HOW DOES THE EFFECT OF MACROECONOMICS FACTORS AFFECT ON ECONOMIC GROWTH IN JAPAN

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Statement of Originality

The work described in this Final Year Project, entitled
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is to the best of author's knowledge that of the author except where due to reference is made.

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ABSTRACT

HOW DOES THE EFFECT OF MACROECONOMICS FACTORS AFFECT ON ECONOMIC GROWTH IN JAPAN

By

TAN JUI TENG

This study is investigating the effect of macroeconomic factors and relationship on economic growth in Japan. The analysis is used time series data analysis within 30 years from 1988 to 2017 in term of annually. The dependent variable is GDP growth rate while the independent variables are population growth rate, tax revenue, inflation rate, unemployment rate and the net inflow of foreign direct investment (FDI). This study used several tests including Augmented Dickey Fuller test, Phillips-Perron test, Johansen-Juselius Cointegration test, Vector Autoregression Granger causality test, and Variance Decomposition test. The empirical results represent that there are a short run relationship between the inflation rate and economic growth, and other variables effect on economic growth. The policy suggestions are regarding to money supply and tax rate system to improve the economic growth in Japan. Recommendation stated in the study is to promote specific factor and panel data analysis.

ABSTRAK

BAGAIMANA KESAN FAKTOR-FAKTOR MAKROEKONOMI TERHADAP PERTUMBUHAN EKONOMI DI JEPUN

Oleh

TAN JUI TENG

Kajian ini bertujuan untuk mengkaji kesan faktor makroekonomi dan hubungan terhadap pertumbuhan ekonomi di Jepun. Analisis ini digunakan analisis data siri masa dalam tempoh 30 tahun dari 1988 hingga 2017 pada setiap tahun. Pemboleh ubah bersandar adalah kadar pertumbuhan KDNK manakala pemboleh ubah bebas adalah kadar pertumbuhan penduduk, hasil cukai, kadar inflasi, kadar pengangguran dan aliran masuk bersih pelaburan langsung asing. Kajian ini menggunakan beberapa ujian termasuk ujian Augmented Dickey Fuller, ujian Phillips-Perron, ujian Johansen-Juselius Cointegration, ujian kausalitas Vector Autoregression Granger, dan ujian Penguraian Varians. Hasil kajian menunjukkan bahawa terdapat hubungan jangka pendek antara kadar inflasi dan pertumbuhan ekonomi, dan pemboleh ubah lain mempengaruhi pertumbuhan ekonomi. Cadangan dasar berkenaan dengan sistem penawaran wang dan kadar cukai untuk meningkatkan pertumbuhan ekonomi di Jepun. Saran yang dinyatakan dalam kajian ini adalah untuk mempromosikan analisis faktor dan panel data tertentu.

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LISTS OF TABLES

LIST OF FIGURES

TABLE OF CONTENTS

CHAPTER ONE

INTRODUCTION

1.1 Introduction

This study is advocated the effect of population growth, tax revenue, inflation, foreign direct investment, and unemployment rate on the economic growth in Japan.

Population is the sum of the people in a country or region. (Kenton, Population Definition, 2019). A population refer to an entire people group, events, objects, or measurements. Most of the times, statisticians and researchers will draw the most precise conclusion possible because that want to know the characteristics of every entity in a population. This is impossible or impractical most times, however, since population sets tend to be quite large. According to the Malthus, the population growth should be led the performance of economy in a country (Thuku, Paul, & Almadi, 2013). When the population growth increase, that mean the labor force in the market also increased, then the productivity and the output of a country will increase at the same time.

Tax revenue is collected from direct tax and indirect tax such as donations to social security, employment and sales taxes, payroll taxes, and other taxes (OECD, 2019). Total tax revenue as a percentage of GDP is a country's production by government-collected taxes. It can become a measure to show that the government way controls the resources of the economy. The tax burden is calculated by the ratio of the revenue to the GDP.

Inflation is the increasing in the price of goods and services over time (Amadeo, 2019). Inflation will cause reducing the power of purchasing in the market because when the price increased, people need pay more for a goods and services. So, the standard of living is declined over the time. While the inflation rate represents the percentage of price increases or decreases over a given period. The inflation rate shows us how quickly prices increased over the period. Inflation would have a negative impact on economic performance , reduced purchasing power and high people and country costs (Faraji Kasidi & Kenani Mwakanemela, 2013).

Unemployment happens when a person who is actively in finding work but he or she still not get the job. In general, unemployment is used to calculate the economic wellbeing. Unemployment rate is the most frequent to measure unemployment in a country (Chappelow, 2019). That is the number of unemployed, divided by the number of labor force. Unemployment was seen as a global economic challenge and was regarded as one of the main impediments to social change. According to Okun's law, the lower unemployment rate should be led the GDP become high (Kenton, Okun's Law, 2018). This is because the workforce can produce more goods and services, and it generate more income for personal and nation.

A foreign direct investment (FDI) is a firm or individual in a one country make an investment into business interest for another country. (Chen, 2019). If an investor sets up foreign business or obtains foreign business assets from a foreign company, FDI will take place in a country. However, FDIs are not same with the portfolio investment. The investor of portfolio investment only can purchase the foreign-based companies' equities.

FDI will stimulate technology transfer, foreign trade, domestic investment and human capital, then affecting the economic growth. (Bouchoucha & Walid, 2019).

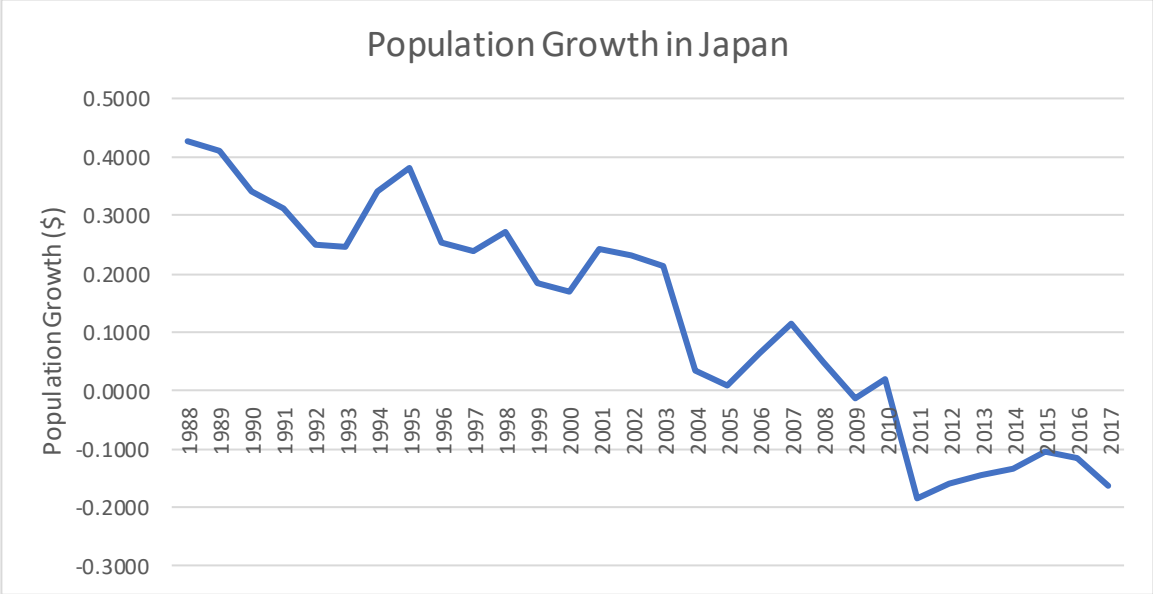
Gross domestic product (GDP) is the most common indicator used to monitor the economic wellbeing of a country (Kramer, 2020). GDP sums up the amount of all finished goods and services produced in a country within a given period of time. The components that have including GDP are personal and public consumption, public and private investment, government spending net export. Besides that, other factors also affect the performance of GDP such as population, inflation rate, exchange rate, unemployment rate, and interest rate.

1.2 Background of study

Japan is an island nation made up of four main islands, Honshu, Hokkaido , Kyushu with Shikoku, and several smaller islands. (Khan Academy, 2019). The national capital is Tokyo, and Tokyo located in east-central Honshu, is the one of the world's populous cities (G, et al., 2019). Japan's closest neighbors are Russia, China and Korea. Since 1950, Japan has emerged as one of the most advanced economical and industrial community in the world. Japan also is the one of the world's most literate countries, and Japan is very emphasizing on education. The economy of Japan is a very developed free-market economy. Japan's economy is the third largest economy in the world, and it achieved after the devastation of the Second World War (BBC, 2019).

1.2.1 Population growth

Figure 1.1: Population growth in Japan (%), during the period from 1988 to 2017



Sources: World Bank

Modern Japan is home to the world's oldest population, the number of adults in diaper more than infants. That mean the proportion of citizens above age of 65 was more than infants (Sigurðsson, 2017). The Japan government try to put up the GDP by increasing the government spending and increase in monetary. So, the Japanese can get a job to sustain their daily cost and the quality of life can improved.

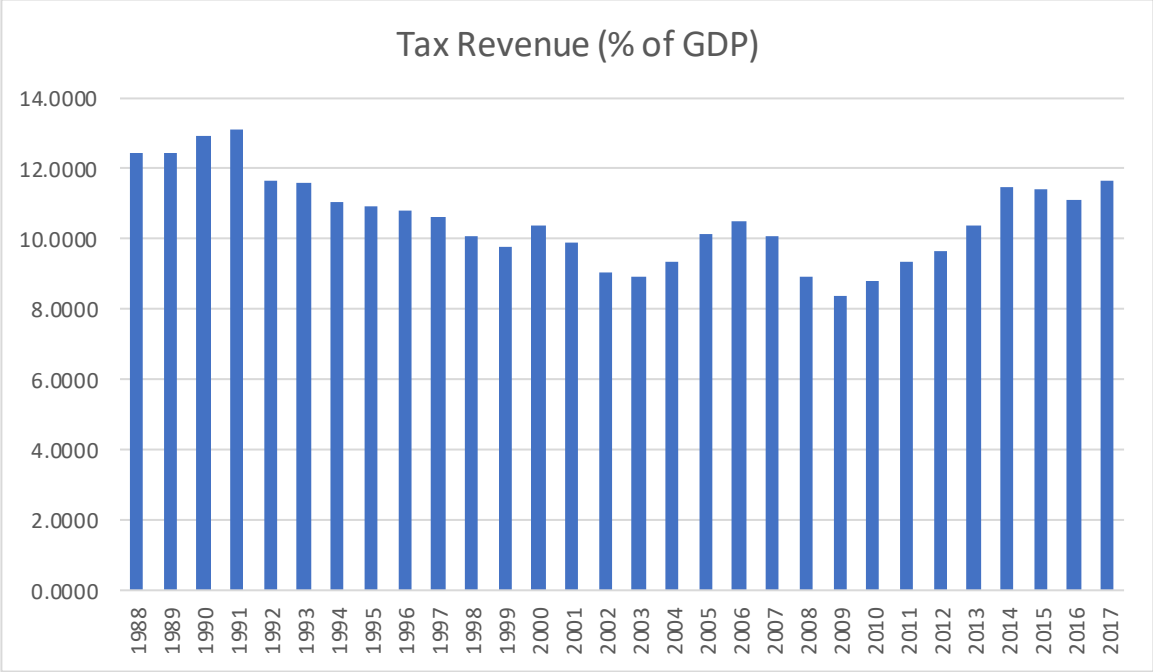
Starting from 1995 to 2000, the population growth was declining but it still keep the growth was positive. In 2011, the population growth decreases again to -0.18 and it continued keep negative growth until 2017. This is because the birthrate is lower and fewer babies being born each year than the previous years (Japan Population , 2019). The reason of lower birthrate in Japan is lack of good job for Japanese men, who are still

expected to be the breadwinners and provide for their families. Due to not having a good job, Japanese men scared the daily cost can't afford after get marries and have a child.

