Efficient Vol 5 (1) (2022): 1520-1533 DOI: https://doi.org/10.15294/efficient.v5i1.50287

EFFICIENT

Indonesian Journal of Development Economics

https://journal.unnes.ac.id/sju/index.php/efficient

The Effect of Innovation, Economic Freedom, Macroeconomic Variables on GDP

Sefria Elina[1]✉, Andryan Setyadharma[2]

Development Economic Study Program, Economics Faculty, Universitas Negeri Semarang

Permalink/DOI: https://doi.org/10.15294/efficient.v5i1.50287

Received: July 2021 ; Accepted: October 2021 ; Published: January 2022

Abstract

The G-20 is a group of 19 countries with the largest economies in the world plus the European Union. Basically, the role of the G-20 in the economy is to maintain stable and high economic growth, realizing balanced growth between developed and developing countries. but based on data, the average GDP growth of the G-20 group in 2014 to 2019 was always below the world average even though the G-20 member countries had a systemic impact on the global economy. This study aims to analyze the effect of innovation, economic freedom, and macroeconomic variables on economic growth in the G-20. The data used in this research is secondary data. This study uses a fixed-effect model with panel data regression, consisting of 19 G-20 member countries for the 2009-2019 period. The results of this study indicate that innovation and economic freedom have no significant effect on economic growth in the 19 G-20 member countries. Inflation and population have a negative and significant effect on economic growth in the 19 member countries of the G-20. Meanwhile, FDI and trade have a positive and significant impact on economic growth in the 19 G-20 member countries.

Keywords: ***GDP, Innovation, Economic Freedom, Macroeconomic Variables***

Abstrak

G-20 adalah 19 negara dengan ekonomi besar di dunia ditambah dengan organisasi Uni Eropa yang berperan untuk menjaga pertumbuhan ekonomi yang stabil dan tinggi antara negara maju dan negara berkembang. Berdasarkan data, rata-rata pertumbuhan PDB kelompok G-20 pada tahun 2014 hingga 2019 selalu berada di bawah rata-rata dunia meskipun negara-negara anggota G-20 berdampak sistemik terhadap perekonomian global. Penelitian ini bertujuan untuk menganalisis pengaruh inovasi, kebebasan ekonomi, dan variabel makroekonomi terhadap pertumbuhan ekonomi di G-20. Data yang digunakan adalah data sekunder. Penelitian ini menggunakan model fixed effect dengan regresi data panel, terdiri dari 19 negara anggota G-20 periode 2009-2019. Hasil penelitian ini menunjukkan bahwa inovasi dan kebebasan ekonomi tidak berpengaruh signifikan terhadap pertumbuhan ekonomi di 19 negara anggota G-20. Inflasi dan jumlah penduduk berpengaruh negatif dan signifikan terhadap pertumbuhan ekonomi di 19 negara anggota G-20. Sedangkan FDI dan perdagangan berpengaruh positif dan signifikan terhadap pertumbuhan ekonomi di 19 negara anggota G-20.

Kata Kunci: PDB, Inovasi, Kebebasan Ekonomi, Variabel Makroekonomi

How to Cite: Elina, S., & Setyadharma, A. (2022). The Effect of Innovation, Economic Freedom, Macroeconomic Variables on GDP. Efficient: Indonesian Journal of Development Economics, 5(1), 1520-1533. https://doi.org/10.15294/efficient.v5i1.50287

✉ Correspondence Address :
Address: Gedung L2 Lantai 2 FE Unnes
Kampus Sekaran, Gunungpati, Semarang, 50229
E-mail : sefriaelina98@students.unnes.ac.id

INTRODUCTION

The G-20 or Group of 20 major economies is a group of 19 countries with large economies in the world coupled with the organization of the European Union. The 19 countries include South Africa, the United States, Saudi Arabia, Argentina, Australia, Brazil, China, India, Indonesia, The United Kingdom, Italy, Japan, Germany, Canada, South Korea, Mexico, France, Russia, and Turkey.

The European Union is an intergovernmental organization of 27 countries: Austria, the Netherlands, Belgium, Bulgaria, Czech Republic, Denmark, Estonia, Finland, Hungary, Ireland, Italy, Germany, Croatia, Latvia, Lithuania, Luxembourg, Malta, Poland, Portugal, France, Romania, Cyprus, Slovenia, Slovakia, Spain, Sweden, and Greece.

Decisions within the organization of the European Union are determined through deliberation and consensus among member states. The EU countries that are members of the G-20 are France, Germany, and Italy. While the other 24 EU countries are not directly involved in the G-20 processes and activities, these countries have little influence on EU participation in the G-20 (Nasra & Debaere, 2012). In this study does not involve EU organizations because the EU members themselves are already represented by France, Germany, and Italy in the G-20 membership.

The G-20 group was formed in 1999 as a forum that systematically gathered the economic forces of developed and developing countries to discuss important issues of the world economy. The G-20 group collects nearly 90% of the world's Gross National Product (PNB, GNP), 80% of total world trade, and two-thirds of the world's population. The G-20 claims to have a global mandate to contribute to the strengthening of international financial architects and provides a forum for discussion on national policies, international cooperation, and international financial institutions. As a global mandate holder, the G-20 is also responsible for providing benefits to countries not included in the forum (Hermawan, 2012).

