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Article

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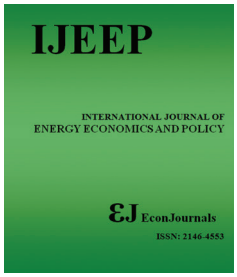

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Influence of Electricity Consumption of Industrial and Business, Electricity Price, Inflation and Interest Rate on GDP and Investments in Indonesia

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ABSTRACT

This study aims to explore the influence of electricity consumption, electricity price, inflation and interest rate on GDP and investments in Indonesia in the period 2001-2018. This paper is explanatory research. A Generalized Structured Component Analysis was a component-based approach to Structural Equation Modelling has used as a research model. The empirical analysis uses time-series data of GDP, Electricity Consumption, Electricity Price, Inflation Rate, Interest Rate, Investments and GDP in Indonesia in the period 2001-2018. The findings of this study are electricity consumption has a significant positive effect on GDP and electricity price. Electricity price has an insignificant positive effect on electricity consumption and investment. GDP has a significant positive effect on electricity consumption but insignificant on investment and inflation. Investment has an insignificant negative effect on electricity consumption and inflation. Inflation has a significant positive effect on the interest rate, vice versa, but is insignificant to electricity consumption. The interest rate has an insignificant positive effect on investment. The Originality of this study, namely previous studies focused more on the relationships and causality between Electricity Consumption, FDI, GDP, while in this study the emphasis is more on predictions between latent variables using the GSCA. In previous studies using total electricity consumption, in this study, the latent variable of electricity consumption is formed by industry electricity consumption and business electricity consumption which is productive consumption in increasing GDP. This study uses a multi-variate study consisting of Electricity Consumption of Industrial and Business, Electricity Price, Investment, GDP variables, and adding Inflation Rate and Interest Rate that represent macro-economic conditions in the research model.

Keywords: Electricity Consumption, Electricity Price, Inflation, Interest Rate, Investments, GDP
JEL Classifications: O13, Q41, Q43, E21, E22, E31, E43, N15

1. INTRODUCTION

Indonesia is an island nation where most of the population is concentrated in Java, accordingly business and industry activities are most concentrated in Java. The installed power plant capacity in Indonesia in 2018 was 41,696.17 MW and the capacity of electricity-generating plants was 35,452.44 MW. The energy produced in 2018 was 267,085.38 GWh and the energy sold was 234,617.88 GWh (PLN Statistics 2018). Based on the Indonesian National Electricity General Plan of 2018, the Government of Indonesia plans an energy mix in 2025 as follows, renewable energy can be higher than 23%, meanwhile, the portion of the gas is around 22%, the largest fuel is 0.4%, and the remaining coal is the largest 55%. Then in 2038, it is expected that the portion of renewable energy will increase to around 28%, gas around 25%, fuel at the most 0.1%, and the remaining coal at the largest 47%. According to PLN Statistics from 2001 to 2018, the average growth of electricity production in Indonesia in the last 18 years was around 6.03% per year, while the average electricity consumption growth in the same period was around 6.38% per year.

Indonesia is one of the countries in Asia that has a fairly good average economic growth, the average economic growth of Indonesia in the period 2001-2018 was 5.3% per year (BPS-Statistics Indonesia, 2009; BPS-Statistics Indonesia, 2019). Indonesia is one of the countries that have an economic dependence on electricity (Squalli, 2007). Electricity has an important role in the economy of a country. Almost all sectors of the economy need electricity as one of the most important factors in their business. Electricity is also very much needed for daily household needs and other public facilities.

Persistent shortages of electric power and capital to fund power system expansion have recently prompted the Indonesian government to allow the private sector to supply electricity. Price has become a controversial Issue-both the retail price private producers would charge the public, and the wholesale price at which they would sell in bulk to the state utility, PLN and the government has traditionally kept the retail price below cost to support economic development objectives, and subsidies have covered PLNs losses (Lorenzo, 1995).

Chandran et al. (2010) investigated the relationship between electricity consumption and real gross domestic product (GDP) for Malaysia in a bivariate and multivariate framework. They found that electricity consumption has a positive significant effect on GDP, while Squalli (2007) found negative causality from GDP and electricity consumption in the OPEC members. Lee (2005) re-investigated the co-movement and the causality relationship between energy consumption and GDP in 18 developing countries, he found that energy consumption has a positive significant effect on GDP in Indonesia, but not significant in Hungary. Aytac and Guran (2010), investigated the relationship between electricity consumption, electricity price and economic growth in Turkey: 1984-2007, they found unidirectional causality run from economic growth to electricity price, while Sengul and Tuncer (2006) found a bidirectional causality.

