SIMULATION ANALYSIS OF THE INFLUENCE OF GOVERNMENT MINIMUM EXPENDITURE AND WAGE EXPENDITURE IN THE SIMULTANEOUS INDUSTRIAL SECTOR MODEL OF DKI JAKARTA PROVINCE

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ABSTRACT
The purpose of the study was to determine the effect of increasing expenditure and increasing the minimum wage of the government in the simultaneous model of the industrial sector of DKI Jakarta province. The estimation model in the simultaneous model of the industrial sector of DKI province uses the 2 SLS (Two-Stage Least Squares) method. The simulation results of a 10% increase in the expenditure of the provincial government of DKI has resulted in an increase of investment of 4.72%, production growth of 0.19%, employment of 0.17%, an increase in production costs by 0.24%, and company profits increased by 0.10%. On the other hand, the simulation results of a 10% increase in the provincial minimum wage has resulted in a decrease in labor absorption by 0.55%, a decrease in production in the industrial sector has resulted in 0.21%, a decrease in investment by 0.07%, and a decrease in production costs by 0.04%.

Keywords: Industrial Sector, Minimum Expenditures and Wages, Simulation

1. INTRODUCTION
The metropolitan Jakarta is the largest urban area in Indonesia even in Southeast Asia. It has an important role and function in supporting the national economy, one of which is as a National Activity Center and the Capital of Indonesia. DKI Jakarta Province which is the capital of the country, has the potential to be strong enough to develop in various sectors. The industrial sector is the dominant sector in the economy of DKI Jakarta Province (Vioya, 2015).
Badan Pusat Statistik (2016) shows that the industrial sector contributes a large GRDP in 2010 of Rp. 60,555,943.29 million or 15.31% of the total GRDP of DKI Jakarta. This contribution continues to increase where in 2011 it reached 63,591,048.83 million or 15.06% of the total GRDP, in 2012 it increased by Rp. 65,591,048.83 million or 14.58% of the total GRDP, and in 2013 reached Rp. 65,134,279.33 million, or 13.65%. From the value scale, the contribution of the industrial sector continues to increase. Increased production of the industrial sector is of course accompanied by an increase in investment and employment (Sulistiawati, 2012).

Investment also becomes important for economic growth related to the contribution it provides. The contribution of investment to economic growth can be seen from the demand and supply side. On the demand side, increased investment stimulates economic growth by creating effective demand. Based on the supply side, increased investment stimulates economic growth by creating more capital reserves which then develops in the form of increased production capacity (Sholihah et al., 2017).

The results show that the factors of credit interest rates, inflation, provincial minimum wages, rupiah exchange rates and the money supply simultaneously and partially have a significant effect on investment (Fayzhall, 2018). On the other hand, the increase in real wages is also an indicator for economic sectors in making demands on labor. When real wages increase, entrepreneurs will generally substitute labor with capital. (Dimas and Woyanti, 2009). DKI Jakarta Province as the center of national economic activities must pay attention to the quality of economic welfare, human resource development, and infrastructure to attract domestic and foreign investors (Sari, 2015).

2. RESEARCH METHODOLOGY
2.1. Location and Time of Research
The study is located in the Special Capital Region of Jakarta, and the data was collected in 2016 - 2017.

2.2. Types and Data Sources
The data that needed is secondary data in the form of annual period data. Data is sourced from Badan Pusat Statistik Nasional, Badan Pusat Statistik DKI Jakarta, Central Bank Indonesia and provinces, and other relevant agencies / services.

2.3. Identification and Estimation Methods
The actual phenomenon is presented in a model in order to explain it, predict it, and control it. Before estimating, the model is first identified to determine whether the parameters can be
predicted. Identification testing uses the order condition argument (Koutsoyianis, 2000; Intriligator et al, 2003; Pindyck and Rubinfeld, 2008). Order condition is expressed as:

\[(K - M) \geq (G - 1)\]

Information:

\[G = \text{Number of endogenous variables in the model}\]
\[K = \text{Total variables in the model (endogenous and exogenous variables)}\]
\[M = \text{The number of endogenous and exogenous variables entered in an equation.}\]

If: \((K - M) = (G - 1)\) then an equation is said exactly identified,

\((K - M) > (G - 1)\) equation is said to be overidentified, and

\((K - M) < (G - 1)\) equation is said to be underidentified.