This is evidenced by the competence of the G-20 in the face of the financial crisis in 2008, namely in the second quarter of 2010, the World Bank noted the start of economic recovery marked by indications of economic growth of countries in the world. This indicates that the decisions and agreements made by the G-20 clearly affect not only the G-20 members but also non-G-20 members.

Non-G-20 members are satisfied with the G-20's ability to realize the recovery in the economic growth of its member countries in the first quarter of 2010, after approximately three years of crisis in the United States (Vastergaard, 2011). Basically, the role of the G-20 in the economy is to maintain stable and high economic growth, the realization of balanced growth for developed and developing countries (Hermawan et al, 2011).

So that the stability and increase in economic growth in supporting the realization of the G-20 goals are very important to analyze considering that the G-20 itself is the main forum of economic cooperation, so economic growth in G-20 member countries will have systemic influence for countries that are not members of the G-20. Data on the economic growth of G-20 member countries in 2009-2019 can be seen in figure 1.

Figure 1 is data on the GDP growth of the 19 G-20 member countries from 2009-to 2019.

After the global financial crisis in 2008, GDP growth was relatively minus in 2009, even Russia's GDP growth in 2009 fell to minus 7.8. GDP growth in 2010 experienced a fairly rapid increase, judging from figure 1 GDP growth in 2010 there is no minus. While in 2011 of the nineteen G-20 member countries only six countries experienced a rise in GDP growth from last year, namely Australia, France, Canada, Saudi Arabia, Turkey, and South Africa, other G-20 member countries again experienced a decline in GDP growth.

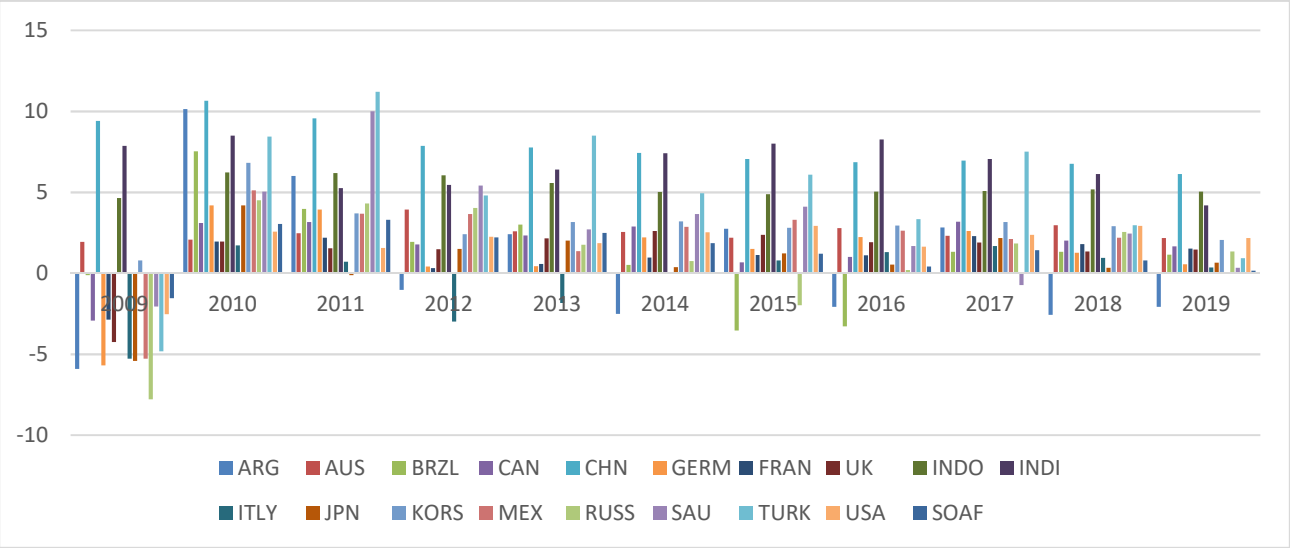

Figure 1. GDP Growth (% Annual) G-20 Member Countries
Source: World Bank, processed

In 2012, only four countries experienced a rise in GDP growth: Australia, India, Japan, and the United States. Then in 2013, the increase in GDP growth was experienced by twelve countries, only seven countries experienced a decline in GDP growth, namely Australia, China, Indonesia, Mexico, Russia, Saudi Arabia, and the United States. Then in 2014, 2015, and 2016 of the nineteen G-20 member countries, only nine countries experienced a rise in GDP growth.

In the last three years of 2017, as many as twelve countries experienced an increase, while in 2018 there were only six countries whose GDP growth was up from last year. The latest in 2019 the decline in GDP growth occurred in almost all G-20 member countries, while the only increases in the United Kingdom and Japan. It can be inferred from the figure of 1 GDP growth of G-20 member countries from 2009 to 2019 fluctuating and tends to decline.

Based on figure 2 the average GDP growth of the G-20 group above the average of world GDP growth only occurred in 2010 to 2013. While in 2009, 2014 to 2019 the average GDP growth of the G-20 group was always below the average growth of world GDP. The world economy experienced its lowest growth in a decade, slumping to 2.365% in 2019, due to a prolonged trade dispute. In 2019, economic growth slowed in nearly 90% of the world (IMF, 2020).

As happened in early 2017 when the issue of a trade war between the two superpowers of

the United States and China. In its publication, the World Trade Organization (WTO) stated that the trade war between two major U.S.-China countries made global economic conditions even less conducive. The U.S. government made changes to import tariffs not only on China but also imposed on other strategic business partners such as the European Union, Brazil, Argentina, Canada, Mexico, and South Korea.

