrease in uncertainty makes transaction costs lower, so that market or trade transactions will increase. As has been understood together that trade provides benefits for business people, because it allows them to specialize. Specialization will increase productivity, and ultimately will increase community prosperity and economic activity.

On the other hand, macroprudential policies are directed at encouraging economic growth, especially economic growth that benefits the poor, and increases the income of the poor, so that it can shift poverty or reduce poverty, even economic growth that increases the income of the poor which is greater than the growth rate itself (Ravallion, 2004), especially economic growth that can strengthen income distribution or quality growth (Thomas, et all, 2000) the prospect of achieving growth for the poor, namely the beginning of the precondition and the type of growth experienced by the country. Economic growth means an increase in domestic product income, total GDP or GDP per capita

Minso et al. (2015) examined the measurement of macroprudential policies for 10 developing countries related to the measurement of macroprudential policies, where macroprudential policies are divided into three categories of policies, namely; (i) credit arrangements through the variable LTV (Loan to value ratio) and DTI (Debt to Income) variables (ii) liquidity arrangements that place net open currency limit or currency mismatches (iii) Capital requirements include countercyclical capital requirements. Credit is associated with macroprudential policies applied in Indonesia, Korea Republic, Singapore and Thailand more using the ratio of LTV (loan to value ratio) and DTI (debt to

income ratio). Meanwhile macroprudential liquidity instruments through reserve requirement and limit on net opencurrency positions are applied in China PRC, India, the Philippines, while macroprudential policies relating to capital are rarely applied except in India.

Rural Credit Banks (BPR) as banking financial institutions that provide services primarily to micro and small businesses and are located close to rural communities. This financial institution is very appropriate and strategic to serve banking services, through the provision of credit to support small businesses in supporting the community's economy and has been recognized as having a role in the economy in Indonesia. Strengthening the role of the banking sector to reduce poverty through strengthening the assets of Rural Banks (BPR), where the strengthening of BPR assets can increase lending, especially as micro and small business capital. Thus, the economy of the community can still survive and become a reinforcement to create jobs that will increase community income and alleviate poverty.

The policy of granting loans on a large scale by banks needs to be monitored to avoid credit risk and systematic risk. Risk measurement that occurs is related to the provision of credit, namely Non Performing Loans (NPL) or non-performing loans. The high Non Performing Loan (NPL) results in bank losses and can lead to financial risk. So it is feared that it will affect the level of loan lending to the community, especially the weak economy.

When at the macro level there is no change in income distribution as long as economic growth occurs, then economic growth can facilitate poverty reduction (Fields, 2001) Similar results are also found from the study of Dollar and Kraay (2001) revealing that economic growth is which is good for the poor, studies conducted in 80 countries for 236 cases, the test results show how the poorest 20% of income changes during the process of economic growth. Another study conducted by Ravallion (2004) found the results of the growth elasticity of poverty alleviation of minus 2-3 percent, which stated an increase in average income of one percent would reduce poverty (head count poverty) by 2-3 percent.

Ravallion (2004) analyzed using data from 62 countries which showed different conditions between countries, formulation of the relationship between poverty reduction and this index of economic growth, the results concluded that poverty reduction was also determined by two factors, namely economic growth rate and Gini Index (as measurement of inequality in income distribution).

The initial argument that links economic growth with poverty is influenced by Kuznet's hypothesis (1955,1963) which states that growth and inequality are associated with an

inverted U image, at the initial level of development, income distribution deteriorates and does not improve until the State reaches middle income status. The implication of this hypothesis is that at the initial level, economic growth will lead to inequality and poverty will decline in a number of developing countries.

Kusnet's hypothesis is based on cross sectional data, where each country will have a different situation in the conditions of development at the same time, so it takes time series data for improvement, studies conducted by Ravallion (1995), Deininger and Squire (1996,1998), Schultz (1998) and Bruno, Ravallion and Squire (1998) find results that reject the Kuznet hypothesis. Based on Deininger and Square (1996) Gross Domestic Product (GDP) per capita increased by 26 percent in developing countries between 1985 and 1995, while this dini coefficient changed only 0.28 percent per year in the same period.

Research conducted by (Riva, 2014) about the effect of unemployment rates and provincial minimum wage levels on poverty levels in Riau Province. The research used multiple time linear regression analysis method. The results showed that the level of open unemployment had a positive and insignificant effect. While the provincial minimum wage has a significant negative effect on the level of poverty in Riau Province in 2002-2011.

Research (Suhartini, A. M. A., & Yuta, 2012) which examined the interrelationship of microfinance institutions (MFIs), micro and small enterprises (MSEs) and poverty in Indonesia in 2012. This study used descriptive analysis and path analysis methods. The results of the study show that the existence of BPR and MSEs can help alleviate poverty. The influence of the existence of BPR on poverty is stronger if it works through the existence of MSEs.

Research (Pamungkas, Rugemintwari, Tarazi, & Trinugroho, 2016) which examines bank lending and income inequality: evidence from Indonesia. This research uses panel data analysis method. The results show that increasing loans to MSMEs can contribute significantly to reducing income inequality.