The formulated industrial sector production model has 7 equations as structural equations. The number of endogenous variables is 7 and exogenous variables are 8. After the model is identified by using order conditions, all equations are "overidentified" so that the estimation method that can be applied is the 2 SLS (Two Stage Least Squares) method. Statistical tests F and t are used to test whether explanatory variables together or each of them have a real or no effect on endogenous variables.

### 2.4. Model Validation

The statistical criteria used for validation are Root Mean Squares Error (RMSE), Root Mean Squares Percent Error (RMSPE) and U-Theil (Theil's Inequality Coefficient). The smaller the RMSE, RMSPE and U values; the better the model. The statistical criteria are formulated as follows:

\[
\text{RMSE} = \sqrt{\frac{1}{n} \sum_{t=1}^{n} (Y_t^s - Y_t^a)^2}
\]

\[
\text{RMSPE} = \sqrt{\frac{1}{n} \sum_{t=1}^{n} \left( \frac{Y_t^s - Y_t^a}{Y_t^a} \right)^2}
\]

\[
U = \sqrt{\frac{1}{n} \sum_{t=1}^{n} (Y_t^s)^2} \left[ \sqrt{\frac{1}{n} \sum_{t=1}^{n} (Y_t^a)^2} + \sqrt{\frac{1}{n} \sum_{t=1}^{n} (Y_t^s - Y_t^a)^2} \right]
\]
where:

\[ Y_t^a = \text{Value of the basic simulation results from the observation variable} \]

\[ Y_t^a = \text{Actual value of the observation variable} \]

\[ n = \text{Number of observation periods} \]

3. RESEARCH RESULT

3.1. Model Estimation General Performance

The coefficient of determination (R\(^2\)) in all equations is quite high, ranging from 0.9393 to 0.9880. The statistical value of F which is indicated by the probability value F of all equations is smaller than 0.0001. F test is a significance test for R\(^2\) statistics (Pindyck and Rubinfeld, 2008). Statistical tests t are used to test whether each explanatory variable individually or not has a significant effect on endogenous variables. Tolerance significance of the t test used in this study is \( \alpha = 20\% \). According to the results of the t test of 38.24% or 13 presumptive parameters the explanatory variables in the equation are significantly different from zero at the real level \( \alpha = 1 - 5\% \), as much as 17.65% or 6 presumptive parameters of explanatory variables are significantly different from zero at the real level \( \alpha = 6-10\% \), as many as 11.76% or 4 presumptive parameters of explanatory variables are significantly different from zero at the real level \( \alpha = 11-15\% \), and as many as 11.76% or 4 presumptive parameters of explanatory variables are significantly different from zero at the real level \( \alpha = 16 - 20\% \).

Table 1: Results of Estimating Variations in Industrial Sector Production (Y)

| Explanatory Variable                             | Presumptive Parameters | Prob. T | Real Level | Elasticity |
|--------------------------------------------------|------------------------|---------|------------|------------|
| Industrial Sector Production (Y)                 |                        |         |            |            |
| Intercept                                        | -1858362               |         |            |            |
| Investment (K)                                   | 0.106347               | 0.1931  | D          | 0.04       | 0.04       |
| Labor Absorption (TK)                            | 31.16099               | 0.1064  | C          | 0.10       | 0.12       |
| Technological Progress (TEK)                     | 1.434732               | 0.0002  | A          | 0.76       | 0.86       |
| Profit Growth (GLABA)                            | 107125                 | 0.1645  | D          | 0.01       | 0.01       |
| Lag of Production of Industrial Sector (LY)      | 0.119273               | 0.2829  | --         | 0.11       | 0.13       |
| Prob. F < 0.0001                                 | R-SQ = 0.9880          | Adj R-SQ = 0.9859 | DW = 2.174 |

Information:

A = Significant influence on the level \( \alpha = 1 - 5\% \)
C = Significant influence on the level \( \alpha = 10 - 15\% \)
D = Significant influence on the level \( \alpha = 16 - 20\% \)
Table 1 shows that industrial sector production is significantly affected by investment, employment, technological progress, and profit growth. The value of the production elasticity of the industrial sector towards investment, employment, technological progress, and profit growth is less than 1% for the short and long term.