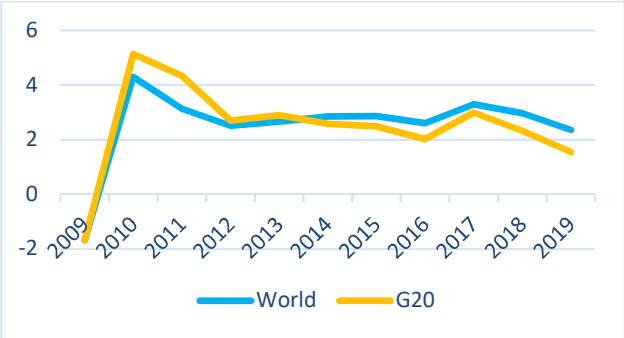

Figure 2. Average GDP Growth World and the G-20 (% YoY)
Source: OECD, processed.

The trade war continues to expand in many countries and resulted in a decrease in world trade volumes that affect various countries, this causes losses in GDP stemming from falling business confidence and negative market reaction due to the widespread trade war. The United States, China, and the Aforementioned strategic business partners are G-20 member countries, so the country's GDP growth is heavily affected by the ongoing trade war.

Figure 2 shows the average GDP growth of the G-20 group from 2014 to 2019 has always been below the world average even though G-20 member countries have a systemic impact on the global economy. Cooperation between the G-20 member countries is needed to achieve financial stability. In general, economic growth is influenced by various variables including innovation, economic freedom, and other macroeconomic variables.

Some previous studies have shown that there are several macroeconomic variables that can affect economic growth, namely inflation, investment, international trade (exports and imports), and population (Wahyu, 2014; Rangkuty et al, 2020). Innovation is one of the factors that influence economic growth. Neoclassical economic growth theory (Solow, 1956) and endogenous growth (Romer, 1986) recognize the importance of innovation in stimulating growth, increasing productivity, and generating technological advances.

Technological advances themselves affect the process of innovation. Innovation is a renewal of various resources so that they have more benefits in life. Innovation occurs in various areas of life ranging from education, health, business, communication, and so on (Todaro & Smith, 2013). In fact, economic growth is also influenced by institutional factors and economic actors. This factor is what is found and measured in the index of economic freedom.

The index of economic freedom is an index consisting of several quantitative and qualitative factors that amount to 12, namely property rights, trade freedom, fiscal freedom, government spending, business freedom, investment freedom, labor freedom, monetary freedom, financial freedom, government integrity, judicial effectiveness, and tax burden. A country that supports the freedom of individuals in carrying out economic activities will increase prosperity for society.

One of the macroeconomic variables that affect economic growth is inflation. In

macroeconomics, one of the references used to see the stability of a country's economy is inflation. High economic growth is achieved with price stability and inflation rates. If the inflation rate is not stable it will make economic conditions weaken. If this drags on, it will lead to sluggishness and have a negative impact on economic growth (Pangestuti, 2018).

In addition to inflation, another macroeconomic variable that affects economic growth is Foreign Direct Investment (FDI). This FDI is a major contributor to economic growth in many developing and developed countries, foreign direct investment will help companies in other countries either from increased productivity or market expansion. This is obviously a very important element because it can determine the direction of the economy, economic policy, to bring economic development to the country (Krugman et al, 2018).

In addition to FDI, another macroeconomic variable that affects economic growth in international trade. When there is export and import, there is a movement of factors of production from the exporter country to the importer country. In different countries, international trade is a source of income and has always been successful in increasing GDP. International trade advances a State and will naturally encourage technological progress, transportation, industrialization, and the presence of foreign or multinational companies, specialization, market expansion, and will encourage economic growth (Sukirno, 2013).

Economic growth is the result of population activity. Empirical research on the influence of populations on economic output shows varying results. In general, the relationship between population and economic growth is grouped into four, namely: pessimistic groups, optimist groups, multidimensional groups, and neutral groups. Pessimists argue that an increase in population will have a negative impact on economic growth.

The optimistic group argues that an increase in population will have a positive impact on economic growth. Multidimensional groups argue that population growth can have both positive and negative impacts on economic growth. While neutral groups argue that population growth does not have a significant impact on economic growth (Birdsall et al, 2001; Bloom et al, 2003). The study aims to analyze the effect of innovation, economic freedom, inflation, FDI, trade, and population growth in the 19 G-20 member countries from 2009 to 2019.

Adam Smith's Theory of Classical Economic Growth explains that important factors in economic growth are human resources (population number and quality), and capital stocks. According to this theory, an economy will grow if there is an increase in population that expands the market and encourages specialization. In addition, an increase in capital stock will encourage increased total output and market expansion (Todaro & Smith, 2013).

According to Wahyuningrum & Soesilowati (2021) also state with the increase in population, Human Resources (HR) will increase and the strength in efforts to develop an area will also increase. So in other words, increasing population is considered a driving factor for a country's economy. Solow-Swan explains that economic growth depends on the availability of factors of production: labor, capital accumulation, and

the rate of technological progress. Increased labor and capital accumulation are sources of GDP growth.