3. Structure of Macroeconometric Modeling

Based on rational behavior to maximize profit, it is formulated as follows;

$$V(0) = \sum_{t=0}^{T} \frac{\pi_t}{(1+r)^t} \left[P_t F(L_t, K_t) - w_t L_t - P_t^I I_t \right]. \tag{1.1}$$

Total profit in time period t, with interest rate r, price of output P_t for the production function $F(L_t, K_t)$ as a function of labor L_t and capital K_t, where is the amount of

wages w_t and the price of investment goods P_t^I, and gross total investment I_t. The capital accumulation equation can be formulated as follows;

$$K_{t+1} = K_t + I_t - \delta K_t = K_t(1 - \delta) + I_t. \tag{1.2}$$

Equation (1.2) consists of gross investment: $K_{t+1} = K_{t+1} - K_t + \delta K_t$, and replacement investment or depreciation δK_t and δ is the rate of depreciation.

Using Langgrangian function approach is formulated as follows;

$$Z = \sum_{t=0}^{T} \frac{\pi_t}{(1+r)^t} \left[P_t F\left(L_t, K_t\right) - w_t L_t - P_t^I I_t \right] + \sum_{t=0}^{T} \left[I_t + K_t(1 - \delta) - K_{t-1} \right]. \tag{1.3}$$

Optimum condition with first differentiation:

$$\frac{\partial Z}{\partial L_t} = \frac{1}{(1+r)^t} \left(P_t F_{Lt} - w_t \right) = 0. \tag{1.4}$$

$$\frac{\partial Z}{\partial K_t} = \frac{P_t f k_t}{(1+r)^t} + \gamma_t(1 - \delta) - \gamma_{t-1} = 0. \tag{1.5}$$

$$\frac{\partial Z}{\partial I_t} = -\frac{P_t^I}{(1+r)^t} + \gamma_t = 0. \tag{1.6}$$

Use of the Real Business Cycles (RBC) model as a balance model that links the living conditions of consumers, where Business Cycle is expressed through random disturbances to production possibilities, if it is used to analyze the consumption behavior of the rich (C_t^K) and consumption of the poor (C_t^m) with the formula as follows:

$$U\left(C_t^K, C_t^m\right) = \ln\left(C_t^K\right) + \ln(C_t^m). \tag{1.7}$$

Both (rich and poor) offer labor and receive wage income W_t, wage income (poor people) is used for consumption and savings, which is formulated as follows;

$$c_t^m + s_t^m = w_t. \tag{1.8}$$

While Income (rich people) is lent to the company, and the company uses these funds to increase capital and increase yield (return) and for capital depreciation costs with a depreciation rate δ, the value of the depreciation rate is $0 < \delta < 1$, so the budget constraint for the rich is formulated as follows:

$$C_t^k = (1 - \delta + r)K_t. \tag{1.9}$$

Equation (1.9) reveals that the amount of consumption expenditure is the same as the results obtained from existing capital, and if there are outstanding loans (μ), then the magnitude of the budget constraints (budget constraints), namely;

$$C_t^k = (1 - \delta + r)K_t - K_{t-1}. \tag{1.10}$$

The macroeconomic model of goods market balance can be formulated as follows;;

$$Y_t = C_t + I_t. \tag{1.11}$$

Where

$$Y_t = AK^\alpha L^\beta. \tag{1.12}$$

and Consumption is divided between the consumption of the Rich group and the Poor group

$$C_t = C_t^K + C_t^M \tag{1.13}$$

combination of equations (1.11), equation (1.12) and equation (1.10) formed the equation below;

$$C_t^K + C_t^M + K_t = AK^\alpha L^\beta + (1 - \delta - \mu)K_{t-1}. \tag{1.14}$$

Or

$$C_t^K + C_t^M + K_t - (1 - \delta - \mu)K_{t-1} = A(K_m + K_k)^\alpha \left(L_m + L_k\right)^\beta \tag{1.14a}$$

So to get the amount of consumption of the poor who guarantees the market balance of goods can be formulated

$$C_t^M = A(K_m + K_k)^\alpha \left(L_m + L_k\right)^\beta - C_t^K - K_t + (1 - \delta - \mu) K_{t-1}. \tag{1.15}$$

or

$$C_t^M = Y_t - C_t^K - K_t + (1 - \delta - \mu) K_{t-1}. \tag{1.15a}$$

Furthermore, to include the consumption equation of the rich group (1.10) into the consumption equation of the poor group (1.15) which guarantees the equilibrium of goods market, the equation is formulated as follows:

$$C_t^M = Y_t - (1 - \delta + r)K_t - K_t + (1 - \delta - \mu) K_{t-1} \tag{1.16}$$

where   is Net Performance Loans (NPL).The production function is formulated with the Cobb Douglas Neo-Classical Production Function model $Y = AK^\alpha L^\beta$.while the Savings Function is divided into two components, the Rich Savings function of the capital owner s_K and and the savings function of the poor s_M, so the total savings function;

$$S = s_K Y_k + s_m W, \tag{1.17}$$

Where $s_P > s_w$ (marginal (and average) propensity to save, so $\left(0 \le s_m \le s_k \le 1\right)$. the overall savings rate is formulated as follows;

$$s = \frac{S}{Y} = s_k \frac{Y_k}{Y} + s_m \frac{W}{Y} \qquad (1.18)$$

where $s_k + s_m = 1$ and $s_m = 1 - s_k$

$$s = \frac{S}{Y} = s_k \frac{Y_k}{Y} + (1 - s_k)\frac{W}{Y} = s_k \left(\frac{Y_k - W_l}{Y}\right) + \frac{W}{Y}. \qquad (1.19)$$