Inflation, interest rates and investment to increase GDP are macroeconomic problems faced by almost all emerging countries. Mallik and Chowdhury (2002) examined the relationship between inflation and real income in Australia, Canada, New Zealand, Finland, Spain, Sweden and UK, they found the long-run relationship between inflation and real income was positive in most cases, while Attari and Javed (2013) found in the short run, the rate of inflation does not effect on the real income. The examined results on the relationship between the interest rate, investment economic growth had different outcomes, Garegnani (1978) found no inverse relationship, while Hansen and Seshadri (2013) and Shaukat et al. (2019) found an inverse relationship. Di Nino et al. (2011) investigated a relationship between exchange rate and economic growth in Italy and found a positive relationship between undervaluation and economic growth, while Habib et al. (2016) found that a real appreciation reduces significantly annual real GDP growth, and vice versa. Several previous studies on the effect of Electricity Consumption, Electricity Price, Inflation Rate, Interest Rate, Exchange Rate on Investments and GDP results have not been conclusive. Gupta and Singh (2016) examined a causal nexus between foreign direct investment and economic growth, they found short-run causality between FDI and GDP in China, and unidirectional long-run causality running from GDP to FDI in the case of Brazil, India and China. While FDI and GDP are independent of one another in Russia and South Africa.

The projected growth in national electricity demand above will be followed by plans for the construction of new power plants, where the construction of new power plants requires new investment from stakeholders. Investment decisions are influenced by several factors such as interest rates, inflation, rates, etc. Based on the previous result studies, this study seeks to explore the influence of electricity consumption, electricity price, inflation and interest rate on GDP and investments in Indonesia in the period 2001-2018.

2. LITERATURE REVIEW.

2.1. Electricity Consumption and GDP

National electricity consumption is the total electricity consumption by the entire industrial structure and housing sector. Electricity consumption by all industrial sectors includes consumption of primary, secondary and tertiary industrial sectors. This is productive electricity consumption and can produce added value (Hu and Hu, 2013). Electricity consumption is caused by real economic activity (Jamil and Ahmad, 2010).

Narayan and Smyth (2009) found an increase in electricity consumption has a positive effect on GDP. Chandran et al. (2010) found a significant positive relationship between electricity consumption and the real GDP. Ouédraogo (2010) found a positive causal relationship between electricity consumption and economic growth both in the short and long term.

Yoo and Kim (2006) have investigated the causal relationship between power generation and economic growth in Indonesia, using the time series technique for the 1971-2002 period, the results show that there is unidirectional causality between economic growth and electricity generation without feedback effects. Squalli (2007) found a negative causality from GDP and electricity consumption. Different results found by Ozturk and Acaravci (2011) and Bah and Azam (2017), found no causal relationship between electricity consumption and economic growth.

2.2. Electricity Consumption and Investments

Electricity consumption is representative of production input at the company level and the production function in electricity generation, and electricity consumption is positively correlated with production input and output factors (Hu and Hu, 2013). Although the use of wind and solar for electricity generation is increasing, they are unable to supply basic load requirements without energy storage capacity, which is currently impractical on the scale needed (Romero and Aguilar, 2011).

Kumari and Sharma (2018) found that electricity consumption plays an important role in high GDP and GDP attracts more FDI. Tang (2009) found causalities in a positive relationship between FDI and electricity consumption. Ouédraogo (2010) found no significant causal relationship between electricity consumption

and capital formation. Hamdi et al. (2014) found the relationship between FDI and electricity consumption is two way. Asiamah et al. (2019) found a significant positive effect of electricity production on FDI.

2.3. Electricity Price and Electricity Consumption

Electricity consumption behaviour can be influenced by electricity prices, and as a result, can save energy, reduce emissions, and increase the load factor (Hu and Hu, 2013). The price of electricity goes up (down) in the manufacturing sector due to deregulation, then electricity and labour intensiveness in the manufacturing sector will go down (up) (Bölük and Koç, 2010). Osigwe and Arawomo (2015) found a bidirectional causality between electricity consumption and electricity prices.