The level of technological advancement in this theory allows the same inputs to produce greater output, increase productivity and drive economic growth (Todaro & Smith, 2013). The endogenous growth theory put forward by Paul Romer views the importance of natural resource governance, government institutions, regional autonomy, physical assets (infrastructure), research institutions, and universities to improve people's well-being and achieve economic growth (Spear & Young, 2016).

This theory views growth as determined by systems that govern production processes (endogenous) rather than by forces from outside the system. Schumpeter's theory says that economic growth can be achieved by entrepreneurship and innovation. The creation of something new (innovation) by entrepreneurs will lead to technological advances, increase productivity, expand new businesses or products, increase jobs, and can create better product quality, so this will drive economic growth (Juma, 2016).

RESEARCH METHODS

This type of research is a quantitative research that uses data in the form of numbers. Quantitative research is conducted to explain and determine the causality of the variables (Kothari & Garg, 2016). The data used in this study is secondary data, in the form of panel data with time-series data for 11 years, namely the period 2009-2019 and cross-section data amounting to 19 G-20 member countries namely South Africa, the United States, Saudi Arabia, Argentina, Australia, Brazil, China, India, Indonesia, The United Kingdom, Italy, Japan, Germany, Canada, South Korea, Mexico, France, Russia, and Turkey. So, the number of observations obtained is 209 observations.

The data is sourced from the World Bank, the World Intellectual Property Organization, and The Heritage Foundation. The data analysis method used is a regression data panel with fixed effect-model specifications processed with the help of the Eviews-10 program. The model of equations to be estimated in this study is as follows:

$$GDPit = \alpha + \beta 1Inovit + \beta 2IEFit + \beta 3Inflit + \beta 4FDIit + \beta 5Tradeit + \beta 6Populit + \varepsilon it \quad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Information:

α	=	Constanta/ intercept
β	=	Coefficient
GDP	=	GDP Growth (%)
Inov	=	Global Innovation Index (scale)
IEF	=	Index of Economic Freedom (scale)
Infl	=	Inflation (Consumer Price Index %)
FDI	=	Foreign Direct Investment (USD)
Trade	=	Trade (% of GDP)
Popul	=	Total Population (people)
ε	=	Error

The dependent variable in the study is the economic growth of G-20 member countries (percentage growth in GDP). While the independent variables used to amount to 6 variables, namely: innovation (global innovation index), economic freedom (economic freedom index), inflation rate (consumer price index), foreign direct investment (net inflow of balance of payments, current USD), trade (percentage of the number of exports and imports of goods and

services measured as part of GDP), population (people).

RESULTS AND DISCUSSION

Before estimating the research model, the first step to do is to choose the best panel data regression approach chow test is done to determine whether the model used is the common effect or the fixed-effect.

Table 1. Chow Test

Effect Test	Statistic	d.f	Probability
Cross-section F	3.919543	(18.184)	0.0000
Cross-section Chi-square	67.834819	18	0.0000

Source: Output Eviews-10, 2021

Table 1 shows the chi-square probability value of 0.0000, which is less than the significance level of 0.05 so this means that the fixed effect model is better than the common effect model. After doing the Chow test, the next step is to do the Hausman test. Hausman test aims to determine the fixed effect model or random effect that is most appropriately used in the data panel estimation.

Table 2. Hausman Test

Test Summary	Chi-Sq. Statistik	Chi-Sq. d.f	Probability
Cross-section random	20.785501	6	0,0020

Source: Output Eviews-10, 2021

Table 2 shows a random cross-section probability value of 0.0020, which is less than the significance level of 0.05. So, this means the fixed effect model is better than the random effect model. Based on the results of the chow and Hausman tests, the best approach model is a fixed effect. The next step is to do a classic assumption test. Based on the correlation test of free intervariable coefficients, there are no free variables that have a correlation value of more than 0.80. So, the model in this study passed the multicollinearity test.

Based on the autocorrelation test obtained a DW value of 1.913167. So that the model in this study is free from autocorrelation problems. Based on the Glejser test, the innovation variable has a probability value below 0.05. So, the model in this study there is a problem of heteroscedasticity. Based on classical assumption tests that have been conducted, the data in this study were exposed to heteroscedasticity. Greene (2003) states that if there is a problem of heteroscedasticity, i.e. the possibility of variance is not the same, then the method that can be used to overcome the problem is the Generalized Least Square (GLS) method.

GLS is another form of Ordinary Least Square (OLS) by minimizing the amount of remaining only in the GLS method is weighted a proper factor then only uses the OLS method to the data that has been weighted so that it has met the assumptions of the smallest square standard. The GLS method can produce an estimator that is BLUE (Gujarati, 2013). So, in this study was weighted on the fixed-effect model with GLS cross-section weights.

Table 3 shows an F-statistical probability value of 0.0000, of which the value is less than 0.05. This means that the free variables in the model as a whole are able to influence the bound variables. While the Adjusted R-square value in table 3 is 0.7701. This means that the free variables in the model are able to explain the bound variables by 77%, while the remaining

23% are explained by other variables outside the model.

Innovation variables have a probability value > level of significance (0.7804 > 0.05), this means that the innovation variable has no significant effect on the economic growth of G-20 member countries. The results of this study support the research of Law, Sarmidi, & Goh (2020), Kacprzyk & Doryn (2017). The insignificant influence between innovations on a country's economic growth also depends on the country's economic conditions. For example, countries that have high incomes, middle incomes, and low incomes have different results.