If these results are included in Solow's steady-state economic growth model, then changes in stock capital are formulated as follows;

$$\Delta k_t = sf\left(k_t\right) - (\delta + \mu)k_{t-1}. \qquad (1.20)$$

$$K_t - K_{t-1} = \left(s_k \left(\frac{Y_k - W_l}{Y}\right) + \frac{W}{Y}\right) Y - (\delta + \mu) K_{t-1}. \qquad (1.21)$$

So the amount of capital stock needed:

$$K_t = \left(s_k \left(\frac{Y_k - W_l}{Y}\right) + \frac{W}{Y}\right) Y + (1 - \delta - \mu) K_{t-1}. \qquad (1.22)$$

Equation (1.22) is substituted for the production function, then produces the following function;

$$Y = A\left(\left(s_k \frac{Y_k - w}{Y}\right) Y + W + (1 - \delta - \mu) K_{t-1}\right)^{\alpha} L^{\beta}. \qquad (1.23)$$

The function of the labor market where the demand for labor is equal to the supply of labor in perfect competition, is formulated as follows;

$$W = P.\beta A\left(\left(s_k \frac{Y_k - w}{Y}\right) Y + W + (1 - \delta - \mu) K_{t-1}\right)^{\alpha} L^{\beta-1}$$

$$L^{\beta-1} = \left(\frac{W}{P}\right).(\beta A)^{-1}\left(\left(s_k \frac{Y_k - w}{Y}\right) Y + W + (1 - \delta - \mu) K_{t-1}\right)^{-\alpha}. \qquad (1.24)$$

Where $\left(s_{k.Y}\frac{Y_k - w}{Y}\right)$ describes the condition of income inequality (GR-Gini Ratio) where if GR is equal to one means that inequality is perfect and if equal to zero means perfectly equal

$$L = \left(\frac{W}{P}\right)^{\frac{1}{\beta-1}}.(\beta A)^{-\frac{1}{\beta-1}} GR^{\frac{-\alpha}{\beta-1}} Y^{-\frac{\alpha}{\beta-1}} + W^{\frac{-\alpha}{\beta-1}} + (1 - \delta - \mu) K_{t-1}^{\frac{-\alpha}{\beta-1}}. \qquad (1.24a)$$

If the component of labor L is divided into;

$$L = L_K + L_M. \qquad (1.25)$$

$$L_M = \left(\frac{W}{P}\right)^{\frac{1}{\beta-1}}.(\beta A)^{-\frac{1}{\beta-1}} GR^{\frac{-\alpha}{\beta-1}} Y^{-\frac{\alpha}{\beta-1}} + W^{\frac{-\alpha}{\beta-1}} + (1 - \delta - \mu) K_{t-1}^{\frac{-\alpha}{\beta-1}} - L_k. \qquad (1.26)$$

The number of poor workers in the balance labor market is formulated as follows

$$\log L_M = \frac{1}{\beta - 1}\log\left(\frac{W}{P}\right) + \frac{1}{\beta - 1}\log\beta A + \frac{-\alpha}{\beta - 1}\log\beta A - \frac{\alpha}{\beta - 1}\log GR$$

(1.27)

$$+ \frac{-\alpha}{\beta - 1}\log Y - \frac{\alpha}{\beta - 1}W - \frac{\alpha}{\beta - 1}\log(1 - \delta - \mu)K_{t-1} - \log L_K.$$

where L_K shows the number of rich people and L_M is the number of poor people

3.1. Balance on the money market

The equation of the money supply function is formulated as money demand equal to money supply

$$Md = Ms$$

(1.28)

and

$$M_s = [mm](NFA + net\ Domestik\ Asset)$$

(1.29)

where mm is a money multiplier. The differentiation of money supply equations is formulated as follows,

$$dM_s = mm\ (r).dNFA + mm(r).dNDA.$$

(1.30)

The condition of the equilibrium of money occurs when money supply equal money demand, money demand $MV = PT$ and if v=1/V and PT=Y then the money supply equation can be written as follow:

$$M_d = vY$$

(1.31)

and the production function $Y = AL^\alpha K^\beta$, so the demand for money is formulated as

$$M_d = vAL^\alpha K^\beta$$

(1.32)

hence the differentiation total of money demand as follows;

$$dM_d = v\alpha\left(\frac{Y}{L}\right)dL + v\beta(\frac{Y}{K})dK$$

(1.33)

So that the total differentiation of the money market is formulation as follow;

$$v\alpha\left(\frac{Y}{L}\right) + v\beta(\frac{Y}{K}) = mm\ (r).dNFA + mm(r).dNDA$$