According to Yoshino and Hesary (2016), they blame that the government misguided the policy, so the aging demographic impeded the economy with a slowing down of the country's innovation ecosystem. For example, the startups or small businees cannot leaded by the Japanese banks, becasue the banks is complying the stringent requirement with Basel requirement. (Halton, 2019).

1.2.2 Tax revenue

Figure 1.2: Tax revenue in Japan (%), during the period from 1988 to 2017



Sources: World Bank

From the Figure 1.2, the percentage of tax revenue of GDP was decreasing from 13.31% in 1991 to 8.91% in 2003, then it increased to 10.51% in 2006. After that, the tax revenue declined again to 8.37% in 2009, and it increased again to 11.64% in 2017. Between the 2014 and 2017, the tax revenue for Japan was stabled.

The sales tax was increased to 5% from 3% in 1997 (BCC News, 2014). After that, Japan was lasting impact of a deep recession and Japan was tried to escape the trap of deflation and decreasing the price. In the 1st April 2014, Prime Minister Shinzo Abe decided to increase the sales tax rate to 8% and it will be increased also to 10% in the 1st October 2015. Japan raised the tax of sale for first time in 17 years before. The stepped-

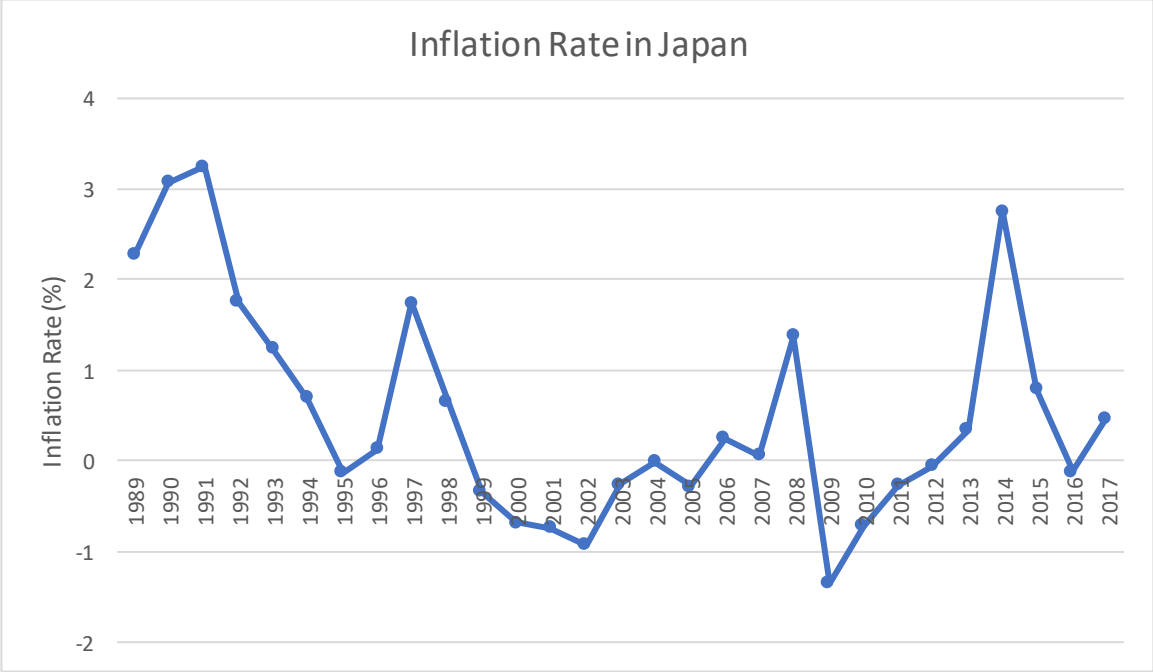
up tax hikes target to offset increasing social care expenses associated with Japan's ageing population.

Furthermore, according to the RIETI Report, the policy of raises sales tax rate to 10% was postponed to October 2019, because the government worried that the household consumption will be reduce (Takashi & Cashin, 2016). Takashi and Cashin (2016) found out the household consumption fell 4% after the sales tax rate increased to 8% in 2014. So, they expect that households already get ready for the future tax rate increase and reduce their consumption. Then they suggested that next tax rate increase will not harm to the economy as the case in 2013-2014.

In 2017, the tax revenue was neared historical high, which is 58.7 Yen trillion, 11.64% of GDP since 1991. The reason was the economic growth and the corporate profit were performing better at the time, such as the stock price increased (Baird, 2018).

1.2.3 Inflation rate

Figure 1.3: Inflation rate in Japan (%), during the period from 1988 to 2017



Sources: World Bank

The period from 1991 to 2000 was called as "Lost Decade" because asset prices burst during this period, but it was not happened catastrophically but in gradually (Historical Inflation Rates for Japan (1971 to 2014), 2019). According to Halton (2019), he stated that Japan was caught in a liquidity trap. The consumer was feared that the economy was getting worse, so they were holding onto their saving. As the result, the demand in the market was low and the overall economy's productivity decline. In 1991, the inflation had reached 3.25% but over the following four years it declined to negative 0.13 in 1995.

In 2009, Japan returned to deflation again due to the global crisis, and it was first time since 2006. The suppliers of low-priced goods and necessary goods was get the benefit from the deflation. But it was negative on consumer spending, the profitability of business and investment. (Euromonitor Research, 2010). The prospects for demand of long-term was low with declining prices. The consumers were expected the goods' price will became cheaper, then consumer spending was delayed. Thus, it reduced corporate earnings and limited retailers' ability to expand and hire workers.

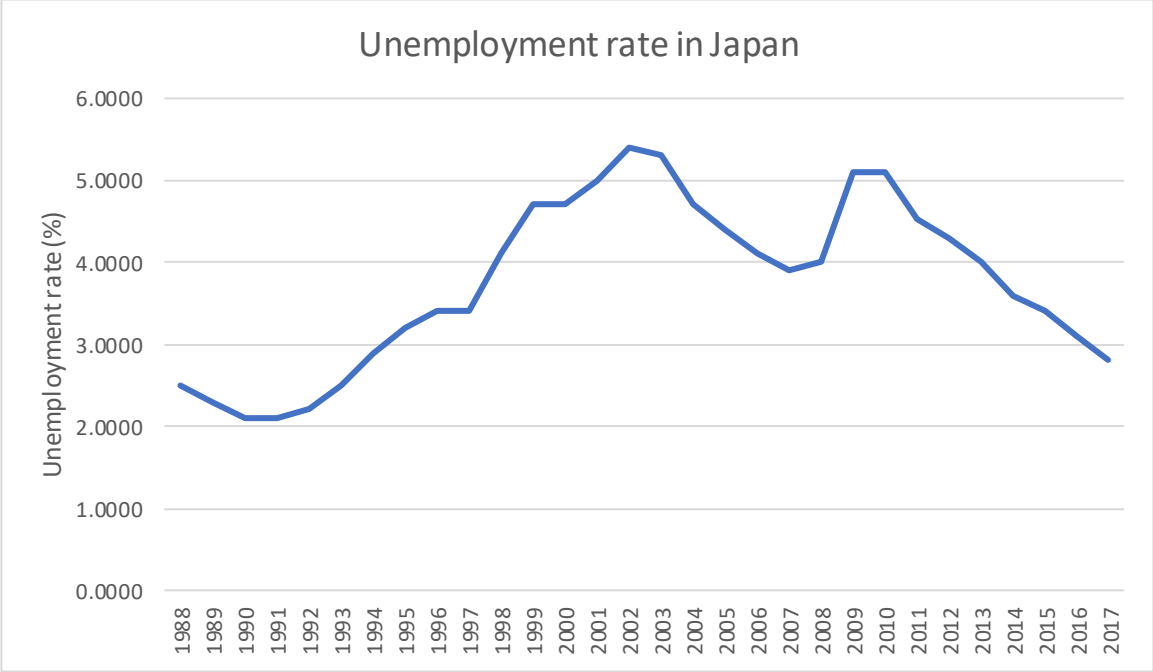
In 2014, Japan's inflation rate was 2.76% and it hit 23-year high (The Japan Times, 2014). It is because the first stage of a double-part sales tax hike that was planned it quarter to dent production.

Furthermore, inflation rate of Japan fell again to negative 0.11% in 2016. It may cause to the case for the Japanese banks to add to monetary policy stimulus (Scutt, 2016). BOJ Governor Haruhiko Kuroda suggested that if the financial movements market aggravated the deflationary mindset of investors, then Japanese lawmakers would be willing to consider further easing, including further taking interest rates into negative territory. He said Eurozone and Switzerland already applied negative interest rate policy. However, the inflation rate gradually increased in 2017. This increasing in 2017 was supported by the rising costs for fuel and medical care (Financial Times, 2017).