According to Sun et al. (2019) the industrial sector in APEC member countries has the largest share in electricity consumption, around 45.5% of consumption in 2016, with an upward trend. Jamil and Ahmad (2010) found that electricity consumption is caused by electricity prices, but not vice versa. Cho and Kim (2007) found that electricity prices critically affected electricity consumption, while Aytac and Guran (2010), found that electricity prices have no effect on electricity consumption.

2.4. Electricity Price and Investments

In the case of gas and coal power plants, the risk premium will lead to an increase in electricity prices by 5-10% to stimulate investment (Blyth et al., 2007). Changes in electricity prices have an impact on electricity demand and investment demand. The key to controlling electricity prices in the future lies in determining the level and type of investment that is ideal in the generation and in enabling full participation of consumers in the market (Murray, 1998). An increase in electricity prices will significantly reduce investment in the manufacturing sector and on the other hand, an increase in capital costs will reduce electricity demand (Bölük and Koç, 2010). Barteková and Ziesemer (2018) found that higher electricity prices reduce the country's ability to attract FDI. In the short term, electricity prices cause a decrease in net FDI inflows. Electricity price has a significant negative effect on FDI inflow in the short term and long term.

2.5. Investments and GDP

Developing countries generally do not have sufficient funds to finance development so that they require loans and investments from abroad to cover the lack of funds as a source of financing for development. Ouédraogo (2010) a high level of investment leads to a high level of economic growth and vice versa.

Wang (2010) found that inward FDI had a negative effect on domestic investment, while the cumulative effect of FDI over time tends to be positive. Elheddad (2014) found that FDI inflows contributed significantly to public domestic investment but inhibited private domestic investment. Choe (2003) found that FDI caused economic growth and vice versa. In addition, gross domestic investment does not cause economic growth, but strong economic growth causes gross domestic investment. Adams (2009) found FDI had a significant positive effect on economic growth. Kim and Seo (2003) found FDI has several positive effects on economic growth, but the effect seems to be insignificant, while Hermes and Lensink (2003) found FDI has a significant negative impact on the host country. Mohamed et al. (2013) found that there is no evidence of causality between FDI and economic growth, but Economic growth has a two-way correlation with domestic growth in the long run.

2.6. Inflation Dan Electricity Consumption

An increase in oil prices leads to higher production costs and drives inflation (Shahbaz dan Ali, 2016, in Shahbaz et al., 2017). Bekhet and Othman (2011) found a one-way Granger-causality flowing from electricity consumption to inflation, this means that increasing electricity consumption has had an impact on inflation. Günay (2016) found that inflation had a significant negative effect on electricity demand (consumption). This finding is in line with Iyke (2015) who found a causal relationship between inflation and electricity consumption, Inflation has a negative effect on electricity consumption.

2.7. GDP and Inflation

According to structuralists inflation is needed for economic growth, while according to monetarists inflation is detrimental to economic growth. Chowdhury (2002) examined constraints on macroeconomic policymaking in Indonesia, the results found that there was no statistically significant relationship between inflation and growth in Indonesia. While Gillman et al. (2004) found that inflation has a negative impact on economic growth comprehensively in OECD countries.

Judson and Orphanides (1996), Ghosh and Phillips (1998), Khan and Senhadji (2001), Risso and Carrera (2009), López-Villavicencio and Mignon (2011), Hung (2017) documented inflation has a significant negative effect on economic growth when above the threshold value of a specific inflation rate, and there is no significant effect below the threshold value. While Attari and Javed (2013) found in the short run, the inflation rate does not affect economic growth, but government spending affects economic growth, whereas in the long run there is a relationship between inflation, economic growth and government expenditure.

2.8. Investments and Inflation

High inflation rates are often associated with "overheating" economies, that is, economies where the demand for goods and services exceeds productive capacity, which leads to increased price pressures (Bodie et al., 2017). If inflation tends to increase, investors need to be vigilant (Greer, 2005). Reenu and Sharma (2015) found that inflation has a positive significant effect on FDI.

Inflation erodes the purchasing power of income before it is converted to consumption (utility), thus, the net benefits of investment fall when inflation rises. This mechanism captures the direct negative effect of foreign (domestic) inflation on a foreign (domestic) investment (Sayek, 2009). Inflation has a negative effect on economic growth because it causes real investment in the economy to shrink (Aydin et al., 2016). Inflation has a negative significant effect on FDI (Ahn et al., 1998; Onyeiwu and Shrestha, 2004; Wang, 2004; Li and Liu, 2005; Kaur and Sharma, 2013; Reenu and Sharma, 2015; Asiamah et al., 2019).