(1.34)

simultaneous market equilibrium, between the goods market, the labor market and the money market is structured as follows;

$$C_t^M = Y_t - (1 - \delta + r)K_t - K_t + (1 - \delta - \mu)K_{t-1}$$ (goods market)

$$\log L_M = \frac{1}{\beta - 1}\log\left(\frac{W}{P}\right) + \frac{1 - \alpha}{\beta - 1}\log\beta A - \frac{\alpha}{\beta - 1}\log GR + \frac{-\alpha}{\beta - 1}\log Y$$
$$-\frac{\alpha}{\beta - 1}W - \frac{\alpha}{\beta - 1}\log(1 - \delta - \mu)K_{t-1} - \log L_K$$ (labor market)

$$v\alpha\left(\frac{Y}{L}\right)dL + v\beta\left(\frac{Y}{K}\right)dK = mm.dNFA + mm.dNDA.$$ (Money market)

If the consumption of the poor, the number of workers is poor and the level of stock capital is as endogenous variable, while the other variables are exogenous;

$$\left\|\begin{matrix} 1 & 0 & (-2 - \delta + r) \\ 0 & 1 & 0 \\ 0 & v\alpha(\frac{Y}{L}) & v\beta(\frac{Y}{K}) \end{matrix}\right\| \left\|\begin{matrix} dC^m \\ dL_m \\ dK_t \end{matrix}\right\|$$

$$= \left|\begin{matrix} 0 & 0 & 1 & -1 & 0 & 1-\delta & 0 & 0 & 0 \\ \frac{1-\alpha}{\beta-1}) & \left(\frac{\alpha}{\beta-1}\right) & \left(\frac{-\alpha}{\beta-1}\right) & -\frac{\alpha}{\beta-1} & 0 & \frac{\alpha}{\beta-1} & \frac{1-\alpha}{\beta-1} & -1 & 0 \\ 0 & 0 & -v\alpha & 0 & mm & 0 & 0 & -\frac{v\alpha y}{L} & mm \end{matrix}\right| \left|\begin{matrix} dW_t \\ dGR \\ dY_t \\ dNPL \\ dNDA \\ dK_{t-1} \\ dA \\ dl_k \\ dNFA_t \end{matrix}\right|$$

determinat matrix $= |\Delta| = v\beta\left(\dfrac{Y}{K}\right) > 0$; and co-factor matrix is:

$$
\left|\dfrac{1}{v\beta\left(\dfrac{Y}{K}\right)}\right|
\begin{Vmatrix}
v\beta(\dfrac{Y}{K}) & -0 & 0 \\
-v\alpha(\dfrac{Y}{L})(-2-\delta+r) & v\beta(\dfrac{Y}{K}) & -v\alpha(\dfrac{Y}{L}) \\
-(-2-\delta+r) & -0 & 1
\end{Vmatrix}
$$

$$
\begin{array}{ccccccccc}
0 & 0 & 1 & -1 & 0 & 1-\delta & 0 & 0 & 0 \\[4pt]
\dfrac{1-\alpha}{\beta-1}) & \left(\dfrac{\alpha}{\beta-1}\right) & \left(\dfrac{-\alpha}{\beta-1}\right) & -\dfrac{\alpha}{\beta-1} & 0 & \dfrac{\alpha}{\beta-1} & \dfrac{1-\alpha}{\beta-1} & -1 & 0 \\[4pt]
0 & 0 & -v\alpha & 0 & mm & 0 & 0 & -\dfrac{v\alpha y}{L} & mm
\end{array}
\cdot
$$

The formulation of the estimation model based on the form of reduced form arranged to observe poverty which is approached by the number of poor people (as the result of derivation of the econometric structure model described earlier) is as follows:

$$
dL_m = \pi_{21}dW_t + \pi_{22}dGR + \pi_{23}dY_t + \pi_{24}dNPL_t + \pi_{25}dNDA + \pi_{26}dK_{t-1}
$$

$$
+\pi_{27}\,dA + \pi_{28}dL_k + \pi_{29}dNFA_t
$$

Based on the form of the reduced form equation, the increase in NPL (Net Performing Loan) will result in an increase in the number of poor people and reduce consumption of the poor. While increasing the assets of BPR will reduce the number of poor people.