BOJ governor Haruhiko Kuroda

1.2.4 Unemployment rate

Figure 1.4: Unemployment rate in Japan (%), during the period from 1988 to 2017



Sources: World Bank

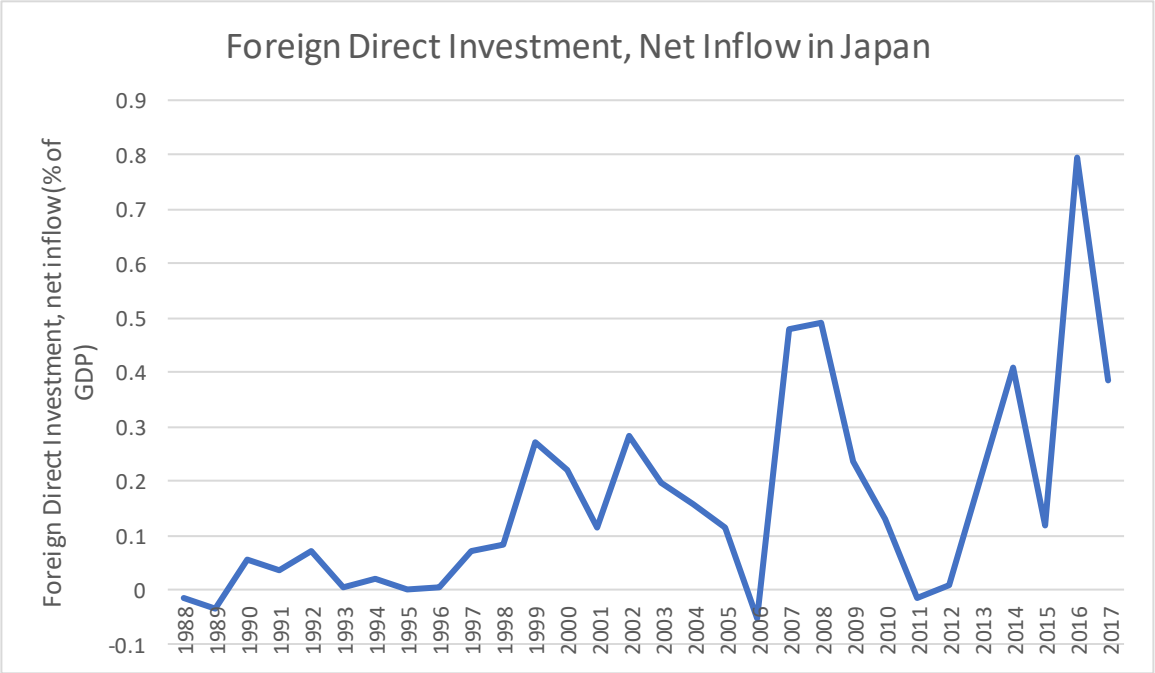
Japan's unemployment rate was gradually increase from 2.1% 1991 to 5.4% in 2002, then it reduced to 3.9% in 2007. In 2008, the unemployment rate was risen to 5.1% in 2010 and declined to 2.8% in 2017.

In 2002, the unemployment rate reached 5.4% and it number reflect severe business conditions and corporate restructuring, including job cuts (Voanews, 2009). While the Labor Minister Chikara Sakaguchi stated that there is more job available for the applicants, but it job may not fulfil the requirement of applicants. The Japanese industrial output decreased in October due to the unemployment problem, dropping three-tenths of one percent from a month earlier.

In 2017 the unemployment rate fell to 2.8 percent and it was offering a positive sign for Japan. According to labour ministry data, in the early of 2017, the unemployment remained unchanged at 1.43% (The Japan Times, 2017). That mean 143 positions were available for 100 applicants. The figure showed that the economy remained moderately recovered while domestic demand remained inadequate. So, the government encouraged the companies increased the salary or wage and stimulate consumer spending. Besides that, wholesale and retail, information and technology, and construction sectors provided more job opportunities for the people compare to last year. In Prime Minister Shinzo Abe's view, the world's third-largest economy was bolstered by the labor reform and wage growth.

1.2.5 Foreign direct investment, net inflow (FDI)

Figure 1.5: Foreign Direct Investment, net inflow in Japan (%), during the period from 1988 to 2017.



Sources: World Bank

In the late 1990s, the net inflow of FDI Japan was growing and it hit the record to reach 0.26% of GDP. In the late 1980s and early 1990s, Japan had the largest product of Japan's own domestic economic boom (Drysdale, Naito, Trewin, & Wilson, 2004). When the bubble burst, FDI fell back again. While, when the second boom that was occurring, FDI inflows are rising despite prolonged Japanese economic stagnation. This suggests that more fundamental changes lie behind the recent rise in FDI.

Since 1989, the FDI of Japan was first time decreased to negative, which is 0.05% of GDP in 2006. According to a U.N. development agency, the reason of FDI became

negative was FDI affected by investments by large transnational companies, including Vodafone Group PLC (The Japan Times, 2007). Another factors that caused to FDI was the General Motor (GM) Corp. of U.S. sold the bulk of Suzuki Motor Corp. shares to lower its stake in the minicar maker.

According to the UN Conference on Trade and Development 's World Investment Survey, global FDI flows in 2013 rose 9 per cent from the previous year to $1,452 trillion (The Japan Times, 2014). Japan directly invested to outbound also increased 10% to $136 billion in 2013. While the investment from other countries only $2.3 billion in 2013, although this figure increased 33% compared to previous year. But Japan 's outstanding FDI-to-GDP ratio was the lowest among industrialized countries, and still lagged behind for many of the emerging economies in Asia and other regions.

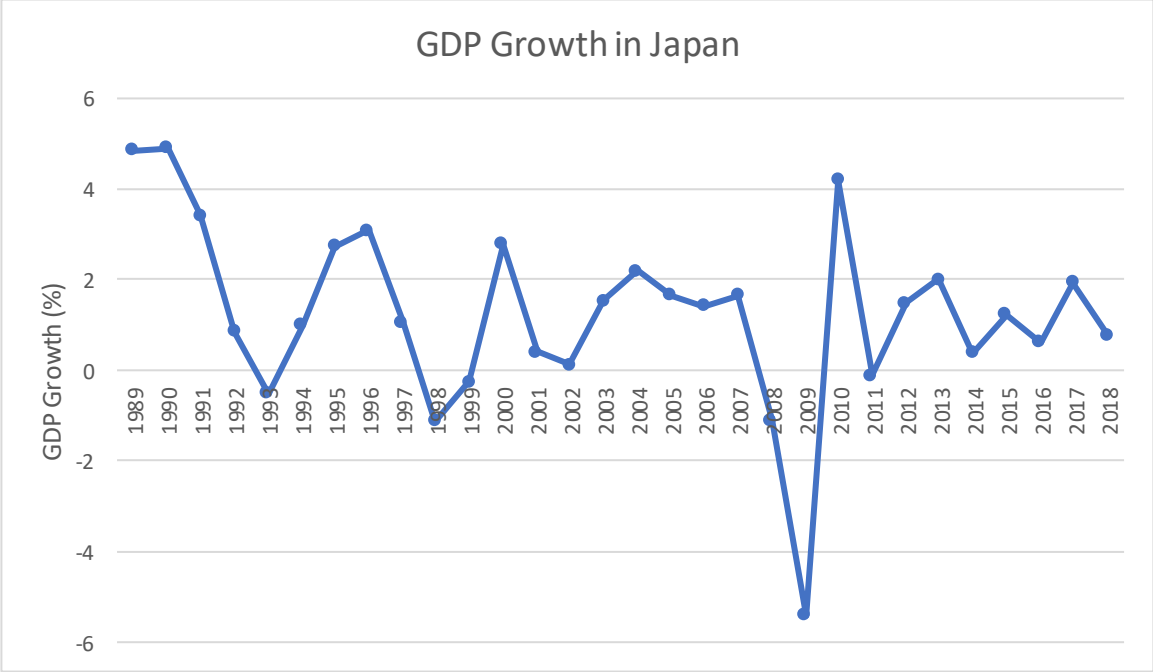
In 2015, the net inflow of FDI declined to 0.12% of GDP. This is because Japan was shifting investments from China to ASEAN (Domínguez, 2014). One of the factors that caused Japan 's investment shift is that Japanese companies operating in China responded to the anti-Japanese uprisings by reducing their foreign direct investment in China because of the increased risk of investing in China. In ASEAN countries such as Indonesia, Vietnam and Myanmar, Japanese were interested in electronics , automotive, food products, power generation, construction equipment, and industrial machinery, because the countries had potential for growth in ASEAN economy.

The net inflow of FDI reached 0.79% of GDP. According to Invest Japan Report 2017, Japan’s net inflow of FDI hit a record high of ¥3.8 trillion in 2016, and it helped by the investments from Asia and Europe (Fensom, 2018). In the major investment, Japan 's

2016 M&A contract, in which a group headed by France's Vinci Airports purchased the management rights to Kansai International Airport, helping to drive European inflows to over 2 trillion yen. However, according to Investment Climate Statements, although the Japan’s net inflow of FDI was increased in 2016, but it contributed to GDP remained the lowest compare to OECD.

1.2.6 GDP growth

Figure 1.6: GDP growth in Japan (%), during the period from 1988 to 2017.



Sources: World Bank

In the late 1980s, Japan was facing "bubble economy" in which stock and real estate price soared to stratospheric heights driven by a speculative mania (Colombo, 2012). Japan's Nikkei stock index reached an all-time high in 1989, only to plunge spectacularly soon after, causing their real estate bubble to burst and plunging the world into a major financial recession and a long stretch of economic depression known as the "Lost Decades." Within the period from 1990 to 2001, the demand in the Japan market was significant low and the overall output also decreased.

Japan's GDP growth fell to -5,416 in 2008, because Japan was hit hard by the 2008 and 2009 global financial crisis (Kawai & Shinji, 2009). In 2007, the U.S. economy

entered a mortgage crisis, which caused global panic and financial turmoil. The financial markets became more volatile, and Japan's stock price jumped to a recent high in the summer of 2007, and a slow but significant downturn began with the start of the US subprime loan crisis through the fall of 2008.

In 2010, GDP growth of Japan was reached to 4.19%. This is due to the companies higher spending in the third quarter (The Guardian, 2010). The factors driving demand were subsidies from government that boosted consumer spending on home appliances. Japanese businesses have been dealing with a heavy dollar and global market uncertainty. Slower growth in main overseas markets has tempered demand for exports, which was a big driver of recovery.

Japan Government is running "Abenomics" since the December 2012 and it introduced by the Prime Minister of Japan, Shinzo Abe (Kenton, Abenomics, 2018). Abenomics entails increasing the supply of capital, boosting government spending and restructuring the Japanese economy to become more sustainable. Abenomics consists three arrows, which are increasing the money supply, spending program to stimulate demand and consumption, a reform of various regulations. As the result, the unemployment rate decreased to 2.8% in May 2017, the demand had increased in the short run. However, Abenomics didn't worked as the expectation. This is because the Japan's population still aging and the slump in global demand.

1.3 Problem Statement

Japan's population is facing demographic challenges. The population has begun to decline, and the population aging. However, the GDP is still growing up. So, it seems like there are negatively relationship between GDP growth and population growth in Japan.

Based on the previous study such as (Cecilia I. Andrade-Velasco , Karen D. Martinez-Silva , Francisco D. Renteria-Rodriguez , & Pedro A. Vallejo-Castillo , 2016) and (Savas, 2008), they stated that population growth has a positive effect on the economic growth in the long-run, but it is negative impact in the short-run. While according to the Yamaguchi (1985), he stated that population has positive relationship with economic growth in Japan. However, the population growth of Japan is negative, and the economic growth is positive since 2011.

Moreover, the Japan government already plans the policy to stimulate the economy in Japan, such as increase the sales tax rate, give the allowance for every female to help cover childbirth expenses. However, there are some policy doesn't work in expectation. So, the study helps to understand which policies are good in implement.

1.4 Motivation of Study

In the study, there is having two motivation factors to motivate for study. Firstly, unlike the previous studies that focuses on the relationship between the macroeconomic factors and economic growth, the study is more focusing on the effect of the macroeconomic factors on economic growth. The study is examining more than 4 macroeconomic factors effect on economic growth compared to other previous studies. The findings of study will provide addition information regarding Japan's economy. Thus, it helps to understand what factors more effect on the economic growth will be.