Table 2: Results of Estimation of Variables in Industrial Sector Investment (K)

| Explanatory Variable                  | Presumptive Parameters | Prob. T | Real Level | Elasticity |
|---------------------------------------|------------------------|---------|------------|------------|
|                                       |                        |         |            | Short Term | Long Term |
| Industrial Investment (K)             |                        |         |            |            |
| Intercept                             | -4544570               |         |            |            |
| Interest Rate (IR)                    | -13128.1               | 0.4931  | --         | -0.01      | -0.01      |
| Domestic Investment (PMDN)            | 0.844488               | 0.1113  | C          | 0.13       | 0.16       |
| Industrial Sector Export Increase (MXD) | 0.074227             | 0.1938  | D          | 0.05       | 0.06       |
| Industrial Sector Production (Y)      | 0.113233               | 0.0935  | B          | 0.33       | 0.41       |
| Local Government Expenditures (GOV)   | 1.604250               | 0.0243  | A          | 0.46       | 0.57       |
| Lag of Investment (LK)                | 0.193861               | 0.1425  | C          | 0.17       | 0.21       |
| Prob. F < 0.0001                       | R-SQ = 0.9393          | Adj R-SQ = 0.9263 | DW = 2.056 |

Information:
A = Significant influence on the level $\alpha = 1 – 5\%$
B = Significant influence on the level $\alpha = 6 – 10\%$
C = Significant influence on the level $\alpha = 11 – 15\%$
D = Significant influence on the level $\alpha = 16 – 20\%$.

Table 2 shows that the increase in domestic investment has a significant effect on increasing investment, increasing exports of the industrial sector, industrial sector production, and regional government spending. The increase in exports of the industrial sector also encouraged increased investment. The value of the variable elasticity of investment is to increase investment, increase in exports of the industrial sector, production of the industrial sector, and regional government spending is below 1% for the short and long term.

Table 3: Results of Estimation of Variations in the Absorption of Labor in Industrial Sector (TK)

| Explanatory Variable      | Presumptive Parameters | Prob. T | Real Level | Elasticity |
|---------------------------|------------------------|---------|------------|------------|
|                           |                        |         |            | Short Term | Long Term |
| Labor Absorption (TK)     |                        |         |            |            |
Table 3 shows that employment is significantly affected by the Provincial Minimum Wage, the number of labor force, the growth of investment investments, the number of companies, and profit growth. The value of elasticity of labor absorption against Provincial Minimum Wage, the number of labor force, the growth of investment investments, the number of companies, and profit growth generally are still under 1% for the short term. On the other hand, the number of labor force and number of companies are above 1% for the long term.

Table 4: Results of Estimation of Industrial Sector Capital Expenditure Variables (COSTK)

| Explanatory Variable                                | Presumptive Parameters | Real Level | Elasticity |
|-----------------------------------------------------|------------------------|------------|------------|
|                                                     |                        |            | Short Term | Long Term  |
| Capital production costs of Industrial sector (COSTK)| 39511.56               |            |            |            |
| Intercept                                           |                        | B          | 0.08       | 0.08       |
| Investment (K)                                      | 0.008714               | 0.0782     | B          | 0.05       | 0.04       |
| Technological Progress (TEK)                        | 0.003274               | 0.3075     | --         | 0.31       | 0.29       |
| Exports of Industrial Sector (XD)                   | 0.005591               | 0.0001     | A          | 0.61       | 0.57       |
| Main Investment Costs (COSTINV)                     | 1.473170               | <.0001     | A          | -0.07      | -0.06      |
| Production Growth of Industrial Sector (GY)         | 1459.524               | 0.4048     | --         | 0.00       | 0.00       |
| Lag of capital production costs of Industrial sector (LCOSTK) | -0.07040              | 0.2747     | --         | -0.07      | -0.06      |

Prob. F < 0.0001

R-SQ = 0.9852
Adj R-SQ = 0.9820
DW = 1.467

Information:

A = Significant influence on the level $\alpha = 1 – 5\%$
B = Significant influence on the level $\alpha = 6 – 10\%$. 
Table 4 shows that the increase in investment is not followed by an increase in the supply of capital tools needed by the company, while the elasticity of investment costs in the industrial sector capital expenditure is above 1% both in the short and long term.