The strengthening of the concept of theoretical findings that is based a the empirical data, the independent variables in which chosen for estimation of poverty are the macroprudential policy (the Net Performing Loan and the BPR asset), Gini ratio, GDRB per capita (gross domestic regional Brutto per capita) and regional minimum wage variable (W). The dependent variable is the amount of the poor. Data analysis uses panel data regression models for 33 provinces in Indonesia during the 2014-2016 period with secondary data sources obtained from the Central Statistics Agency (BPS) and the Financial Services Authority (OJK). An Estimation model to observe the impact of macroprudential policies through controlling BPR assets and NPL against the number of poor people in the Cobb Douglas model: $Y_{it} = \beta_0 X_{1it}^{\beta_1} X_{2it}^{\beta_2} X_{3it}^{\beta_3} X_{4it}^{\beta_4} X_{5it}^{\beta_5} u_{it}^{e_{it}}$, then be transformed which be the double log function;

$$
\mathrm{Log}\,Y_{it} = \beta_0 + \beta_1 \mathrm{Log}\,X_{1it} + \beta_2 \mathrm{Log}\,X_{2it} + \beta_3 \mathrm{Log}\,X_{3it} + \beta_2 \mathrm{Log}\,X_{4it} + \beta_3 \mathrm{Log}\,X_{5it} + e_{it}. \quad (1.36)
$$

	Consumption of the Poor, (C^M)	Number of poor workers (L_M)	Stock Kapital (K_t)
Minimum wages (dW)	$\pi_{11} = 0$	$\left(\dfrac{1-\alpha}{\beta-1}\right)$	$\pi_{31} = 0$
Gini ratio (GR)	$\pi_{12} = 0$	$\left(\dfrac{\alpha}{\beta-1}\right)$	$\pi_{32} = 0$
PDRB per kapita (Yt)	$\pi_{13} = \dfrac{\upsilon\beta\left(\frac{Y}{K}\right)}{\Delta}=1$	$\left(\dfrac{-\alpha}{\beta-1}\right)\cdot\left(\dfrac{\alpha K}{\beta L}\right)(-2-\delta+r)<0$	$\pi_{33} = \dfrac{-(2-\delta+r)-\upsilon\alpha}{\upsilon\beta\left(\frac{Y}{K}\right)}$
NPL	$\pi_{14} = \dfrac{-\upsilon\beta\left(\frac{Y}{K}\right)}{\Delta}=-1$	$\left(\dfrac{\alpha K}{\beta L}\right)(-2-\delta+r)-\left(\dfrac{\alpha}{\beta-1}\right)>0$	$\pi_{33} = \dfrac{-(2-\delta+r)-\upsilon\alpha}{\upsilon\beta\left(\frac{Y}{K}\right)}$
NDA/Asset BPR	0	$\dfrac{mm\left(-\upsilon\alpha\left(\frac{Y}{L}\right)\right)}{\upsilon\beta\left(\frac{Y}{K}\right)} = -\dfrac{mm\alpha K}{\beta L}<0$	$\pi_{34} = mm > 0$
dK_{t-1}	$(1-\delta) > 0$	$\dfrac{\alpha}{\beta-1} - \dfrac{\alpha K}{\beta L}(-2-\delta+r)(1-\delta))$	$\pi_{35} = \dfrac{\alpha}{\beta-1}$
dA	0	$\dfrac{1-\alpha}{\beta-1}=-\dfrac{\beta}{\alpha}$	$\pi_{36} = 0$
dLk	0	$\dfrac{\alpha K}{\beta L}\left(\upsilon\alpha\left(\frac{Y}{L}\right)-1\right)$	$\pi_{37} = \dfrac{-\frac{\upsilon\alpha y}{L}}{\upsilon\beta\left(\frac{Y}{K}\right)} = \dfrac{\alpha K}{\beta L}$
dNFA	0	$-\left(\dfrac{\alpha K}{\beta L}\right)mm$	$\pi_{38} = mm > 0$

where Y_{it} = Poverty Rate (number of Poor Population); β_0 = Konstanta/Intercept; $\beta_{1,2,3,4,5}$ = Regression coefficients of independent variables; X_{1it} = Provincial Minimum Wage (UMP); X_{2it} = Income Inequality (Gini Ratio); X_{3it} = GDRB per capita; X_{4it} = BPR assets and X_{5it} = Number of Non Performing Loans (NPL) and e= *Term of error*

The econometric model of panel data that includes three selected regression models, namely pooled or Common Effect models, Fixed Effect and Random Effect models. In Pooled or Common Effect models, where the model is relatively simple with assume that the condition of region are homogeneous or there is no heterogeneity between observations and the same impact for the entire province. Such a model structure is

used to test for homogeneity between provinces, so that the common model is most constrained and compared with the model where the intercept is different between provinces. If the impact is the same for the whole province (as Ho null hyphotesis) and there is a different impact (as Hi describes a non-uniform condition), the alternative hypothesis shows the level of poverty difference between provinces in Indonesia.

4. Results and Discussion

The conditions of poverty and inequality of income distribution in Indonesia, high economic growth and followed by an increasingly even distribution of income will be a strategic factor to alleviate poverty or reduce poverty, but on the contrary if high economic growth is followed by large inequality in distribution income, will have an impact on increasing poverty. The data shows that there are fluctuations in poverty and income inequality in all provinces in Indonesia on average, the empirical results show that there are fluctuations in the development of the number of poor people in Indonesia during the 2014-2016 period, but the income evenness figure indicated by the Gini Ratio value indicates a decrease increased equity of national income distribution. Based on Table 1, the Gini Ratio figure is fluctuating as a reflection of the inequality of income distribution that is associated with the number of poor people, between 2012 and 2013 the decline in the number of poor people followed by a decrease in the gini ratio, but not for 2014 where the decline in the number of poor people followed by Gini ratio increase. On the contrary, for 2015, there was an increase in the number of poor people, followed by a decrease in the gini ratio or even more even distribution of income compared to the previous year

TABLE 1: Number of Poor and Gini Ratio in Indonesia in 2012-2016.