Secondly, there are less research on the population growth and economic growth in Japan. Based on the previous studies, the latest studies are until 2011 that examined the relationship between population growth and economic growth. So, that is not any studies after the Prime Minister of Japan introduced the "Abenomics" in 2012. Therefore, it become the factor that motivate in this study.

1.5 Objective of Study

1.5.1 General objective

To study the relationship between the population, tax revenue, and inflation, unemployment, and foreign direct investment towards economic growth in Japan.

1.5.2 Specific Objectives

i. To determine the effect of population growth on the economic growth in Japan.

ii. To examine the effect of tax revenue on the economic growth in Japan.

iii. To study the effect of inflation rate on the on the economic growth in Japan.

iv. To study the effect of unemployment rate on the economic growth in Japan.

v. To investigate the effect of foreign direct investment (FDI) on the economic growth in Japan.

1.6 Significant of Study

The study examines the effect of the population growth, tax revenue, inflation rate, unemployment and FDI on economic growth. In the previous study, the researches mostly study on one independent's relationship and the impact. It is less attention to study about more than one macroeconomics factor relationship with economic growth. Thus, the study can be considered as an important study to determine more than one macroeconomics factors' effect on the economic growth in Japan, and it can help for the future research.

Furthermore, the study also will be giving beneficial for the policy maker, especially for Japan. Since the Prime Minister of Japan, Shinzo Abe introduced "Abenomics", the strategies are based on the market situation such as population, sales tax revenue and unemployment. The understanding of effects of macroeconomics factors on economic is important for the government. An accurate estimation of the effects will enable for the policy maker to make efficient decisions.

1.7 Organization of the Study

This study is structured and presented into several chapters as mentioned below. Chapter one is introducing the topic and discuss the background, motivation, problem statement, objectives and significance of the study. Secondly, chapter two reviews the theoretical framework, testing procedures, the empirical findings. In chapter three will be discuss the methodology used in this study is described in few subtopics according to theoretical framework, data description, empirical testing, and empirical evidence. Chapter four is analysing data and interpretation of the results. Lastly, chapter five contains the summary, conclusions and presents suggestions and recommendation for further studies.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This analysis been conducted to determine the impact of population growth, tax revenue, inflation rate, unemployment rate and foreign direct investment on economic growth, and the relationship between these variables. This part if the research provides an overview of the previous studies that comprises similar and relevant work that measuring the interconnections between these variables.

2.2 Theoretical Framework

This study investigates the impact of population growth, tax revenue, inflation rate, unemployment rate and FDI on economic growth in japan. There is theories by the previous researchers in order to explain these factors.

2.2.1 Theory related to population growth and economic growth

2.2.1.1 Malthusian model

Based on Malthusian model, it mentions that the population and economic growth are having both direction and affect each other. When the economy in a country is increasing, it will stimulate the people get marry early and birth rate increasing (Thuku, Paul, & Almadi, 2013). So, the population also will be increased. While the higher population will depress the economic growth through diminishing returns. However, Adam Smith claimed the population growth and economic growth is having negative relationship because economic growth and improvement in the socioeconomics of people will affect the fertility rate over time (Spengler, 2015). The Malthusian model has following form:

$$P(t) = P_0 e^{rt}$$

where:

- P_0 = P (0) is the initial population size,
- r = the population growth rate, sometimes called Malthusian parameter,
- t = time.

2.2.2 Theory related to tax revenue and economic growth

2.2.2.1 Keynesian model of aggregate demand

Based on Keynesian economics (1936), growth of taxation has negative influence on GDP (Papava & Ananiashvili, 2012). According to the authors, tax revenue not only impacts on the current economic growth (GDP), but also keep the impact in several years by changing consumptions. The tax will reduce the purchasing power of consumer because the income that can use decreased. Although the tax revenue is contributed to the GDP, but it gives negative effect on the economic growth in the long run. The Keynesian model of aggregate demand as below:

$$Y = C(a + b(Y - T)) + I + G + NX$$

where,

Y = Gross domestic product (GDP)

a = Autonomous consumption

b = Marginal propensity of households to consume

C = Household consumption

I = Gross domestic private investments

G = Government purchases

NX = N et exports

2.2.3 Theory related to inflation rate and economic growth.

2.2.3.1 Neoclassical Model

Mundell (1963) suggested that inflation is positive relationship with economic growth (Gokal & Hanif, 2004). According to the author, the wealth of people will be reduced due to inflation increased. People will be saving more money and switching to real assets to raise their price, then slowing down the real rate. Greater savings will bring greater capital accumulation and faster growth in output.

While Stockman (1981) argued that the inflation has negative relationship with economic growth. He claimed that an increasing in the inflation rate results in a lower economic growth and reduction wealth of people reduces.

2.2.4 Theory related to unemployment rate and economic growth.

2.2.4.1 Okun's Law

Okun's law is developed by Okun (1962) and it proved the relationship between unemployment and economic growth is negative (Attfield & Silverstone , 1998). Okun 's law specified that the partnership would be decided by workplace attendance, length of work and improvements in productivity. An increasing in workforce must produce more product and service. According to Adachi (2007), he proved the Okun's in the research. His result showed that the unemployment rate decreased 1%, associated with additional output growth of about 3 percentage points for the U.S. economy. So, when the unemployment rate declines, the economic growth should be high. The model of the Okun's law as below:

$$u = u^* - \left[\frac{\beta(y - y^*)}{y^*}\right]$$

Where:

$u =$ actual unemployment rate

$u^* =$ natural unemployment rate

$y =$ actual real income

$y^* =$ potential real income

$\beta =$ coefficient for the country economy

2.2.5 Theory related to FDI and economic growth.

2.2.5.1 Endogenous growth model

Lucas, (1988), Rebelo (1991) and Romer (1986) had been developed the endogenous growth model. This growth model incorporates capital in the form of allocation of human capital and R and D, which illustrates the externalities that come out of these forms of capital. The integration of new inputs and technologies inspired by the FDI in the of host countries' production systems. Furthermore, if FDI brings more productivity, positive externalities and spill over effects. the economic growth endogenously will be stimulating. De Mello (1997) shows that FDI will introduces the technological progress, capital accumulation and human capital augmentation can boost the economic development in long run.

2.3 Empirical Findings

2.3.1 Population

Kelley (1988) examined the economic consequences of population change for less developed countries (LDC) within 1950 to 1990. The result showed that lower population growth will help in enhancing the economic growth. The growth target was achieved by reducing population growth and increasing the income per capita. Countries' per capita income increase 2.5%, if the population growth under 1% annually. However, population growth of more than 2 per cent had a slight increase of less than 2 per cent in per capita income.

Bloom and Williamson (1997) look for the important to examine demographic factors for economic growth in East Asia between 1965 and 1990. Their results showed that the age distribution will drive to economic performance, not the population growth. The difference in labour-age growth rates and dependent population can influence the impact of age distribution. The study showed that demographic movements accounted for as many as 1.4% to 1.9% points of GDP per capita growth, or as much as one third of East Asia 's overall miracle GDP per capita growth rate.

Dawson and Tiffin (1998) studied the relationship between population and economic growth in long run, and they used annual time series date for the period from 1950 to 1993 in India. The study adopted cointegration and Granger causality test. Then, in long run, they found out that there is no relationship between the two variables. Then, population growth and economic growth do not Granger cause each other.

Furuoka (2009) investigate the relationship between the population and economic growth in Thailand. The author found out that there had co-movement between the population and economic growth, and it was had positive impact in Thailand over the period 1960-2003. While he also found out that there are having unidirectional causality from population to GDP in Thailand. These finding found out the population growth in a country's promotes its economic development, that mean it support to the population-driven economic growth hypothesis.

Thuku, Paul and Almadi (2013) examine the effect of demographic changes on Kenya's economic development during the period 1963 to 2009. The results indicated that there is correlated and positive between population growth and economic growth. The uptick in population would have positive impacts on the economic growth.

2.3.2 Tax Revenue

Helms' (1985) study on the effect of taxes on economic growth for 48 states by using cross section time series within 1965 until 1979. The findings revealed that 1% tax and fee rise would lead to an improvement in transfer spending of 5.32 per cent. They virtue to the programs being more highly regarded by labor and industry, thus increasing efficiency by 15. Helms observes a negative association between tax hikes and economic activity as taxes are used for dividend transfers or income redistribution.

De Wet, Schoeman and Koch (2005) find that direct taxes have a negative effect on economic growth. Their study is in South African within the period from 1969 to 2003. However, they found out there is insignificant effect on economic growth from indirect taxes. Therefore, they recommend a substitution effect of direct to indirect taxes to ease the tax burden and therefore have less negative effect on economic growth.

Arnold (2008) studied the link between tax structure and economic growth within the period from to 2004 by using annual panel data for 21 OECD countries to. Arnold uses annual statistics and computations based on a common mathematical model and a government spending limitation that allows for the estimation of revenue-neutral tax institutional adjustments. The results show that a greater reliance on income tax implies a significantly lower level of GDP per capita than the use of consumer and property taxes. Among the income taxes he notices that corporate income taxes are correlated with lower per capita GDP rates than personal income taxes.

Yi and Suyono (2014) study the relationship tax revenue and economic growth on the Hebei Province in China in the period from 1978 to 2011. They found that tax

increases at the provincial level may not have as negative an effect on growth as most other studies have indicated by amending the formula for tax multipliers in their methodology. They consider that shifting indirect to direct tax has more positive effects on production, as well as steering policy spending to factors supporting improved living conditions such as social security and other social programs, as well as compensating for the costs of the medical sector.

2.3.3 Inflation

Kormendi and Meguire (1985) was using the cross-section data of 47 countries during the period between 1990 and 2011 to approximate a growth equation with cross-sectional data and to show that inflation has a negative impact on the growth rate, while it lacks explanatory capacity when the spending rate is still included in the regression. This suggested that inflation impact is reflected primarily in a decline in production but not in capital productivity.

Bruno and Easterly (1995) analysed the determinants of economic growth using 26 countries' annual CPI inflation that witnessed inflation crises during the period 1961-1992. The inflation rate of 40% and higher is known as the trigger point for an inflation crisis in their scientific study. They considered the relationship between inflation and economic growth below this threshold contradictory or rather inconclusive, when high-inflation countries are omitted from the study. Moreover, the empirical analysis suggests a temporary negative relationship exists between inflation and economic growth beyond that threshold level.

Ahmed and Mortaza (2005) used an annual data collection on real GDP and CPI for the period 1980 to 2005 in their empirical analysis of the relation between inflation and economic growth in Bangladesh. The empirical research suggests that there is a statistically important long-term negative association between inflation and economic development for the world due to the long-term negative relationship between the consumer price index (CPI) and actual GDP.