Table 5: Results of Estimation of Variations in Labor Expenditures (COSTTK)

| Explanatory Variable                                      | Presumptive Parameters | Prob. T | Real Level | Elasticity |
|-----------------------------------------------------------|------------------------|---------|------------|------------|
| Labor production costs of Industrial sector (COSTTK)      |                        |         |            |            |
| Intercept                                                 | -644528                |         |            |            |
| Labor absorption of industrial sector (TK)                | 2.336368               | 0.1830  | D          | 0.17       |
| Provincial Minimum Wage (UMP)                             | 3.367875               | 0.0146  | A          | 0.65       |
| Capital production costs of Industrial sector (COSTK)     | 0.701851               | 0.0747  | B          | 0.57       |
| Lag of labor production costs of Industrial sector (LCOSTTK) | -0.26124              | 0.0998  | B          | -0.25      |
| Prob. F < 0.0001                                          | R-SQ = 0.9538          | Adj R-SQ = 0.9477 | DW = 1.931 |

Information:
A = Significant influence on the level $\alpha = 1 - 5\%$
B = Significant influence on the level $\alpha = 6 - 10\%$
D = Significant influence on the level $\alpha = 16 - 20\%$

Table 5 shows that the increase in provincial minimum wages has a positive effect on labor expenditure in the industrial sector. The elasticity of expenditure for labor against labor absorption is less than 1% for the short and long term. The elasticity value of labor expenditure on capital expenditure in the industrial sector is also below 1% for the short and long term.

Table 6: Results of Estimating Variations in Industrial Sector Production Costs (COST)

| Explanatory Variable                                      | Presumptive Parameters | Prob. T | Real Level | Elasticity |
|-----------------------------------------------------------|------------------------|---------|------------|------------|
| Production costs of Industrial sector (COST)              |                        |         |            |            |
| Intercept                                                 | -555033                |         |            |            |
| Labor production costs of Industrial sector (COSTTK)      | 5.053911               | 0.0104  | A          | 0.46       |

Table 6 shows that the increase in provincial minimum wages has a positive effect on labor expenditure in the industrial sector. The elasticity of expenditure for labor against labor absorption is less than 1% for the short and long term. The elasticity value of labor expenditure on capital expenditure in the industrial sector is also below 1% for the short and long term.
Information:

A = Significant influence on the level $\alpha = 1 \rightarrow 5 \%$.

Table 6 shows that small production increases affect the industrial sector's production costs. The elasticity value of the industrial sector's production costs for labor expenditure is still below 1% for the short and long term. The elasticity value of the industrial sector's production costs for industrial sector production is also still below 1% for the short and long term.

Table 7: Estimation Results of Industrial Sector Profit Variables (LABA)

| Explanatory Variable                        | Presumptive Parameters | Prob. t | Real Level | Elasticity       |
|--------------------------------------------|------------------------|---------|------------|-----------------|
| Profit of Industrial sector (LABA)         |                        |         |            |                 |
| Intercept                                  | -5894405               |         |            |                 |
| Price Level of Industrial Sector (P)       | 2128414                | 0.0097  | A          | 0.13 0.16       |
| Exports of Industrial Sector (XD)          | 0.034197               | 0.0425  | A          | 0.13 0.17       |
| Industrial sector production (Y)           | 0.359440               | 0.0001  | A          | 0.70 0.87       |
| Growth in Production Costs of Industrial Sector (GCOST) | -80625.5               | 0.1306  | C          | -0.02 -0.03     |
| Lag of Profit of Industrial sector (LLABA) | 0.201570               | 0.1185  | C          | 0.18 0.23       |

Prob. F < 0.0001

R-SQ = 0.9806  Adj R-SQ = 0.9773  DW = 1.711

Information:

A = Significant influence on the level $\alpha = 1 \rightarrow 5 \%$

C = Significant influence on the level $\alpha = 11 \rightarrow 15 \%$.

Table 7 shows that industrial sector profits are significantly influenced by the level of industrial sector prices, industrial sector production, and industrial sector production cost growth. The elasticity value of industrial sector earnings to the industrial sector price level is still below 1% for the short and long term. Likewise, exports to the industrial sector and industrial sector production, each under 1% for the short and long term.
3.2. Model Validation Results

Table 8: Results of Validation of DKI Jakarta Sector Industrial Sector Model

| Endogenous Variable                                    | Validation Statistics |
|--------------------------------------------------------|-----------------------|
|                                                        | RMSE | RMSPE | U-Theil |
| Y = Industrial sector production (IDR)                  | 11011120 | 21.7513 | 0.0416 |
| K = Investment in the industrial sector                 | 10605366 | 191.400 | 0.0992 |
| TK = Labor absorption of industrial sector              | 34773.9  | 17.6919 | 0.0526 |
| COSTK = Capital production costs of Industrial sector   | 364604  | 17.7156 | 0.0399 |
| COSTTK = Labor production costs of Industrial sector    | 911796  | 40.6838 | 0.0793 |
| COST = Production costs of Industrial sector            | 10635325 | 21.4900 | 0.0829 |
| LABA = Profit of Industrial sector                      | 7805695 | 29.9626 | 0.0566 |