Year	Number of Poor People (Souls)	Gini Ratio (%)	Number of Population (Soul)	Poverty Contribution (%)
2012	28594700	0,413	245416200	11,65
2013	28553930	0,406	248818100	11,47
2014	27727780	0,414	252164800	11,00
2015	28513570	0,402	255461700	11,16
2016	27764320	0,394	258705000	10,73

Source: Indonesian BPS is processed, 2017

Empirically the results of the study for 33 provinces during the period 2014-2016 with the panel data model for the dependent variable shows the number of poor people in each province in Indonesia during the period 2014-2016 will be influenced by a number

of variables, namely minimum wages, income ratio, GDRB per capita, assets of rural banks and NPLs.

Formulation of the estimation model with the double log approach shows that the results reveal significant regression parameter values for the common effect model, where all independent variables affect the poverty level, there are only two variables that are not significant, namely minimum wages and BPR assets. For the Fixed effect model when viewed from the coefficient of determination (R^2) shows a relatively high number of 0.998, in terms of the criteria of the model based on the model goodness (*goodness of fit test*) is relatively good, but if viewed from the significance of the regression parameters indicate conditions that are not one variable parameter shows significance, it is a sign that the model experiences what is called spurious regression. So that the common effect model becomes more precise.

TABLE 2: The Resulted of Double Log Model For Regression Data Panel.

Variabel			Poverty			
		Common Effect (Y)	Fixed Effect (Y)	Random Effect(Y)	conclusion	
INTERCEPT	Coefficient	10.91023	4.357097	5.703955	signifikan	
	t-Statistic	4.787497*	3.690775*	5.846654*		
Minimum Wages	Coefficient	-0.432828	-0.034716	-0.035127	Gini ratio elasticity is significant	
	t-Statistic	-1.644202	-0.559866	-0.604207		
Gini Ratio	Coefficient	1.406278	0.005333	0.219881		
	t-Statistic	1.919010*	1.520918	0.9995		
GDRB per capita	Coefficient	-0.548049	0.219881	-0.060265	GDRB per capita elasticity is significant	
	t-Statistic	-2.881592*	1.122809	-0.376470		
Asset BPR	Coefficient	0.103688	0.007584	0.039026	The elasticity of BPR assets is insignificant	
	t-Statistic	1.071269	0.290444	1.549731		
NPL	Coefficient	0.242341	-0.017921	0.019230	Significant NPL elasticity	
	t-Statistic	2.643632*	-0.698651	0.783186		
Adj R Square		0.487896	0.998034	0.047557		
F Statistic		19.67350*	1345.325*	0.928723		
* Sig & Prob(F-statistic) $<$ 0,05						

The results of the common effect model assume that the poor have the same diversity or homogeneity, so the common model is determined as the most suitable model choice. The Double Log regression result shows the parameter value at the same time shows the magnitude of elasticity, so that the minimum wage elasticity against poverty is negative at 0.432828, this means that the minimum wage increase of ten percent will reduce the poverty rate by 4.32828 percent (although this number is not significant) but theoretically appropriate (theoretical identification).

Determination of the minimum wage in the situation of labor supply exceeds the demand for labor will result in an increase in unemployment (structural unemployment), meaning that it will encourage an increase in the number of poor people. However, if the situation of labor demand is greater than the supply of labor, it will result in an increase in the amount of labor used or unemployment will decrease, or to lead to a balance process, the wage level will be increased. This means that the increase in the minimum wage will reduce poverty. The results showed a positive influence of the minimum wage increase on poverty of 0.432828, meaning that the condition of the surplus profit of entrepreneurs has not been fully distributed to the labor force, meaning that the increase in the regional minimum wage does not have an impact on reducing the profits of firms.

The relationship between the level of distribution of income measured from the Gini Ratio figure, then shown the Gini Ratio elasticity parameter estimation results on the number of poor people is significantly positive at 1.406728, meaning that if the Gini Ratio increases by one percent then the number of poor people will increase by 1.406728 percent This means that if the inequality of regional income distribution per province increases by one percent it will result in an increase in the number of poor people in province at 1.406728 percent.

Increased per capita economic growth as a result of gross regional domestic product per population, the effect on the number of poor people is shown by the elasticity parameters of the growth of per capita income to the poor population which is significantly negative at 0.548, this means that a 10 percent increase in provincial regional income per capita will result in a reduction in the number of poor people by 5.48 percent.

Based on the double log regression model in the Common effect model shows the influence of macroprudential policy (in terms of the influence of NPLs and BPR assets) on the number of poor people, it can be concluded that the NPL (net performance loan) has a significant positive effect of 0.242341, meaning a 10 percent increase in non-performing loan growth (NPL) then increase the growth of the number of poor people

by 2.42341 percent. Such conditions indicate the need to strengthen macroprudential policies on bank credit selection. While the effect of increasing BPR (People's Credit Bank) assets on poverty is positive at 0.103688, not significant.