Table 3. Fixed Effect Model with Cross-Section Weights

Variable	Coefficien	t-stat	Prob.
Constanta	-2,3153	-0.6311	0.5287
INOV	0,0067	0.2792	0.7804
IEF	0,0576	1.3367	0.1830
INFL	-0,1557*	-2.5212	0.0125
FDI	8,24E-12*	2.7560	0.0064
TRADE	0,1015*	4.2204	0.0000
POPUL	-1,91E-08*	-1.9809	0.0491
Prob. F-stat	0,0000		
Adj. R^2	0,7701		

Source : Output Eviews-10, 2021

*Information = significant in the level 0,05

GDPit = -2,3153 + 0,0067 INOV + 0,0576 IEF – 0,1557 INFL + 8,24E-12 FDI + 0,1015 TRADE – 1,91E-08 POPUL + εit.....(2)

Hasan & Tucci's (2010) research results show that innovation has a positive and significant effect on the economic growth of high-income countries, but not significantly for middle- and low-income countries. Furthermore, the significant influence of innovation on economic growth in high-income countries is not obtained in a fast way, more budget and attention is needed in the field of innovation and technology, one way is to provide fiscal incentives and increase budgets for research and development that produce new publications or patents that will improve the quality of innovation and technology in the country.

The positive and insignificant influence between innovation and economic growth in the nineteen G-20 member countries is due to the G-20 member countries consisting of ten high-income developed countries where the PNB per capita in 2019 was USD 12,696 or more, the ten countries are Australia, Canada, France, Germany, Italy, Japan, South Korea, Saudi Arabia, the United Kingdom, and the United States.

While nine developing countries are middle-income G-20 members where PNB per capita in 2019 were between USD 1,046 and 12,695, the nine countries are Argentina, Brazil, China, India, Indonesia, Mexico, Russia, South Africa, and Turkey. It is as Hasan & Tucci (2010) revealed that innovation has a positive and significant effect on the economic growth of high-income countries, but not significantly for middle-income and low-income countries.

The variable economic freedom has a probability value > a level of significance (0.1830 > 0.05), this means that the variable of economic freedom has no significant effect on the economic growth of G-20 member countries. The results of this study support the research of Bergh & Karlsson (2010), Brkic, Gradojevic, & Ignjatijevic (2020) who concluded that economic freedom has no correlation to economic growth. But the insignificant influence between economic freedoms on a country's economic

growth also depends on the conditions of each country. Government intervention in developing countries is relatively high, so in developing countries, economic freedom is not ready to be accepted and utilized to increase economic growth.

In the process of economic decision-making, it is not uncommon for a government to be held hostage by its political interests. This is in contrast to individual decisions, which are heavily dominated by purely economic interests. Thus, the greater the role of the government by itself will reduce the portion for individuals to play a role in the economy. This is why in developing countries economic freedom is not yet ready to be accepted and utilized (Brkic, Gradojevic, & Ignjatijevic, 2020).

The positive and insignificant influence between economic freedom and economic growth in the nineteen G-20 member countries is due to the G-20 member states consisting of developed countries with high economic freedom indexes namely Australia, Canada, France, Germany, Italy, Japan, South Korea, Saudi Arabia, the United Kingdom, and the United States. And also consists of developing countries with a relatively low index of economic freedom, namely Argentina, Brazil, China, India, Indonesia, Mexico, Russia, South Africa, and Turkey won the category of economic freedom mostly unfree and moderately free. This shows that in developing countries economic freedom is lower than in developed countries.

Based on previous research conducted by Brkic, Gradojevic, & Ignjatijevic (2020) it has been stated that the insignificant influence between variables of economic freedom and economic growth is due to G-20 member states consisting of developing and developed countries, wherein developing countries' government intervention is still needed for economic growth or there are still some countries that are not ready to accept economic freedom. Furthermore & Cateano (2009) said that economic freedom also has little influence on foreign direct investment because investors in various countries have varying degrees of tolerance to imperfections in the host investment environment which in the end economic freedom itself exerts little influence in driving economic growth.

Inflation variables have a probability value < a level of significance (0.0125 < 0.05), this means that the inflation variable has a significant effect on the economic growth of G-20 member countries with a negative relationship direction. The results of this study support the assumption of the Solow-Swan neoclassical economic growth theory which states that economic growth depends on capital. Capital accumulation and capital return are affected by price levels.

Rising inflation rates lead to decreases in the rate of return on capital, which in turn reduces capital accumulation and reduces the rate of economic growth (Todaro & Smith, 2013). The results of this study support the research of Tanin & Masih (2017), Samsuddin & Amar (2020), and Simanungkalit (2020). This negative effect of inflation on economic growth means that an increase in average inflation per year will reduce the rate of GDP growth per year and will further lower the ratio of investment to GDP.

High and unstable inflation is a reflection of economic instability that results in rising prices for goods and services in general and continuously, and ultimately leads to a decline in economic growth (Umaru & Zubairu, 2012).

Inflation is one of the important economic indicators, the growth rate is always low and stable. Inflation can disrupt economic stability because when inflation occurs, it will most likely continue in other commodities.

Consumers who decide to buy commodities in large quantities before commodity prices increase will increase the high demand in the market, while consumers who do not experience an increase in income will reduce the quantity of consumption so that the amount of demand will decrease, this results in the company's sluggishness and will lead to job stops. On the other hand, producers can benefit if the revenue earned is higher than the increase in production costs.