Kanchan and Chandan (2011) studied on the relationship between inflation and economic growth in Malaysia. This study used time series data from 1971 to 2001 and employed the methods of VEC estimation and VAR model estimation to test the relationship between inflation and economic growth in short-run and long-run. In the result, inflation is having negative effect on the economic growth in the short run. By using the VAR model estimation, there are showed the inflation can positively leads to change in economic growth. They also used the Impulse Response Function method to support the results VEC modelling, but the reserve is not true. The impulse of inflation is not significant, whereas the inflation response due to shocks in growth is effective up to fourth year in future.

Kasidi and Mwakanmela (2013) examine the inflation's impact on economic growth in Tanzania, and they used annual time series data for the period from 1990 to 2011. Based on the study, they found out inflation have negative impact to economic growth. In Tanzania, an increased 1% in inflation rate will cause to GDP go down 48.105%. While they also found out there is not co-integration between inflation and GDP. That mean, there is no relationship between inflation and economic growth in long run in the country.

Babalola, Oladapo, Danladi, Akomolafe, John, and Ajiboye (2015), examined the inflation, interest rate and economic growth in Nigeria, and they were using annual time series data from 1981 to 2014. He was found it that inflation is having negative impact to the economic growth by using the method of OLS. That mean when the inflation increased, the economic growth will be reduce. The Granger causality test shows that inflation and do not Granger cause the economic growth in Nigeria.

2.3.4 Unemployment rate

Cuaresma (2003) studied the relationship between unemployment and economic growth in US during the period from 1965 to 1999. He proposed an asymmetrical relationship between unemployment and economic growth in his study. The author found negative significant relationship between economic growth and unemployment during economic shrinkage periods.

Kreishan (2011) investigated the relationship between unemployment and economic growth in Jordan through the implementation of Okun's law during the period from 1970 to 2008. The results showed that the unemployment rate does not depending on the economic growth. Therefore, the findings that showed the Okun's law not valid in Jordan. The analysis indicated that there should be no major impact of economic policies linked to demand management in raising the unemployment.

Chand, Tiwari and Phuyal (2017) study the effect of economic growth on unemployment rate in India during the period between 1990 and 2016. Their findings stated that the unemployment rate and GDP had strong negative correlated, which is 0.71. While, the results also explained that an increased 1% in unemployment will cause to GDP declined 4.8%.

Seth, John and Dalhatu (2018) studied the impact of unemployment on economic growth in Nigeria between the periods 1986 and 2015. For the cointegration result, it showed that the unemployment and GDP didn't not had relationship in the long run. However, in long run, an increase 1% in unemployment rate will caused to the GDP increased 20.7%. While in the short run, there variables were negative relationship.

2.3.5 Foreign direct investment (FDI)

De Mello (1999) studied the evidence for a growth hypothesis based on FDI when time series analysis and data panel estimates were made for a group of 32 OECD and non-OECD countries from 1970 to 1990. The results of panel analysis, there were having positive impact of FDP on output growth without country specific terms. For the OECD panel, FDI appeared will have positive impact on technology change. For the non-OECD countries, FDI was given negative impact on the total factors productivity.

Ericsson and Irandoust (2001) analyzed the causal impact of growth in FDI and output growth for the four OECD countries applying a multi-country system to data from Denmark, Finland, Norway and Sweden between 1970 and 1997. They found out that there is not causal relationship between FDI and output growth for Denmark and Finland. While for the Norway and Sweden, the FDI and output growth are bi-directional. So, these variables will affect each other for Norway and Sweden.

Johnson (2005) models the potential of the inflow of FDI to impact economic growth in the host country. The study is carried out over the period 1980 to 2002 in both cross-sectional and panel results for 90 countries. The analytical aspect of the paper shows that the arrival of FDI in emerging countries boosts economic development but not in developed economies.

Kharroubi and Ouahiba (2018) studied the impact of FDI on economic growth in Malaysia and using annual time series date from 1970 to 2017. Their result showed that FDI and GDP are negative relationship. The GDP will reduce 0.012% due to the FDI

increased 1%. However, the FDI is significant on the local investment and it also cause to increase in GDP.

Bouchoucha and Ali (2019) investigated the impact of foreign direct investment on economic growth in Tunisia over the period from 1980 to 2015. Their identified FDI has a positive and significant short-term economic impact in Tunisia. Indeed, an increase in FDI of 1% will help to increase 0.512% economic growth in Tunisia in the short run. While in the long term, there are also having positive impact of FDI on the economic growth, but the impact is less than in short run. Throughout the long term, a 1 % rise throughout FDI would further improve economic growth by rising by 0.298%.

2.4 Conclusion Remark

There are some theories used by the economist on their study of economic growth. The Malthusian model is popular in understanding the relationship between population growth and economic development, and the Keynesian aggregate demand model can also explain easily the impact of tax revenues on economic growth. While inflation rate is used by neoclassical model to explain the effect, but there are many economists proved that the relationship between inflation rate and economic growth can be positive and negative. Okun's law is the most popular and many economists accepted to explain the unemployment rate, and the endogenous growth model is explained the relationship between FDI and economic growth. In short, most of the previous studies are match with the theories, but in different countries maybe not work as well.

CHAPTER 3

METHODOLOGY

3.1 Introduction

Chapter 3 has five section. The sections are introduction, conceptual framework, research design, empirical model and econometric methodology. Research designs explain the data description that consists of the period of data uses for this study. The empirical model is the model specification equation used in the study. The conceptual framework is the visualization of the theoretical construct in the study. Lastly, econometric methodology is the method used to examine the relationship and effect of the variables in the study.

The study examines the effect of the population growth, tax revenue, inflation rate, unemployment rate and FDI on the economic growth in Japan within 30 years of the period from 1988 to 2017. This study is time series analysis which included method that analyse the independent variables' effect on the dependent variable in the country.

3.2 Research Design

3.2.1 Data description

Data that used is from Japan which within 30 years of the period from 1989 to 2018. The data be annually data and the data sources are from the World Bank. The population growth, tax revenue, inflation rate, unemployment rate, and the net inflow of FDI are the independent variables. While GDP growth rate is dependent variable. The data resources of population growth, tax revenue, inflation rate, unemployment rate, FDI and GDP growth rate are acquired from World Bank.

3.3 Empirical Model

The effect of population growth, tax revenue, inflation rate, unemployment rate, and FDI on GDP growth will be examine in the study. The equation is expressed as below, and it is to determine the effect of these variables. Based on the literature reviewed as reference, the equations are as follow:

$$LGDP_t = \alpha + \beta_1 LPOP_t + \beta_2 LTAX_t + \beta_3 LINF_t + \beta_4 LUN_t + \beta_5 LFDI_t + \varepsilon_t$$

Where:

$LGDPG_t$ = Logarithm of GDP growth for period t (annual %)

α = Parameter constant

$L\text{POP}_t$ = Logarithm of population growth for period t (annual %)

$LTAX_t$ = Logarithm of total tax revenue for period t (annual %)

$LINF_t$ = Logarithm of inflation rate for period t (annual %)

LUN_t= Logarithm of unemployment rate for period t(annual %)

LFDI_t= Logarithm of Foreign Direct Investment, net inflow for period t (% of GDP)

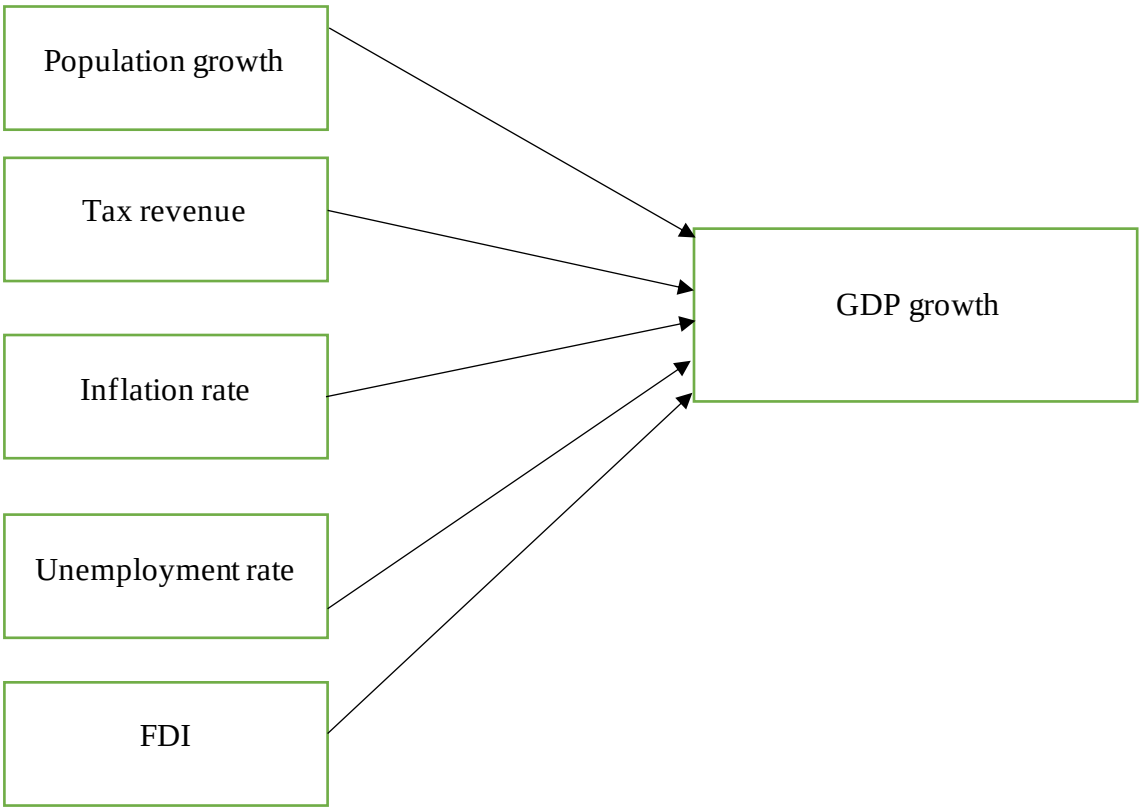
ε_t= random error term for period t

β_1 , β_2 , β_3 , β_4 and β_5 are the coefficient for each independent variable.

3.4 Conceptual Framework

The conceptual framework explains the effect of population growth, tax revenue, inflation rate, unemployment rate, and FDI on the GDP growth.

Figure 3.1: The effect of population growth, tax revenue, inflation rate, FDI, and unemployment rate on the GDP growth.



Independent Variable **Dependent Variable**

The arrows in Figure 3.1 show that the independent variables influence the dependent variable an there have five independent variables in this study which include population growth, tax revenue, inflation rate, unemployment rate, and FDI, and the dependent variable is GDP growth.

3.5 Methodology

Time series consists of the collection or series of data each one recorded at the time, and time series analysis is to determine the time series data to reflect the characteristic. Unit root test, cointegration test, Granger causality test and dynamic analysis are the test that will be used in the study.

Unit root test consists of the Augmented Dickey Fuller (ADF) test and Phillips-Perron (PP) test in the study, and these tests are meant to test the model stationary. Johansen-Juselius (JJ) cointegration test is to examine the relationship between the variables in long run. Then, Granger causality test and it divided into Vector Error Correction Model (VECM) Granger causality and Granger causality test. Lastly, the dynamic analysis will be conducted the variance decomposition.