The result of Ismaail's research (2011), Non-Performing Loans (NPLs) will result in bank losses. Losses due to non-receipt of funds that have been distributed, as well as unacceptable interest income. That is, the bank loses the opportunity to get interest, which results in a decrease in total income and the profit received by the bank will decrease due to decreased interest income. So this shows that the Non Performing Loan (NPL) has a close relationship with the internal state of the bank itself.

The effect of the minimum wage on poverty is negative at 0.4324, meaning that a one percent increase in the minimum wage will reduce poverty by 0.4324 percent even though this number is not significant. The results of this study are supported by (Riva, 2014), (Kapelyuk, 2014) and (Sudirman, 2017) that minimum wages have a negative and significant influence on the number of poor people. This shows that the increase in Provincial Minimum Wages (UMP) can lead to an increase in income inequality in Indonesia. The results of this study are also supported by (Sungkar et al., 2015) that minimum wages have a positive and significant influence on income inequality. This means using minimum wages as a strategic tool to reduce income inequality is useless. Instead of reducing income inequality, it actually triggers an increase in the income inequality index which means the income distribution becomes more uneven. This situation is a consequence of the structure of the workforce in Indonesia, where especially those working in the agricultural sector or the informal sector are not directly affected by the increase in the minimum wage.

This research is supported by (Suhartini, A. M. A., & Yuta, 2012) that BPRs have a direct influence on poverty reduction. BPR as one of the Microfinance Institutions (MFIs) which has advantages with a focus on service to micro / small businesses, more flexible services, and located in the countryside. This is a distinct advantage for small communities with greater ease in reaching sources of financing for their economic activities, both consumptive and productive. So that an increase in BPR will have a positive impact in reducing poverty, where this positive impact will be even greater if the MFI works through MSEs. Where MSEs themselves are part of the poor who have the willingness to get out of poor conditions and have productive abilities that can increase their income and welfare. This research is also supported by (Burgess, 2004) and (Panagariya, 2006) that the expansion of BPR branches has a significant effect on poverty alleviation in India.

This shows that the increase in Provincial Minimum Wages (UMP) can lead to an increase in income inequality in Indonesia. The results of this study are also supported by (Sungkar et al., 2015) that minimum wages have a positive and significant influence on income inequality. This means using minimum wages as a strategic tool to reduce income inequality is useless. Instead of reducing income inequality, it actually triggers an increase in the income inequality index which means the income distribution becomes more uneven. This situation is a consequence of the structure of the workforce in Indonesia, where especially those working in the agricultural sector or the informal sector are not directly affected by the increase in the minimum wage. This research is also supported by (Pamungkas et al., 2016) which says that bank loans given to MSMEs contribute significantly to reducing income inequality.

5. Conclusions and Recommendations

Macroprudential policy controls the size of credit and assets of banking institutions, where credit swelling often impacts systemic risk and financial risk, the proxies used for macroprudential policy control through the Assets of Rural Banks (BPR) and NPL (Net Performance Loans) controls. The policy will have an impact on poverty alleviation, where the NPL elasticity against positive poverty is 0.242, consider the elasticity of negative BPR assset 1.0712

the elasticity of the minimum wage to the poverty rate is negative at 0.432828, this means that a minimum wage increase of ten percent will reduce the poverty rate by 4.32828 percent (although this figure is not significant) but theoretically appropriate (theoretical identi fi cability).

Gini Ratio elasticity to the number of poor people is significantly positive at 1.406728, meaning that if the Gini Ratio increases by one percent then the number of poor people will increase by 1.406728 percent. The elasticity of the growth of per capita income to the poor population is significantly negative at 0.548, this means that a 10 percent increase in provincial regional income per capita will result in a reduction in the number of poor people by 5.48 percent

Macroprudential policy by controlling banking credit so that it can control the value of NPLs, controlling bank loan loans also affects bank assets, but credit control must be selective in priority sectors that can increase regional economic growth, so that the existence of BPR assets needs to be improved so as to encourage growth and development sectoral that will have an impact on strengthening economic growth that can increase the income of the poor, when the aspect of income distribution is more

evenly distributed by treating progressive taxation, as well as the attention of local governments to constantly adjust the determination of regional minimum wage levels that always adjust to the level of regional inflation, resulting in will be able to reduce poverty.

References

[1] Azansyah. (2013). Peran Kelembagaan Dalam Perekonomian , Kondisi Pembangunan Kelembagaan Di Indonesia , Dan Membangun Lembaga Yang Efektif. *Peran Kelembagaan dalam perekonomian*, *VII*(2), 262–279.

[2] Bourguignon.F,.1981,"Pareto Superiority of Unegalitarian Equilbrium in Stiglitz's Model of Wealth Distribution with Convex Saving Function," Econometrica, Vol.49,pp 1469-75.

[3] Burgess, R. (2004). Can Rural Banks Reduce Poverty?? Evidence from the Indian Social Banking Experiment, 1–17.