2.9. Inflation and Interest Rate

Inflation, especially with varying inflation rates, can increase uncertainty in the economy and increase interest rates (Landau, 1985). The higher inflation runs in the long run, the higher the total benefits paid to beneficiaries. Some investment benefit officers must argue that inflation is not very important, because higher inflation leads to higher interest rates, which gives them a higher discount rate to calculate the present value of their obligations, interest rates are rising because inflation rises (Greer, 2005).

Chu et al. (2017) Fisher's equation raise a positive long-term relationship between the nominal interest rate and the inflation rate. Whereas Reenu and Sharma (2015) found inflation is negatively correlated with an interest rate, but the coefficient is not too strong. Al-Khazali (1999) found that the nominal interest rate and inflation were not coordinated and found no direct causality between inflation and interest rates, vice versa.

2.10. Interest Rate and Investments

Loans from the public can cause interest rates to rise thereby reducing investment and capital accumulation or investment (Landau, 1985). High-interest rates reduce the present value of future cash flows, thereby reducing the attractiveness of investment opportunities. For this reason, real interest rates are the main determinant of business investment spending (Bodie et al., 2017), low-interest rates can cause changes in the volume and composition of investments abroad (Ammer et al., 2019). Lower deposit rates at home stimulate investment because of lower capital costs (Ma, 2017). Reenu and Sharma (2015) found that interest rate has a positive not significant effect on FDI.

Asiamah et al. (2019) and Tripathi et al. (2015) found that interest rate has a significant negative effect on FDI, this finding is supported by Greene and Villanueva (1991); Onyeiwu and Shrestha (2004) and Yohanna (2013). While Li and Liu (2005), found Interest rate has no impact on FDI inflows, as FDI is direct rather than portfolio investment.

3. RESEARCH METHOD

This paper is explanatory research, which is to explain the effect of variable X on Y through testing the structural model. In general, the data presented is in the form of numbers that will be calculated through a statistical test. The empirical analysis uses time-series data of GDP, Electricity Consumption, Electricity Price, Inflation Rate, Interest Rate, Investments and GDP in Indonesia in the period 2001-2018.

3.1. Development of Structural Charts

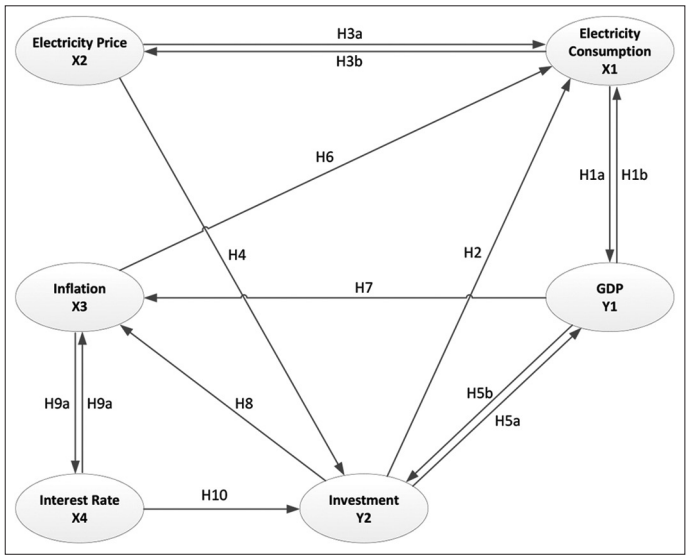
The structural research model is presented in the flowchart as in Figure 1.

Based on the literature reviews and former research outcomes, the hypothesis in this study is as follows:

H1a: Electricity Consumption has a significant positive effect on GDP.

H1b: GDP has a significant positive effect on Electricity Consumption.

Figure 1: Structural research model



H2: Investments has a significant positive effect on Electricity Consumption.

H3a: Electricity Price has a significant positive effect on Electricity Consumption.

H3b: Electricity Consumption has a significant positive effect on Electricity Price.

H4: Electricity Price has a significant positive effect on Investments.

H5a: Investments has a significant positive effect on GDP.

H5b: GDP has a significant positive effect on Investments.