Based on Table 8, the RMSE value of each endogenous variable is very large, which is greater than 100, where this result does not meet the statistics in the model validation. The criteria that meet the requirements are RMSPE and U-Theil. RMSPE values are mostly endogenous variables (85.71%) smaller than 100 and the U-Theil values for all endogenous variables are smaller than 0.20. Pindyck and Rubinfeld (2008) says that the value of U-Theil is smaller than 0.20 indicating that the model does not have a systematic bias, the model can correctly replace the variation of the dependent variable, the simulation error fluctuates due to random. The results of the prediction of this model have fulfilled the statistical criteria in question so that the model declared valid is used in the simulation.

3.2.1. Simulation of Increasing Government Expenditures and Provincial Minimum Wages

The simulation results of increased local government spending and provincial minimum wages of 10% each are presented in Table 9.

Table 9: Results of Simulation of Increased Regional Government Expenditures and Provincial Minimum Wages of 10%

| Endogenous variable                      | Simulation Value          |
|-----------------------------------------|---------------------------|
|                                         | Government Expenditures    | Provincial Minimum Wage |
|                                         | (value) | (%)      | (value) | (%)     |
| Industrial sector production (million IDR) | 185.389 | 0.19     | -197.995 | -0.21  |
| investment (million IDR)                | 1.581.445 | 4.72   | -22.420   | -0.07   |
### 3.2.1.1. Impact of Increased Regional Government Expenditures

The simulation results of Table 10 show an increase in government expenditure of 10% which has a direct impact on increasing investment on average by 1,581,445 million rupiahs (4.72%). The increase in investment further impacts the industrial sector production of 185,389 million rupiah (0.19%). The increase in further investment planting has the effect of increasing labor of 524 people (0.17%). The impact of the increase in investment and labor absorption has had a further impact in the form of an increase in the cost of each factor of production and also an increase in the total production cost of 110,142 million rupiah (0.24%).

The impact of an increase in production due to an increase in production factors, then impact on increasing industrial profits. It is known that the increase in the number of factors of investment and labor absorption has an impact on increasing the cost component and this has the potential to suppress industrial profit, but the simulation results still show an increase in profit of 47,327 million rupiah (0.10%). The simulation results indicate the impact of increased production on profits is stronger than the impact due to the increase in production costs against the pressure of decreasing profits.

The results of the simulation analysis show that the impact of increased regional government spending to encourage industrial sector growth can be seen in the accumulation of investment in the sector. This means that the expansion of regional government spending is more dominant, giving a greater signal to the increase in investment than the growth in labor and profit growth.

### 3.2.1.2. Impact of Provincial Minimum Wage Increase

Table 9 shows that the 10% increase in provincial minimum wages has a direct impact on reducing the average labor absorption of 1,702 people (0.55%). The decline in labor further affected the production of the industrial sector by 197,995 million rupiah (0.21%). The subsequent decline in production had the effect of reducing investment by 22,420 million rupiahs (0.07%). The decline in investment has the effect of reducing capital production costs by 1,310 million rupiah (0.04%). On the other hand, the impact of the increase in provincial...
minimum wages directly increases labor production costs by 275,898 million rupiah (6.44%). The impact of the increase in labor costs is to increase production costs by 1,336,272 million rupiah (2.85%).

On the one hand, the impact is that there is a decrease in production and on the other hand there is an increase in production costs due to the increase in the provincial minimum wage, the eventual impact is the industrial profit has decreased by 288,751 million rupiah or a negative growth of 0.59%. The simulation results show that the increase in provincial minimum wages has considerable consequences, in addition to increasing production costs as well as reducing production and even reducing the use of production factors and industrial profits.

4. CONCLUSIONS AND SUGGESTIONS

4.1. Conclusion
Increased government spending is often a driving factor that provides stimulus for entrepreneurs to expand their businesses, support industrial business development, and plan new investments. However, the increase in provincial minimum wages often impedes and reduces private business activities in the form of production and profits.

4.2. Policy Recommendations and Implications
The suggestion of policy implications that need to be done by the regional government of DKI Jakarta to support the development of the industrial sector is to improve and develop better production technology.

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