[4] Claesssens Stijn, 2013," Macro-Prudential Policies to Mitigate Financial System Bourguignon.F,.1981,"Pareto Superiority of Unegalitarian Equilbrium in Stiglitz's Model of Vulnerabilities", Journal of International Money and Finance

[5] Claesssens Stijn, 2014," An Oveerview of Macroprudential Policy Tools", IMF Working Paper

[6] Cornford, 2014,"Macroprudential Regulation: Potential Implicatioans for Rules for Cross Border Banking", United Nations Conference on trade and development, discussion Papers

[7] Deninger, Klaus and Lyn Squire, 1996,'A New Data Set Measuring Income Inequality." world Bank Economic Review. vol 10, No.3:565-591

[8] Deninger, Klaus and Lyn Squire, 1998,'A New Ways of Looking at Old Issues: Income Inequality." Journal of Development Economics vol 57, No.2:259-287

[9] Dollar, David and Aart Kraay, 2001," Growth is good for The Poor. Washington D.C: World Bank

[10] Fields, Gary s, (2001)'Distributional and Development, A new look at the developing world. New York, Cambridge & London: Russel Sage Foundation & MIT press.

[11] Frost Jon and Straten van Rene, 2018," Macroprudential Policy and Income Inequality", DNB Working Paper, no 598

[12] Jeanneney Sylviane Guillaumont and Kpodar Kangni,2008,"Financial Development and Poverty Reduction: Can There Be a Benefit Without a Cost",IMF Working Paper

[13] Jenkins Paul and Longworth David,2015" Securing Monetary and Financial stability: Why Canada Needs a Macroprudential Policy Framework",Institut C.C. Howe Institure No.429

[14] Kaldor,N,(1957),"A Model od Economic Growth,"Economic Journal, Vol.67.pp 591-624

[15] Kapelyuk, S. (2014). Impact of minimum wage on income distribution and poverty in Russia. *Working Paper*, *14*(3), 1–38. Diambil dari https://www.eerc.kiev.ua/default/download/creater/working_papers/file/ c3683c36cca3ed44a46d046e446c49930e5a3dbd.pdf

[16] Kuznet , Simon, 1955,"Economic Growth and Income Inequality", American Economic Review (march): 1-28

[17] Kuznet ,Simon, 1963,"Quantitative Aspect of the Economic Growth of Nations:VIII, Distribution of Income by Size",Economic Development and Cultural Change (part 2) (january):1-80

[18] Kawata Hiroshi, Kurachi Yochiyiki, Nakamura Koji, Ternishi Yuki, 2013,"Impact of Macroprudential Policy Measures on Economic Dynamics: Simulation Using a Financial Macro-Econometric Model", Bank of Japang Working Paper Series

[19] Lee Minsoo, Asuncion Ruben Carlo, Kim Jungsuk, 2015," Effectiveness of Macroprudential Policies in Developing Asia: An Empirical Analysis", ADB Economics Working Paper Series

[20] Pamungkas, P., Rugemintwari, C., Tarazi, A., & Trinugroho, I. (2016). Bank Lending and Income Inequality?: Evidence from Indonesia. *SSRN Working Paper*, 1–10.

[21] Panagariya, A. (2006). Bank Branch Expansion and Poverty Reduction: A Comment. *Economy, Indian Political*, 1–12.

[22] Peydro Jose Luis, 2016," Macroprudential Policy and Credit Supply", JEL vol 152 (4) 305-318

[23] Ravallion, (2004),"Pro Poor Growth : A Primer .In World Bank Policy Research Working Paper, Washington DC: World Bank

[24] Riva, V. (2014). Pengaruh Tingkat Pengangguran Dan Tingkat Upah Minimum Provinsi Terhadap Tingkat Kemiskinan Di Provinsi Riau. *JOM FEKON*, *1*(2), 1–15.

[25] Rubio Margarita and Carrasco Joseph A, 2016,'Coordinating Macroprudential Policies within the Euro Area: The Case of Spain", Economic Modeling, 59,pp 570-582

[26] Sudirman, L. A. (2017). PENGARUH UPAH MINIMUM DAN INFLASI TERHADAP JUMLAH PENDUDUK MISKIN DI PROVINSI JAMBI. *jurnal of economics and business*, *1*(1), 148–159.

[27] Suhartini, A. M. A., & Yuta, R. (2012). Keterkaitan Lembaga Keuangan Mikro (LKM), Usaha Mikro dan Kecil (UMK) serta Kemiskinan di Indonesia Tahun 2012. *Jurnal Ekonomi Kuantitatif Terapan*, *7*(2), 137–144. Diambil dari ojs.unud.ac.id/index.php/jekt/article/view/16439

[28] Sungkar, S. N., Nasir, M., & Nazamuddin. (2015). Pengaruh Upah Minimum Terhadap Ketimpangan Pendapatan Di Indonesia. *Jurnai Ilmu Ekonomi Pascasarjana Universitas Syiah Kuala*, *3*(2), 14.

[29] Thomas,V.M. Ailami, A Dhareshwar, D.Kaufmann, N.Kishor,R.Lopez and Y.Wang 2000, The Quality of growth, Washington,D.D: World Bank.