H6: Inflation has a significant positive effect on Electricity Consumption.

H7: GDP has a significant negative effect on Inflation.

H8: Investments has a significant positive effect on Inflation.

H9a: Inflation has a significant positive effect on Interest Rate.

H9b: Interest Rate has a significant positive effect on Inflation.

H10: Interest Rate has a significant positive effect on Investments.

3.2. Research Variables

The problem in this study is formulated into a simultaneous model, which is a model formed through more than one dependent variable that is explained by one or several independent variables, where the dependent variable will at the same time act as an independent variable for other tiered relationships.

3.2.1. Exogenous variables

Exogenous variables in this study consisted of Electricity Consumption (X1), Electricity Price (X2), Inflation Rate (X3), Interest Rate (X4) with the following indicators:

1. Electricity Consumption (GWh), measured using formative indicators as follows:
   Industry (X1.1), (2) Business (X1.2). Electricity Consumption data is in GWh, for statistical purposes, all indicators are logged naturally. The Electricity Consumption as a variable refers to Narayan and Smyth (2009), Chandran et al. (2010), Ozturk and Acaravci (2011), Hu and Hu (2013), Bah and Azam (2017), Ali et al. (2020).

2. Electricity Price (Rp/kWh), measured using formative indicators as follows:
   (1) Industry (X2.1), (2) Business (X2.2). The Electricity Price variable refers to Jamil and Ahmad (2010), Osigwe and Arawomo (2015), Barteková and Ziesemer (2018).
3. Inflation Rate (%), measured using formative indicators as follows:
   (1) Inflation Rate (X4.1). The Inflation Rate variable refers to Ahn et al. (1998), Ghosh and Phillips (1998), Judson and Orphanides (1996), Khan and Senhadji (2001), Chowdhury (2002), Onyeiwu and Shrestha (2004), Wang (2004), Gillman et al. (2004), Li and Liu (2005), Sayek (2009), Risso and Carrera (2009), López-Villavicencio and Mignon (2011), Kaur and Sharma (2013), Iyke (2015), Reenu and Sharma (2015), Günay (2016), Hung (2017), Asiamah et al. (2019).
4. Interest Rate (%), measured using formative indicators as follows:
   (1) Central Bank of Indonesia Rate (X4.1), The Interest Rate variable refers to Greene and Villanueva (1991), Al-Khazali (1999), Onyeiwu and Shrestha (2004), Li and Liu (2005), Yohanna (2013), Reenu and Sharma (2015), Tripathi et al. (2015), Chu et al. (2017), Asiamah et al. (2019).

3.3. Endogenous Variables

Endogenous variables are variables that are influenced by other variables in the research model, endogenous variables in this study consist of GDP (Y1) and Investments (Y2) with the following indicators:

1. GDP (Y1), measured using formative indicators as follows:
   (1) GDP (Y1.1), GDP data is measured using GDP at current in trillion rupiahs, for statistical purposes, all indicators are logged naturally. The GDP indicator refers to Squalli (2007), Sarwar et al. (2017).
2. Investments (Y2), measured using formative indicators as follows:
   (1) Domestic Investment, (2) Foreign Direct Investment. Domestic Investment Data is in billion Rupiahs and Foreign Direct Investment is in million US $, for statistical purposes, all indicators are logged naturally. The Investments variable refers to Ahn et al. (1998), Choe (2003), Kim and Seo (2003), Hermes dan Lensink (2003), Adams (2009), Wang (2010), Ouédraogo (2010), Mohamed et al. (2013), Kaur and Sharma (2013), Yohanna (2013), Elheddad (2014), Hamdi et al. (2014), Tripathi et al. (2015), Asiamah et al. (2019).

3.4. Inferential Statistical Analysis

Inferential statistical analysis is an analysis that focuses on the field of analysis and interpretation of data to conclude. The inferential statistical method used to analyze in this study is component-based using Generalized Structured Component Analysis (GSCA) online software (www.sem-gesca.com). The method is versatile enough to capture complex relationships among variables, including higher-order components and multi-group comparisons (Hwang and Takane, 2004).

4. RESULTS AND DISCUSSIONS

4.1. Evaluation of Model Measurement

The generalized structured component analysis (GSCA) defines a latent variable as a component or weighted composite of indicators (Hwang and Takane, 2015). GSCA converged even when the sample size is 10, the mean congruence coefficient between parameters and estimates higher than 0.90. GSCA is free from improper solutions, which lead to interpretational difficulties and tend to occur frequently in combination with small sample sizes (Kim et al., 2016).