But conversely, if inflation causes rising production costs to the detriment of producers, producers can go out of business. This is what makes economic actors difficult to make decisions and causes uncertainty in the economic situation (Samsuddin & Amar, 2020). Inflation can have both positive and negative impacts on economic growth. Positive impact if inflation can give passion and passion to businesses to increase their production, but negatively if inflation decreases people's purchasing power (Umaru & Zubairu, 2012).

The Foreign Direct Investment (FDI) variable has a probability value < a level of significance (0.0064 < 0.05), this means that FDI has a significant effect on the economic growth of G-20 member countries with a positive direction of the relationship. The results of this study support the assumption of Adam Smith's classical economic growth theory which states that increased investment will increase the amount of output, increase productivity and encourage economic growth.

The results of this study are supported by previous research of Suparyati & Fadilah (2015), Razmi & Refaei (2013), Pecea, Simona, & Salisteanu (2015), Goel & Korhonen (2011), and Haq (2018). The positive effect of FDI on economic growth means that an increase in FDI can boost economic growth. FDI has a major impact on economic growth through knowledge transfer and business internationalization.

FDI can boost economic growth because for local companies or host countries that receive that investment fund, FDI is useful for improving technological processes, opening up new markets, skills, and marketing lines, it is also useful to get cheaper production facilities for companies (Haq, 2018). Capital accumulation is one of the important elements for economic development in developing countries, because development really requires capital for financing (Murdiah & Bowo, 2020).

Trading variables have a probability value < a level of significance (0.0000 < 0.05), this means that trade variables have a significant effect on the economic growth of G-20 member countries with a positive direction of relations. The results of this study support the assumption of Adam Smith's classical economic growth theory which states that the expansion of markets or in other words free trade will make the resources used more efficient, increase specialization, division of labor, and will increase economic growth.

The results of this study support the research of Razmi & Refaei (2013), Fitriani (2019), Goel, & Korhonen (2011). Trade in this study is the number of exports and imports of goods and services measured as a share of GDP. This positive influence of trade on economic growth means that an increase in international trade (exports and imports) is able to increase

economic growth in a country. This is because international trade plays an important role in a country's economic activities. One of the advantages of international trade is getting a country to specialize in producing cheap goods and services.

Furthermore, other benefits of international trade can be the expansion of employment opportunities, increases in state income, capital transactions, and foreign exchange reserves. So, exports will generate foreign exchange that will be used to finance the import of raw materials and capital goods needed for the production process to get added value (Razmi & Refai, 2013).

A country that tries to meet all its own goods and services will not achieve efficiency in its economy. Only with international trade can efficiency be generated and the two countries will benefit from each other due to various factors such as differences in natural resource wealth, climate differences, mastery of science and technology. Increased international trade can be supported through conducive institutional frameworks and policies that support trade such as lower costs in doing business, investment in infrastructure, technological innovation, and entrepreneurial promotion (Were, 2015).

The population variable has a probability value < a level of significance (0.0491 < 0.05), this means that the population variable has a significant effect on the economic growth of G-20 member countries with a negative direction of relations. The results of this study reject Adam Smith's classical economic growth theory which states that population growth will expand markets, encourage specialization, expand economic activity, and will encourage economic growth. But the negative and significant effect of population growth on economic growth in this study can be explained by Malthus' theory.

Malthus states that humans develop like a measuring sequence, while the growth of food production only increases like a series of calculations. So, the rate of growth of foodstuffs is much slower than the rate of population growth. As a result, if the population is not controlled, it will result in poverty and economic problems, such as increased labor supply which results in wages will decrease, this will certainly have a negative effect on welfare per capita. Malthus argues that population growth should be controlled (Deliarnov, 2016).

Indonesia is a G-20 member country with the largest population after China, India, and the United States. Population problems in Indonesia are characterized by three things, namely: an increasing population, a very lame population distribution, and a dominant population structure of young age. The census in 1980 amounted to 147 million people. The census in 2000 amounted to 203 million people. The census in 2010 amounted to 242 million people. While the results of the population census in 2020 as many as 270 million people.

The results of the population census organized by the Central Statistics Agency (BPS) every ten years showed there is always an increase in the number of residents. The second population problem is the distribution of a very lame population. Most of Indonesia's population is concentrated on java island, while the area of Java island is a small part of the area of Indonesia. Based on data released by BPS in the 2020 population census, 56.10% of the population is in Java island and 21.68% of residents live on Sumatra Island. Of these two

islands alone, the total is 77.78%. Uneven distribution causes the area of agriculture to narrow so that food production decreases, excess labor so that the number of unemployed increases, the quality of the population decreases because the facilities of life are not able to meet the needs of so many residents.

The third population problem is that the dominant population structure of young people (0-14 years old) is a severe challenge for development. This will increase the dependency ratio, which is a comparison of the number of people aged 0-14 years plus age 65 years and above compared to the population aged 15-64 years (Labor force). The higher the dependency ratio indicates the higher the burden that productive populations must bear to finance the lives of people who are not productive and unproductive anymore.

This has an impact on declining productivity, and it is difficult to become a developed country due to the high burden of dependents (BPS, 2020). The results of this study are supported by the research of Astuti, Hidayat, & Darwin (2017), Klasen & Lawson (2007). This negative influence of population on economic growth means that an increase in population will lead to lower economic growth. Large populations are a burden on development. This is related to the fulfillment of needs that are increasingly more and more along with the development of the population.