3.5.1 Unit Root Test

Unit root test is using to test for stationary of the model in a time series within the period of observation. The unit root test consists Augmented Dickey-Fuller (ADF) test and Phillip- Perron (PP) test are the most popular tests that used by previous research.

3.5.1.2 Augmented Dickey-Fuller (ADF) test

Dicky and Fuller (1981) were developed the ADF test and the purpose is to test the stationary properties of the data. The null hypothesis implies that the unit root and the variables are not stationary. The alternative hypothesis implies the variables find the series to be stationary. The null hypothesis and alternative hypothesis of ADF are as below:

$$H_0: \alpha = 0 \text{ (The variables are non-stationary)}$$

$$H_1: \alpha \neq 0 \text{ (The variables are stationary)}$$

The rejection rule of the ADF test is when the measured test statistics at a significant level are larger than the critical value, then the null hypothesis is rejected. Generally , the study applies the 1%, 5%, and 10% significant level or critical value.

3.5.1.2 Phillips-Perron (PP) test

Philips and Perron (1998) were developed the PP test is developed by and it used to make correction to the test statistics and is robust to the unspecified autocorrelation and heteroscedasticity in the errors. It is applied to examine whether an integration of order 1 exist or not. The null hypothesis indicates that the presence of unit root and the variables is non-stationary, and the hypothesis is same with the ADF test. The alternatives hypothesis implies that the variables do not contain unit root and the variables is stationary. The null hypothesis and alternative hypothesis of PP are as below:

$$H_0: \alpha = 0 \text{ (The variables are non-stationary)}$$

$$H_1: \alpha \neq 0 \text{ (The variables are stationary)}$$

The PP test's rejection rule is same with ADF test. If the result of test statistic is greater than the critical value, then the variables is significant, and the null hypothesis rejected. While if the result of test statistics is less than the critical value, then the variables is not significant, and the null hypothesis cannot be rejected. Generally, the 1%, 5%, and 10% significant level or critical value is used for the study.

3.5.2 Johansen-Juselius (JJ) Cointegration Test

Johansen-Juselius (JJ) Cointegration is founded by Johansen and Juselius (1990). JJ cointegration test is used in the long-term analysis of the cointegration relationship between the variables in the data set. Two likelihood tests used to examine the number of vectors used for cointegration. Trace test and maximum eigenvalue test are the likehood test.

3.5.2.1 Trace Test

The trace test can be express as following

$$T_{trace} = -T \sum_{i=r+1}^{n} In(1 - \lambda_i)$$

Where,

$T =$ The observations number

$n =$ The number of variables

$\lambda_i =$ The largest estimated eigenvalue

Trace test's null hypothesis and alternative hypothesis of are as below:

H_0: r = 0

H_1: r > 0

The null hypothesis indicates that there is no cointegration. In contrast, the alternatives hypothesis indicates that there is one or more cointegration vector. If the trace

test's value is larger than the critical value, then reject the null hypothesis and the model has cointegration.

3.5.2.2 Maximum Eigenvalue test

The Eigenvalue Test can define as following:

$$T_{max} = -T\ In(1 - \lambda_{r-1})$$

$T =$ The observations number

$\lambda_{r-1} =$ The largest estimated eigenvalue

The null hypothesis and alternative hypothesis if trace test is as below:

H_0: r = 0

H_1: r + 1

The null hypothesis indicates that there is no cointegration. In contrast, the alternative hypothesis indicates that there is one or more cointegration vector. If the value computed is greater than the critical value, then reject the null hypothesis is rejected and the model has more cointegrating vectors in the long run.

3.5.3 Vector Error Correction Model (VECM) Granger Causality

Vector Error Correction Model (VECM) is applied to examine the existence of long-run and short-run relationship of the cointegration vectors and indicate the time series model's speed of adjustment from long-run equilibrium. Error Correction Term (ECT) is the measurement of adjustment speed to test the variables how fast to adjust back to long-run equilibrium. ECT is important to avoid misspecifications and omissions of major constraints. The conditions of ECT must be fulfilled the requirement, which is the coefficient less than one, significant and negative.

3.5.4 Granger Causality Test

Granger causality test would also be applied to investigate the short run Granger causality between the variables used in this study. Granger causality test is to examine the directional between the variables, either there are unidirectional, bidirectional, or not directional. This test that used test one variable causes another variable to grange. The null hypothesis and alternative hypothesis of Granger causality test are as below:

H_0: A does not granger cause B

H_1: A does granger cause B

When the p-value is greater than the critical value at the significant level, the null hypothesis can be rejected. The significant levels are 1%, 5% and 10%.

3.5.5 Dynamic Analysis

Dynamic test strengthens the findings from the causality analysis and providing further evidence of the empirical investigation. The dynamic analysis provides further forecasting ability which enables us to foretell the responses of each given variable due to the movements in any other variable. There are two types of dynamic analysis, which are the forecast error variance decomposition (FEVDs) and impulse response function (IRF). Both methods are helpful in determining how shocks reverberate through a network of economic variables used. FEVDs only been used in the study.

3.5.5.1 Forecast Error Variance Decomposition (FEVDs)

Forecast error variance decomposition (FEVDs) is a standard statistical tool for multivariate analysis to find simplifying structures in a wide variety of variables. FEVDs provides information on the relative importance of each breakthrough in influencing the predicted error variance of all system response variables. FEVDs measure the contribution of each type of shock to the forecast error variance.

3.6 Conclusion Remark

In conclusion, the first step of methodology is to test the stationary of the model by using ADF unit root test and PP unit root test. The second step is using JJ cointegration test to identify on the cointegration between dependent and independent variables. Moreover, VECM Granger causality test is proceeded when there is the existence of cointegration between the variables. The variance decomposition is the dynamic analysis that will be proceeded after the VECM test.

The investigation to get a significant result is conducted by using E-View 9 and the result of the significance data will be interpreted in Chapter 4. Chapter 4 will be discussed the analysis and data interpretation.

CHAPTER 4

RESULT AND DISCUSSION

4.1 Introduction

This study used E-view 9 to run the tests to order to get the empirical results in this chapter. Unit root test consisted Augmented Dickey Fuller (ADF) test and Phillips-Perron (PP) to test on the stationary of the model. Johansen-Juselius (JJ) Cointegration test is used to test the result of cointegrating vector. Vector Error-Correction Model (VECM) Granger causality test is used to test on the long-run equilibrium and short run equilibrium. Lastly, Variance Decomposition are adopted to test for dynamic analysis of the model. Then, the result will be discussing further.

4.2 Empirical Result

4.2.1 Unit root test: Augmented Dickey Fuller test and Phillips-Perron test

Table 4.1: Unit root tests results

	ADF μ	ADF α	PP μ	PP α
	A: Level			
GDP	-2.6326 (4)	-3.1622 (2)	-5.0280(7)*	-5.2796 (7)*
POP	-0.7395 (0)	-2.9698 (0)	-0.7395(0)	-2.9698(0)
TAX	-2.2315(3)	-0.6589 (2)	-1.6520(4)	-0.312117(9)
INF	-2.5707(1)	-2.5637 (1)	-3.2341(7)*	-3.1984(16)
UN	-2.0205 (1)	0.211340(0)	-1.400623(3)	0.2113(0)
FDI	-2.2364(2)	-2.1935 (4)	-3.2746(7)*	-4.1683(7)*
	B: First Difference			
GDP	-5.7339(1) *	-5.6948(4)*	-8.9264(1)*	-8.8189(1)*
POP	-5.8642(0)*	-5.7650(0)*	-5.8642(0)*	-5.7650(0)*
TAX	-4.0614(1)*	-4.9934(1)*	-3.3030(9)*	-5.2513(27)*
INF	-7.4185(0)*	-7.3103(0)*	-10.686(6)*	-15.1153(14)*
UN	-1.7216(2)*	-4.1033(1)*	-2.8287(1) *	-3.3946(1)*
FDI	-7.3194(0)*	-7.1647(0)*	-17.700(27)*	-17.215(27)*

Notes: Asterisks (*) show statically significant at 10% level, μ denotes as intercept while α denotes as trend and intercept. Figures in parentheses () are the lag length.

Table 4.1 shows that the results acquired from Augmented Dickey Fuller (ADF) unit root test and Phillips-Perron (PP) unit root test for Gross Domestic Product growth rate (GDP), population (POP), taxation (TAX), inflation rate (INF), unemployment (UN), and foreign direct investment (FDI). Based on the result of ADF, at level, GDP, POP, TAX, INF,UN, and FDI are not significant at the 10% significant level for intercept and trend and intercept in ADF test because the significant level is lower than p-value. Thus,

the testing does not reject null hypothesis and non-stationary at level. In contrast, at first difference, all the variables including GDP, POP, TAX, INF UN and FDI are significant at 10% significant level for intercept and trend and intercept because the significant level is greater than p-value. Thus, the testing rejects null hypothesis and all the variables are stationary at first difference.

Based on PP test's result, at level, POP, TAX, and UN are not significant at the 10% significant level for both intercept and trend and intercept. That mean these variables are stationary at level. While GDP and FDI are significant at 10% significant level for intercept and trend and intercept, and GDP and FDI are non-stationary at level. For the INF, INF is significant at 10% of significant level for intercept but not significant for trend and intercept at level. In short, the testing does not reject the null hypothesis and all variables are stationary at level except GDP. In contrast, at first difference, all variables are significant at 10% level significant for intercept and trend and intercept in PP test. This is because the significant level greater than p-value. Hence, the testing rejects null hypothesis and these variables are stationary at first difference.

4.2.2 Johansen-Juselius (JJ) Cointegration test

Table 4.2: Johansen-Juselius (JJ) cointegration test results

Hypothesis		Trace		Maximum Eigenvalue	
Null	**Alternative**	**Unadjusted**	**95% Critical Value**	**Unadjusted**	**95% Critical Value**
r=0	r=1	116.3208*	95.7537*	46.6871*	40.0776*
r≤1	r=2	69.6337	69.8189	30.8366	33.8769
r≤2	r=3	38.7971	47.8561	20.4357	27.5843
r≤3	r=4	18.3614	29.7971	12.4445	21.1316
r≤4	r=5	5.9169	15.4947	5.0097	14.2646
r≤5	r=6	0.9071	3.8415	0.9071	3.8415

Notes: Asterisks (*) denote statically significant at 5% level. The r denotes the number of co-integrating vectors.

Table 4.2 shows the result of Johansen-Juselius cointegration test for LGDP, LPOP, LTAX, LINF, LUN and LFDI. Based on the result of the trace and maximum eigenvalue tests, the null hypothesis of no cointegrating vectors is rejected because both are statistically significant at 5% level of significance. The result of trace and eigenvalue suggest that there is 1 cointegrating vectors exists between variables for the sample from 1998 to 2017. Since the trace and maximum eigenvalue were rejected the hypothesis of no cointegration exist, so there is long run linkage among the variables. Vector Error-Correction Model (VECM) Granger causality framework can be applied to determine the long run equilibrium relationship between the variables since the cointegrating vectors are

exist in the model. There are more than 1 cointegrating vectors at maximum eigenvalue, so VECM is applied.