The weighted relation model is used to explicitly express such a relationship between indicators and a latent variable. GSCA involves the specification of three sub-models to specify a structural equation model namely measurement, structural, and weighted relation models. Formative indicator entails no loading in the measurement model, while its weight denotes how the indicator contributes to forming the corresponding latent variable. Fit shows the proportion of the total variance of all indicators and latent variables explained by a given particular model specification. The values of Fit range from 0 to 1. The larger this value, the more variance in the variables is accounted for by the model specification (Hwang and Takane, 2015).

Then the data is processed using the online GSCA online software and the results are as follows in Table 1.

Indicators X1.1 (ln Industrial Electricity Consumption), X2.1 (ln Industrial Electricity Price) and Y2.1 (ln Domestic Investment) are not significant and should be dropped from the model, then data processing was run again using the GSCA online software and the results are as in Table 2.

4.2. Structural Model Results

Evaluation of structural models resulting from GSCA output is as follows as presented in Table 3.

The results of the Path Coefficient Structural Model above are presented in the form of a path diagram as follows in Figure 2.

4.3. Based on Table 3 and Figure 2, the Empirical Results as Follows

1. Hypothesis H1a, Electricity Consumption has a significant positive effect on GDP is accepted because the path coefficient from Electricity Consumption (X1) to GDP (Y1) is 0.951 and CR = 37.06, it means that Electricity Consumption has a significant positive effect on GDP.
   Hypothesis H1b, GDP has a significant positive effect on Electricity Consumption is accepted because the path coefficient from GDP (Y1) to Electricity Consumption (X1) is 0.923 and CR = 10.38, it means that GDP has a significant positive effect on Electricity Consumption. An increase in GDP will increase Electricity Consumption significantly, but the impact of the increase in GDP on Electricity Consumption is smaller than the impact of the increase in Electricity Consumption on GDP.

Table 1: Measurement model of variables

Variable	Loading			Weight			SMC		
	Estimate	SE	CR	Estimate	SE	CR	Estimate	SE	CR
X1	AVE = 0.000, Alpha = 0.913								
X1.1	0	0	0	-0.076	0.261	0.29	0	0	0
X1.2	0	0	0	1.074	0.255	4.22*	0	0	0
X2	AVE = 0.000, Alpha = 0.985								
X2.1	0	0	0	-0.046	0.531	0.09	0	0	0
X2.2	0	0	0	1.045	0.516	2.02*	0	0	0
X3	AVE = 0.000, Alpha = 0.000								
X3.1	0	0	0	1	0	-	0	0	0
X4	AVE = 0.000, Alpha = 0.000								
X4.1	0	0	0	1	0	-	0	0	0
Y1	AVE = 0.000, Alpha = 0.000								
Y1.1	0	0	0	1	0	-	0	0	0
Y2	AVE = 0.000, Alpha = 0.829								
Y2.1	0	0	0	-0.205	0.572	0.36	0	0	0
Y2.2	0	0	0	1.174	0.5	2.35*	0	0	0

CR* = Significant at 0.05 level

Table 2: Measurement model of variables

Variable	Loading			Weight			SMC		
	Estimate	SE	CR	Estimate	SE	CR	Estimate	SE	CR
X1	AVE = 0.000, Alpha = 0.000								
X1.2	0	0	0	1	0	-	0	0	0
X2	AVE = 0.000, Alpha = 0.000								
X2.2	0	0	0	1	0	-	0	0	0
X3	AVE = 0.000, Alpha = 0.000								
X3.1	0	0	0	1	0	-	0	0	0
X4	AVE = 0.000, Alpha = 0.000								
X4.1	0	0	0	1	0	-	0	0	0
Y1	AVE = 0.000, Alpha = 0.000								
Y1.1	0	0	0	1	0	-	0	0	0
Y2	AVE = 0.000, Alpha = 0.000								
Y2.2	0	0	0	1	0	-	0	0	0