So that, not the welfare obtained but precisely squalor will be encountered when the population is not controlled properly. Actually, the problems that arise in the field of the population are not only in large numbers but also affect the derivatives of such large quantities, among others, the quality of the population, the adequacy in terms of consumption, the structure of the population that is mostly young, the capital and technology owned are also still low and consequently work productivity decreases and crucial problems related to employment (Peterson, 2017).

CONCLUSION

Based on the results of research and discussion in this study, several conclusions were obtained, namely: Innovation does not have a significant effect on economic growth in G-20 member countries. Economic freedom does not have a significant effect on economic growth in G-20 member countries Inflation has a significant effect with the direction of negative relations to economic growth in G-20 member countries.

Foreign Direct Investment (FDI) is a significant influence with a positive direction of relations to economic growth in G-20 member countries. Trade has a significant effect on the direction of positive relations with economic growth in G-20 member countries. Population numbers have a significant effect on the direction of negative relations with economic growth in G-20 member countries.

REFERENCES

Astuti, W. A., Hidayat, M., & Darwin, R. (2017). [Pengaruh Investasi, Tenaga Kerja dan Pertumbuhan Penduduk Terhadap Pertumbuhan Ekonomi di Kabupaten Pelalawan]. *Jurnal Akuntansi Dan Ekonomika*, *7*(2), 141–147. https://ejurnal.umri.ac.id/index.php/jae/article/view/252/156

Bergh, A., & Karlsson, M. (2010). Government size and growth: Accounting for economic freedom and globalization. *Public Choice*, *142*(1–2), 195–213. https://doi.org/10.1007/s11127-009-9484-1

Birdsall, N., Alen, C. K., Steven, S. 2001. *Population Matters: Demographic Change, Economic Growth, and Poverty in The Developing World*. New York: Oxford University Press.

Cateano, J., Caleiro, A. (2009). Economic Freedom and Foreign Direct Investment-How Different are the MENA Countries from the EU?. *Development Research Working Paper Series*, *1*(2), 1-23. https://www.econstor.eu/bitstream/10419/144148/1/wp_2009_02.pdf

Deliarnov. (2016). [*Perkembangan Pemikiran Ekonomi*]. Jakarta: Raja Grafindo Persada.

Fitriani, E. (2019). [Analisis Pengaruh Perdagangan Internasional Terhadap Pertumbuhan Ekonomi Indonesia]. *Jurnal Riset Bisnis Dan Manajemen*, *9*(1), 18–26.

Goel, R. K., Korhonen, L. (2011). Determinants of Economic Growth in BRIC Countries. *Development Research Working Paper Series*, (5), 1-30. https://www.econstor.eu/bitstream/10419/87817/1/670597422.pdf

Gujarati, D., Porter, D. N., Mangunsong, R. C. (2012). [*Dasar-Dasar Ekonometrika Buku 2 Edisi 5*]. Jakarta: Salemba Empat.

Haq, I. (2018). Impact of innovation on economic development: Cross nation comparison of Canada, South Korea and Pakistan. *Journal of Economic Info*, *5*(3), 7–15. https://doi.org/10.31580/jei.v5i3.96

Hasan, I., & Tucci, C. L. (2010). The innovation-economic growth nexus: Global evidence. *Research Policy*, *39*(10), 1264–1276. https://doi.org/10.1016/j.respol.2010.07.005

Hermawan, Y. P., Sriyulani W., Hardjiwijono, G. H., Tanaga, S. (2011). [*Proyek Riset G-20: Latar belakang, peran, dan tujuan keanggotaan Indonesia*]. Jakarta: Friedrich Ebert Stiftung. https://library.fes.de/pdf-files/bueros/indonesien/08366.pdf

Hermawan, Y. P. (2012). [Legitimasi, Efektivitas, dan Akuntabilitas G-20 Sebagai Klub Eksklusif Dalam Pembentukan Tata Kelola Ekonomi Global]. *Jurnal Ilmiah Hubungan Internasional*, *8*(2), 199-210. https://doi.org/10.26593/jihi.v8i2.544.%25p

International Monetary Fund. (2020). *World Economic Outlook Reports*. (https://www.imf.org/en/Publications/WEO). Accessed on 8 January 2020.

Juma, C. (2016). *Innovation and Its Enemies: Why People Resist New Technology*. New York: Oxford University Press.

Kacprzyk, A., & Doryń, W. (2017). Innovation and economic growth in old and new member states of the European Union. *Economic Research-Ekonomska Istrazivanja*, *30*(1), 1724–1742. https://doi.org/10.1080/1331677X.2017.1383176

Klasen, S., & Lawson, D. (2007). The Impact of Population Growth on Economic Growth and Poverty Reduction in Uganda. *Diskussionsbeiträge*, (133), 1-21. https://www.econstor.eu/bitstream/10419/31966/1/534768717.pdf

Kothari, C. R., & Gaurav G. (2016). *Research Methodology: Methods and Techniques (Third Edition)*. London: New Age International Limited Publishers.

Krugman, P. R., Maurice, O., Marc, M. (2018). *International Economics: Theory and Policy (11th Edition)*. Harlow: Pearson Education.