4.2.3 Vector Error-Correction Model (VECM) Granger Causality Test

Table 4.3: VECM Granger causality result

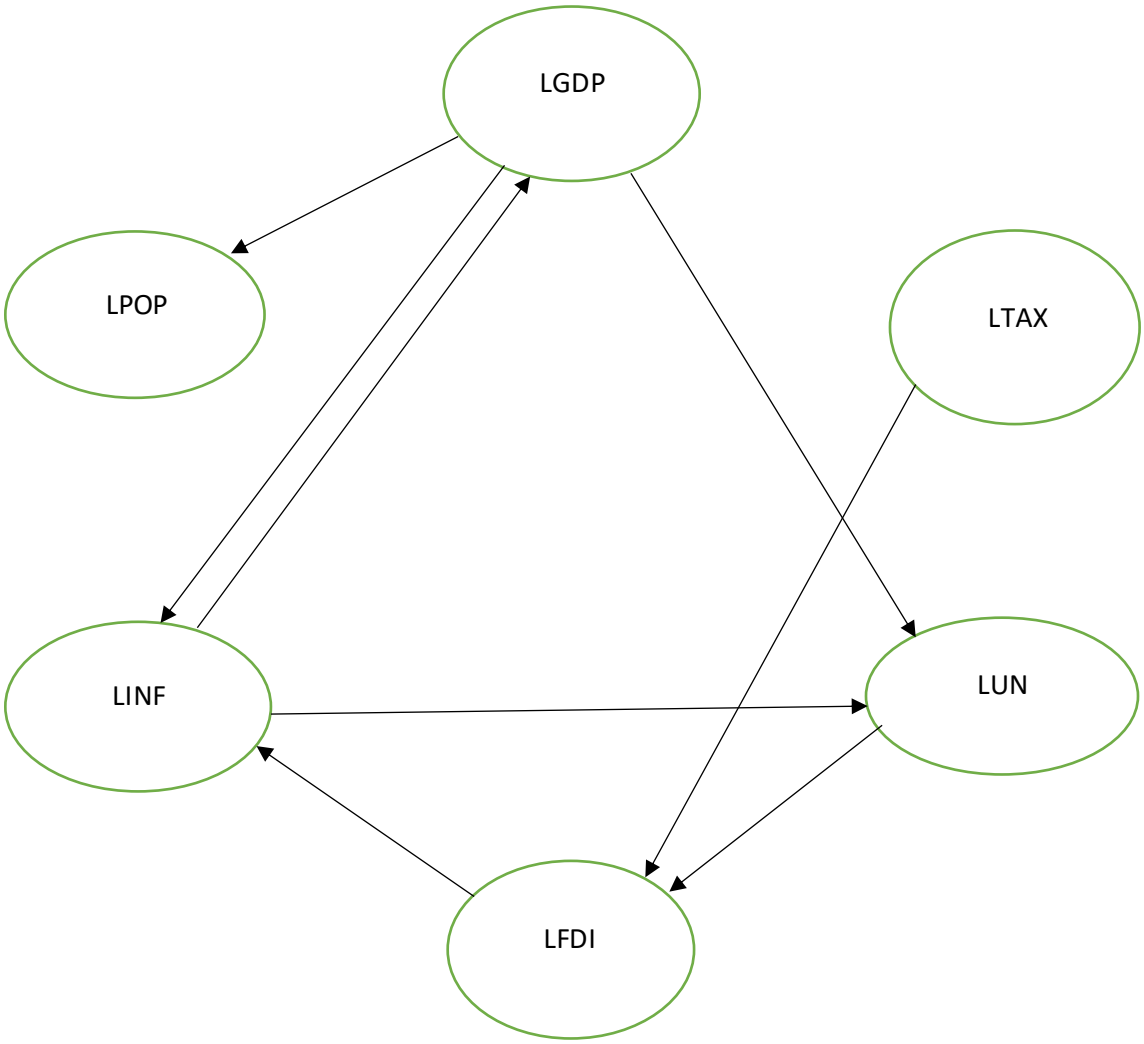
Dependent variable (log)	**LGDP**	**LPOP**	**LTAX**	**LINF**	**LUN**	**LFDI**	**ECT**	
	X^2statistics (p-value)						**Coefficient**	**t-ratio**
LGDP	-	1.0950	0.7766	6.3367	0.3587	2.0998	-0.5408*	-2.42960*
		(0.2954)	(0.3782)	(0.0118)*	(0.5492)	(0.1473)		
LPOP	7.8629	-	1.4594	0.0833	0.0081	0.2024	-0.0453	-0.84894
	(0.0050)*		(0.2270)	(0.7729)	(0.9283)	(0.6528)		
LTAX	1.6007	2.4843	-	1.5145	0.0567	0.0039	0.0011	0.03525
	(0.2058)	(0.1150)		(0.2184)	(0.8119)	(0.9502)		
LINF	9.5386	2.9692	0.3327	-	1.9427	14.1625	-1.1073	-3.94725
	(0.0020)*	(0.0849)	(0.5640)		(0.1634)	(0.0002)*		
LUN	6.6732	0.1888	0.0660	4.6739	-	0.2712	0.0481	1.23455
	(0.0098)*	(0.6639)	(0.7972)	(0.0306)*		(0.6025)		
LFDI	0.0401	2.0879	7.7116	1.9292	7.0868	-	-1.0956	-3.55001
	(0.8412)	(0.1485)	(0.0055)*	(0.1648)	(0.0078)*			

Notes: The X^2 statistics tests the joint significance of the lagged values of the independent variables, and the significant of the error correction terms. Δ is the first different operator. Asterisks (*) indicate statistically significant at 5% level.

Table 4.3 illustrates the causality relationship between Gross Domestic Product growth rate (LGDP), population (LPOP), tax revenue (LTAX), inflation rate (LINF), unemployment (LUN), and FDI (LFDI). The p-value of the dependent variables of the VECM explained the significant of the short run causal effects. The t-ratio on the coefficient of the lagged error- correction term (ECT) indicates the significant of the long run causal effects.

Based on the result obtained in Table 4.3, when LGDP is dependent variables, the variable will in negative sign and statistically significant at 5% significant level in the result of ECT and the coefficient is between 0 and -1. The coefficient of LGDP shows -0.5408% of adjustment to go back to the equilibrium and in long run. While when LPOP, LTAX, LINF and LUN and LFDI are dependent variables, theses variables statistically insignificant.

Figure 4.1: Short run VECM Granger causality result.



The rejection rule of Granger causality is the variables probability less than 5% significant level. In the short run, there is having bidirectional Granger Causality between LGDP and LINF. LGDP also has unidirectional Granger causal to LPOP and LUN. For the LTAX and LUN are Granger causa to LFDI. Besides that, there is unidirectional Granger causality from LINF to LUN.

4.2.4 Variance Decomposition

Table 4.4: Variance Decomposition result

Variance Decomposition of LGDP

Period	**LGDP**	LPOP	LTAX	LINF	LUN	LFDI	CU
1	**100.0000**	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
10	**49.7644**	2.4326	4.8123	13.7703	24.3652	4.8552	50.2356
20	**43.2698**	2.6525	3.0275	12.5477	35.3275	3.1750	56.7302
30	**40.3370**	2.7422	2.2239	11.9805	40.3009	2.4156	59.6630

Variance Decomposition of LPOP

Period	LGDP	**LPOP**	LTAX	LINF	LUN	LFDI	CU
1	24.4553	**75.5447**	0.0000	0.0000	0.0000	0.0000	24.4553
10	19.4003	**60.3128**	17.9912	0.9395	0.6770	0.6793	39.6872
20	16.0523	**61.4620**	20.6320	0.5412	0.8969	0.4156	38.5380
30	14.8529	**61.8674**	21.5804	0.3990	0.9811	0.3193	38.1326

Variance Decomposition of LTAX

Period	LGDP	LPOP	**LTAX**	LINF	LUN	LFDI	CU
1	29.1108	0.7464	**70.1428**	0.0000	0.0000	0.0000	29.8572
10	48.2474	0.7452	**45.9960**	4.2704	0.3148	0.4262	54.0040
20	49.1615	0.7276	**44.6449**	4.5740	0.4196	0.4725	55.3551
30	49.4609	0.7218	**44.2034**	4.6725	0.4546	0.4867	55.7966

Variance Decomposition of LINF

Period	LGDP	LPOP	LTAX	**LINF**	LUN	LFDI	CU
1	37.7763	2.7638	0.4113	**59.0485**	0.0000	0.0000	40.9515
10	35.2455	4.9865	15.0116	**23.2881**	13.3988	8.0696	76.7119
20	31.0425	5.2005	13.0989	**24.8075**	18.2590	7.5916	75.1925
30	29.4023	5.2700	12.3759	**25.4074**	20.1215	7.4229	74.5926

Variance Decomposition of LUN

Period	LGDP	LPOP	LTAX	LINF	**LUN**	LFDI	CU
1	48.0276	5.3712	11.2627	2.6160	**32.7225**	0.0000	67.2775
10	58.1672	2.0151	15.7982	3.5437	**20.1938**	0.2820	79.8062
20	58.1390	1.9012	15.2592	3.8943	**20.6722**	0.1341	79.3278
30	58.1272	1.8673	15.1111	3.9932	**20.8080**	0.0932	79.1920

Variance Decomposition of LFDI

Period	LGDP	LPOP	LTAX	LINF	LUN	**LFDI**	CU
1	12.4221	3.0138	2.8431	8.0047	5.7091	**68.0071**	31.9929
10	37.9174	1.5482	25.3814	3.1489	5.4454	**26.5587**	73.4413
20	39.0769	0.9118	29.9537	2.3133	5.2974	**22.4470**	77.5530
30	39.5727	0.6464	31.8659	1.9593	5.2294	**20.7263**	79.2737

Notes: CU shows the percentage of forecast error variances of each variables explained by other variables. Bolded column shows the impact on their own shock.

Table 4.3 explains the Variance Decomposition's result of the dependent variable and independent variables. By using variance decomposition, the variables will be determining either exogenous or endogenous. Exogenous variable refers to variable with its value that entirely causality independent from other variables. Endogenous variable that refers to variable which relatively specific to a model and performing a causal relationship within independent variables. From the result obtained in Table 4, population (LPOP) is the most exogenous variables, which is 61.8674% of forecast variance can be explained by its own variable at the end of 30 years period. While the most endogenous variable is foreign direct investment (LFDI) as there is 20.7263% of forecast variance can be explained by other variables. The following the 20.8080% of unemployment (LUN), 25.4074% of inflation rate (LINF), 40.3370% of Gross Domestic Product growth rate (LGDP), and then 44.2034% of tax revenue (LTAX).