CR = Significant at 0.05 level

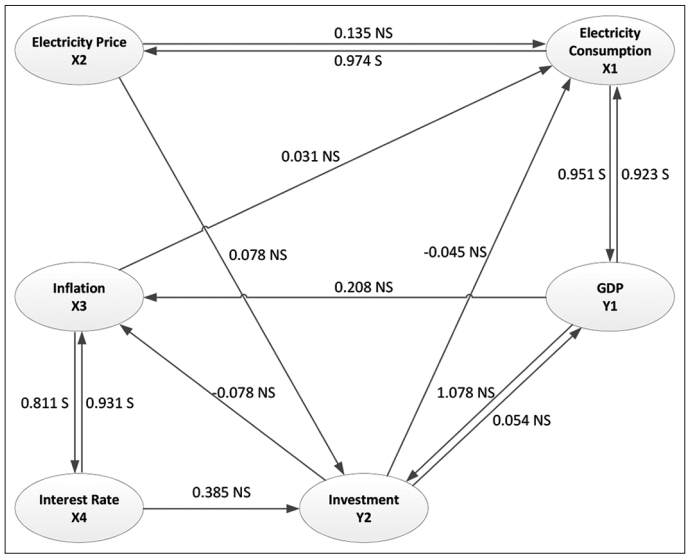
Table 3: Path coefficient structural model

Path coefficients			
	Estimate	SE	CR
X1→X2	0.974	0.007	139.9*
X1→Y1	0.951	0.026	37.06*
X2→X1	0.135	0.083	1.62
X2→Y2	0.078	0.66	0.12
X3→X1	0.031	0.025	1.28
X3→X4	0.811	0.053	15.2*
X4→X3	0.931	0.18	5.18*
X4→Y2	0.385	0.281	1.37
Y1→X1	0.923	0.089	10.38*
Y1→X3	0.208	0.395	0.53
Y1→Y2	1.078	0.741	1.45
Y2→X1	-0.045	0.034	1.33
Y2→X3	-0.078	0.328	0.24
Y2→Y1	0.054	0.029	1.9

CR* = Significant at 0.05 level

2. Hypothesis H2, Investments has a significant positive effect on Electricity Consumption is rejected because the path coefficient from Investments (Y2) to Electricity Consumption (X1) is -0.045 and CR = 1.33, it means that Investments have an insignificant negative effect on Electricity Consumption. An increase in investment will reduce Electricity Consumption insignificantly.
3. Hypothesis H3a, Electricity Price has a significant positive effect on Electricity Consumption is rejected because the path coefficient from Electricity Price (X2) to Electricity Consumption (X1) is 0.135 and CR = 1.62, it means that Electricity Price has an insignificant positive effect on Electricity Consumption. An increase in Electricity Price will increase Electricity Consumption insignificantly.
   Hypothesis H3b, Electricity Consumption has a significant positive effect on Electricity Price is accepted because the path coefficient from Electricity Consumption (X1) to Electricity Price (X2) is 0.974 and CR = 139.9, it means that Electricity Consumption has a significant positive effect on Electricity Price. An increase in Electricity Consumption will increase Electricity Prices significantly.
4. Hypothesis H4, Electricity Price has a significant positive effect on Investments is rejected because the path coefficient from Electricity Price (X2) to Investments (Y2) is 0.078 and CR = 0.12, it means that Electricity Price has an insignificant positive effect on Investments. An increase in Electricity Price will increase investment significantly.
5. Hypothesis H5a, Investments has a significant positive effect on GDP is rejected because the path coefficient from Investments (Y2) to GDP (Y1) is 0.054 and CR = 1.9, it means that Investments has an insignificant positive effect

Figure 2: Test results path chart. Remarks: S: Significant, NS: Not Significant



on GDP. An increase in investment will not increase GDP significantly.

Hypothesis H5b, GDP has a significant positive effect on Investments rejected because the path coefficient from GDP (Y1) to Investments (Y2) is 1.078 and CR = 1.45, it means that GDP has an insignificant positive effect on Investments. An increase in GDP will increase investment insignificantly.