Law, S. H., Sarmidi, T., & Goh, L. T. (2020). Impact of innovation on economic growth: Evidence from Malaysia. *Malaysian Journal of Economic Studies*, *57*(1), 113–132. https://doi.org/10.22452/MJES.vol57no1.6

Murdiah, A., & Bowo, P. A. (2020). [Analisis Kausalitas antara Investasi, Pendapatan Nasional, dan Jumlah Uang Beredar]. *Efficient: Indonesian Journal of Development Economics*, *3*(1), 606-615.

Nasra, S., & Peter D. (2012). The European Union in the G-20: What Role For Small States?. *Cambridge Review of International Affairs*, *29*(1), 1-22. https://doi.org/10.1080/09557571.2012.678304

Pangestuti, D. F. (2018). [Analisis Hubungan Inflasi, PDRB, dan PAD terhadap PMA di Kabupaten Semarang]. *Efficient: Indonesian Journal of Development Economics*, *1*(2), 100-105.

Pece, A. M., Simona, O. E. O., & Salisteanu, F. (2015). Innovation and Economic Growth: An Empirical Analysis for CEE Countries. *Procedia Economics and Finance*, *26*(15), 461–467. https://doi.org/10.1016/s2212-5671(15)00874-6

Peterson, E. W. F. (2017). The role of population in economic growth. *SAGE Open*, *7*(4). https://doi.org/10.1177/2158244017736094

Rangkuty, D. M., Nasution, L. N., Ramadhani, A. E. (2020). [Analisis Variabel Makro Ekonomi Terhadap Pertumbuhan Ekonomi di Indonesia]. *Jurnal Kajian Ekonomi dan Kebijakan Publik*, 5(1), 78-85. https://jurnal.pancabudi.ac.id/index.php/jepa/article/view/857/810

Razmi, M. J., & Refaei, R. (2013). The effect of trade openness and economic freedom on economic growth: The case of middle east and East Asian

countries. International Journal of Economics and Financial Issues, 3(2), 376–385. https://www.econjournals.com/index.php/ijefi/article/view/410/pdf

Samsuddin, M. A., & Amar, S. (2020). Determinants of Economic Growth in Developing Countries of G-20 Members. *Advances in Economics, Business and Management Research*, *152*, 177-183. https://dx.doi.org/10.2991/aebmr.k.201126.021

Simanungkalit, E. F. B. (2020). [Pengaruh Inflasi Terhadap Pertumbuhan Ekonomi di Indonesia]. *Journal of Management (SME's)*, *13*(3), 327–340. https://doi.org/10.35508/jom.v13i3.3311

Spear, S. E., Young, W. (2016). Endogenous Growth Theory and Models: The First Wave 1952-1973. *Working Paper*, (2), 1-38. https://www.econstor.eu/bitstream/10419/173739/1/859330389.pdf

Sukirno, S. (2013). [*Makroekonomi: Teori Pengantar*]. Jakarta: Rajawali Pers.

Suparyati, A., & Fadilah, N. (2015). [Dampak Economic Freedom Terhadap Pertumbuhan Ekonomi Negara Asia]. *Jurnal Ekonomi & Studi Pembangunan*, *16*(2), 158–176. https://doi.org/10.18196/jesp.16.2.1289

Tanin, T. I., & Masih, M. (2017). Does economic freedom lead or lag economic growth? evidence from Bangladesh. *Munich Personal RePEc Archive, MPRA Paper*, 79446, 1–28. https://mpra.ub.uni-muenchen.de/79446/1/MPRA_paper_79446.pdf

The Heritage Foundation. (2020). *Report International Economies*. (https://www.heritage.org/international-economies/report/how-economic-freedom-promotes-better-health-care-education-and). Accessed on 15 January 2020.

The Organization for Economic Cooperation and Development (OECD). (2020). *Open Data OECD*. (https://data.oecd.org/). Accessed on 05 January 2020.

Todaro, M. P., & Smith, S. C. (2013). [*Pembangunan Ekonomi (Edisi Kesebelas)*]. Jakarta: Erlangga.

Umaru, A., & Zubairu, A. A. (2012). Effect of Inflation on the Growth and Development of the Nigerian Economy (An Empirical Analysis). *International Journal of Business and Social Science*, *3*(10), 183–191. http://ijbssnet.com/journals/Vol_3_No_10_Special_Issue_May_2012/19.pdf

Vestergaard, J. (2011). *The G-20 and Beyond: Towards Effective Global Economic Governance*. Copenhagen: Danish Institute for International Studies (DIIS). https://www.diis.dk/files/media/publications/import/extra/rp2011-04-g20-and-beyond_web_0.pdf

Wahyu, T. (2014). [Identifikasi Variabel Makro Ekonomi di Provinsi Jawa Tengah]. *Jurnal Ekonomi Kuantitatif Terapan*, *7*(2), 155-167. https://doi.org/10.24843/JEKT.2014.v07.i02.p08

Wahyuningrum, F., & Soesilowati, E. (2021). The Effect of Economic Growth, Population and Unemployment on HDI. *Efficient: Indonesian Journal of Development Economics*, *4*(2), 1217-1229

Were, M. (2015). Differential effects of trade on economic growth and investment: A cross-country empirical investigation. *Journal of African Trade*, *2*(1–2), 71. https://doi.org/10.1016/j.joat.2015.08.002

World Bank. (2019). *World Bank Open Data*. (https://data.worldbank.org/). Accessed on 15 December 2019