6. Hypothesis H6, Inflation has a significant positive effect on Electricity Consumption is rejected because the path coefficient from Inflation (X3) to Electricity Consumption (X1) is 0.031 and CR = 1.28, it means that Inflation has an insignificant positive effect on Electricity Consumption. An increase in inflation will increase Electricity Consumption insignificantly.
7. Hypothesis H7, GDP has a significant positive effect on Inflation is rejected because the path coefficient from GDP (Y1) to Inflation (X3) is 0.208 and CR = 0.53, it means that GDP has an insignificant positive effect on inflation. An increase in GDP will increase Inflation insignificantly.
8. Hypothesis H8, Investments has a significant positive effect on Inflation is rejected because the path coefficient from Investments (Y2) to Inflation (X3) is -0.078 and CR = 0.24, it means that Investments have an insignificant negative effect on Inflation. Increase in Investments will reduce Inflation insignificantly.
9. Hypothesis H9a, Inflation has a significant positive effect on Interest Rate is accepted because the path coefficient from Inflation (X3) to Interest Rate (X4) is 0.811 and CR = 15.2, it means that Inflation has a significant positive effect on Interest Rate. An increase in inflation will increase interest rates significantly.

   Hypothesis H9b, Interest Rate has a significant positive effect on Inflation is accepted because the path coefficient from Interest Rate (X4) to Inflation (X3) is 0.931 and CR = 5.18, it means that Interest Rate has a significant positive effect on Inflation. An increase in Interest Rate will increase inflation significantly.

Table 4: Measurement model of goodness FIT

Model fit	Remarks
FIT	
0.842	Good
AFIT	
0.806	Good
NPAR	
20	

10. Hypothesis H10, Interest Rate has a significant positive effect on Investments is rejected because the path coefficient from Interest Rate (X4) to Investments (Y2) is 0.385 and CR = 1.37, it means that Interest Rate has an insignificant positive effect on Investments. An increase in Interest Rate will not significantly increase Investments.

    Based on Table 4, The goodness-fit value of the regression model is 0.842 which means that the total variation of all variables that can be explained by the model is 84.2% and the rest is explained by other variables that are not yet in the model. The adjusted Fit value is 0.806. NPAR is the estimated number of parameters 20.

5. CONCLUSIONS, IMPLICATIONS, LIMITATIONS AND SUGGESTIONS

5.1. Conclusions

Based on the empirical result analysis the conclusion is as follows, Electricity Consumption has a significant positive effect on GDP, GDP has a significant positive effect on Electricity Consumption. An increase in GDP will significantly increase Electricity Consumption, but the impact of the increase in GDP on Electricity Consumption is smaller. Investments have an insignificant negative effect on Electricity Consumption, Electricity Price has an insignificant positive effect on Electricity Consumption. Electricity Consumption has a significant positive effect on Electricity Price. Electricity Price has an insignificant positive effect on Investments. An increase in Electricity Price will increase investment significantly.

Investments have an insignificant positive effect on GDP. An increase in investment will not increase GDP significantly. GDP has an insignificant positive effect on Investments. An increase in GDP will increase investment insignificantly. Inflation has an insignificant positive effect on Electricity Consumption. An increase in inflation will increase Electricity Consumption insignificantly. GDP has an insignificant positive effect on inflation. An increase in GDP will increase Inflation insignificantly. Investments have an insignificant negative effect on inflation. Increase in Investments will reduce Inflation insignificantly.

Inflation has a significant positive effect on Interest Rate. An increase in inflation will increase interest rates significantly. Interest Rate has a significant positive effect on inflation. An increase in Interest Rate will increase inflation significantly. Interest Rate has an insignificant positive effect on Investments. An increase in Interest Rate will not significantly increase Investments.

5.2. Implications

5.2.1. Practical implications

The paper provides an overview of the influence of investment on electricity consumption and GDP. Studies on Investment, Electricity Consumption and GDP using latent variables has not been done. The result of the statistical analysis test of this research hypothesis is investment has no significant effect on electricity consumption and GDP. Formulate better governance in investment is necessary in order for the increase in new investment can have a significant positive effect on electricity consumption and GDP.

5.2.2. Empirical implication

In general, the results of previous studies found that inflation reduced electricity consumption. The result of the statistical analysis test of this research hypothesis is inflation has no significant effect on electricity consumption. Management of interest rates to control inflation has a significant effect.

5.2.3. Limitations and suggestions

1. There are limitations to getting electricity statistics for the period 1970-2000 so that this study only uses data for the period 2001-2018.
2. This study has no done examines the cause of the negative relationship between Industrial Electricity Consumption indicators and Business Electricity Consumption, and Industrial Electricity Price indicators with Business Electricity Price, as well as the causes of the negative relationship between Domestic Investment indicators and FDI. The author suggests that these findings can be examined in future studies.

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