4.3 Discussion of the Results

This section is to point out whether the purpose of the study has been fulfilled which is to examine the effect and relationship between macroeconomic factors on economic growth in Japan. The population growth rate, taxation, inflation rate, unemployment rate, and Foreign Direct Investment (FDI) inflow are the explanatory variables and Gross Domestic Product (GDP) growth rate is dependent variable have been conducted.

The result on Granger causality running from (LINF) to LGDP is supported by the Kanchan Datta & Chandan Kumar Mukhopadhyay (2011). Their study is to investigate the relationship between inflation and economic growth, and the result showed that inflation has negative relationship with the economic growth but its is positive relationship. Kasidi and Mwakanmela (2013) also studies the relationship between inflation and economic growth, and the result same with Kanchan Datta & Chandan Kumar Mukhopadhyay (2011), which is negative relationship between inflation and economic growth. Therefore, the inflation has negative relationship and effect on the economic growth.

Moreover, the tax revenue is the most influence the economic growth and it showed by the VECM test. The result of tax revenue has negative effect on economic growth in the result of VECM test supported by the research from Arnold (2008), and Yi and Suyono (2014). Their study used personal income tax, tax revenue and progressive taxes to test the relationship on economic growth. The results showed that there is statistically significant, and taxation have negative relationship with economic growth.

Besides that, De Wet, Schoeman and Koch (2005) also proved that direct tax has negative relationship with the economic growth in South African. Therefore, taxation have negative impact for economic growth.

In conclusion, the second and third objective of the study has been fulfilled where taxation have negative effect and inflation has positive effect on economic growth in Japan. While, the objective of population growth rate, inflation rate and unemployment rate also been achieved, and the result showed that there are not effect on economic growth.

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1 Introduction

The main objective of this study is to determine the effect of the population, tax revenue, and inflation, unemployment, and foreign direct investment on economic growth in Japan between 1988 to 2017. The relationship between the population, tax revenue, and inflation, unemployment, and foreign direct investment towards economic growth in Japan. Hence, the effect and relationship had been proven through different tests. This chapter will be discussed the summary of finding, and then the policy implication and recommendations. Then, it followed by the contribution of study and limitation if the study. Lastly, this chapter discussed the recommendations.

5.2 Summary of Findings

The study's main purpose is to investigate the relationship of macroeconomic factors and economic growth in Japan. Gross Domestic Product (GDP) growth rate is the dependent variable, while population growth rate, taxation, inflation rate, unemployment rate and Foreign Direct Investment (FDI) inflow are the independent variables. The empirical results is based on time series analysis data and the time period from 1988 to 2017.

Based on the empirical results obtained in Chapter 4, all variables are stationary at first difference in Augmented Dickey Fuller (ADF) unit root test. Then, the Johansen-Juselius (JJ) cointegration test results shows that the variables have 1 cointegrating vectors and there is long run relationship between GDP growth rate, population growth rate, taxation, inflation rate, unemployment rate and FDI. Moreover, in the VECM Granger Causality test, inflation rate Granger cause to GDP growth rate with a unidirectional relationship in the short run. While based on the ECT results, the coefficient of LGDP shows -0.5408 of adjustment to go back to the equilibrium in long term. Furthermore, the dynamic analysis of variance decomposition shows LPOP is the most exogenous variables and LUN is most endogenous variables in the study of the period within 30 year.

In conclusion, the empirical evidence showed that inflation rate has negative relationship with the economic growth, So, an increasing in inflation rate will affect the decreased of economic growth. While tax revenue is the most affected the economic growth in Japan.

5.3 Policy Implication

The policy implications are suggested based on the results or findings in empirical results that inflation rate and taxation have significant negative relationship on the Japan's economic growth in short run. The policymaker can consider for contractionary monetary policy to control the inflation rate. The contractionary monetary policy is to decrease the money supply by increasing interest rate and reducing the price of bond. This could help in reduce the spending of households. There are having 3 tools of the policy which is increasing the interest rate and reserve requirement and reducing the money supply. By using these tools, the inflation rate can be control because it can reduce the spending of households, so the market will not easily to increase the product's price.

Moreover, the policy suggested that the policymaker reform the taxation in Japan. The previous studies showed that higher tax rate has negative effect on economic growth, so policymaker could reduce the tax rate to stimulate the economy. By reducing tax rate, people can use the money to purchase other things like bond, necessary good, luxury good, and assets. That mean the purchasing power of people increased in the market, and it can stimulate the economic growth. While on the supply side, the supplier can produce more productivity in the market. Supplier can buy an asset or hire more worker in the industry because the cost of production decreased. By the way, unemployment rate also can be reduced since there are more workers have been hired. Thus, tax rate reform has potential to raise economic growth.

To sum up, to improve economic growth, the government should consider the contractionary monetary policy and tax rate reform policy. The government can have a research to find out the effect of the macroeconomics factors on economic growth.

5.4 Contribution of the Study

This study can contribute advantage information on the correlation between macroeconomic factors such as population, taxation, inflation, unemployment, FDI and economic growth in a highly developed country like Japan. This study suggests the government to improve and develop the policies are regarding with macroeconomic factors to raise the economic growth. The policies can base on the empirical results to set up. The policy of tax rate reform could be helping in improvement of economic growth and life quality. The government also can decrease the tax rate to attract investment from foreign investors. By the way, decrease tax rate also can stimulate the FDI. The government can have some program of investment and promote to other countries. The investment from foreign investors can helping in import good and improve the economic growth. Thus, it is recommended that the government should have some policy about macroeconomic factors to stimulate economic growth.

5.5 Limitation of the study

Throughout the study, the limitations have occurred and its need to be addressed. Firstly, the variables lack consideration of other factors. For example, FDI inflow cannot prove net FDI because of the lack of FDI outflow. This research is based on the usual variables to test, not a special field variable. Although these variables can still be studied, it is only in certain fields that they can only be used as research. In addition, this study does not consider cultural issues. For example, the problem of excessive overtime, the flow of people out, marriage and childbirth culture. Culture can influence data indirectly and thus affect the entire economic environment. The influence of culture is not only on the economic aspect, it has changed people's thinking, life, and habits. Moreover, the previous research in Japan are not the latest. There is less research about the determine economic growth in Japan from 2010 to 2019. Although other countries have latest research, but this study cannot compare with recent research.

5.6 Recommendations

This study is focusing on Japan, one of a highly developed free market economy countries and Japan is the third largest economy in the world. The first recommendation is specific the variables to find out the effect of macroeconomic factors on economic growth for the study. A particular factor can more closely explore the impact of that factor on the economy. For example, the types of tax are personal income tax, corporate income tax and indirect tax. Using specific factors to study, the government can follow a clear direction to formulate policies.

The second recommendation is using panel data analysis for the study. Panel data analysis is analysing the factors of two or above countries. The study can analysis developing countries and developed countries. Then to determine which factors are most important and impactful on the economic growth. By using panel analysis, the country can see as a same category of developing, the factors have same the effect on the economic growth. Thus, panel analysis is very suitable and useful for the study.

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Appendix

Appendix A： Summary table of population growth

Author (year)	Variables	Data	Country	Findings
Kelley (1988)	• Income per capita • Population growth	Data frequency: Annually Period of study: 1950-1990	Less developed countries	For the less developed countries, the results showed that income per capita and population had negative relationship.
Bloom and Williamson (1997)	• Real GDP per capita • Population growth • Life expectancy	Data frequency: Annually Period of study: 1965-1990	East Asia countries	The result shows the age distribution will drive the economic growth, but not population growth.
Dawson and Tiffin (1998)	• Population • real per capita GDP	Data frequency: Annually Period of study: 1950-1993	India	In the long term, there are not relationship exist.
Furuoka (2009)	• Population • Per capita real GDP	Data frequency: Annually Period of study: 1961-2003	Thailand	By the cointegration test, there was a long-run co-movement between population and economic growth. While the Granger causality test results showed that only population can affected the economic growth, but economic growth would not influence the population.
Thuku, Paul and Almadi (2013)	• GDP growth rate • Population	Data frequency: Annually Kenya	Kenya	The population growth and economic growth are positive correlated.

		Period of study: 1963-2009		

Appendix B: Summary table of tax revenue

Author (year)	Variables	Data	Country	Findings
Helms (1985)	• State personal income • taxes and other revenues • public expenditures • demographic and labor force characteristics	Data frequency: Annually Period of study: 1965-1979	48 states	There are having negative effect of the increasing of tax and fee on the state personal income.
De Wet, Schoeman and Koch (2005)	• GDP • The direct tax growth rate of total tax • The indirect tax growth rate of total tax • The direct tax growth rate of total income • The indirect tax growth rate of total income • The ratio of fixed capital formation to GDP	Data frequency: Annually Period of study: 1969-2003	South African	Their result showed there are having negative impact of direct tax on the economic growth but they also found an insignificant effect of indirect taxes on economic growth.

	• The labor force growth rate			
Arnold (2008)	• GDP per capita • personal income taxes • progressive taxes	Data frequency: Annually Period of study: 1971-2004	21 OECD countries	The results suggest that income taxes are generally associated with lower economic growth than taxes on consumption and property.
Yi and Suyono (2014)	• GDP • Tax revenue	Data frequency: Annually Period of study: 1978-2011	Hebei Province in China	The result showed the impact negative of increase of tax revenue on economic growth may not serious and the cut of tax can create more positive effects in Hebei Province

Appendix C： Summary table of inflation rate

Author (year)	Variables	Data	Country	Findings
Kormendi and Meguire (1985)	• The mean growth of real aggregate output (MDY) • The mean growth in the rate of inflation (MDINF)	Data frequency: Annually Period of study: 1961-1992	47 countries	For the variable of inflation, the effect of inflation on economic growth is negative. Inflation will reduce the investment and indirectly cause to the economic growth reduce.
Bruno and Easterly (1995)	• GDP growth CPI	Data frequency: Annually Period of study: 1961-1992	26 countries	There are existing the negative relationship between inflation and economic growth beyond this threshold level.
Ahmed and Mortaza (2005)	• real GDP • CPI	Data frequency: Annually Period of study: 1981-2005	Bangladesh	There exists a statistically significant long-run negative relationship between inflation and economic growth for the country
Kanchan Datta & Chandan Kumar	• Real GDP • CPI	Data frequency: Annually	Malaysia	Inflation has negative relationship with economic growth in short run, but there are positive relationship in long run.

Mukhopadhyay (2011)		Period of study: 1971-2001		
Kasidi and Mwakanmela (2013)	• GDP • Inflation rate	Data frequency: Annually Period of study: 1990-2011	Tanzania	The results showed that there is negative impact of inflation on economic growth. While in the long run, the inflation and GDP are not co-integration.
Kasidi and Mwakanmela (2013)	• GDP • inflation	Data frequency: Annually Period of study: 1980-2010	Ghana	Inflation has negative effects on economic growth. There is no long run relationship between inflation and economic growth during the period of the study.
Babalola, O. Oladapo, Danladi, Jonathan D. Akomolafe, K. John, and Ajiboye, O.Paul (2015)	• Real Gross Domestic Product • Inflation at Consumer Prices • Interest Rate	Data frequency: Annually Period of study: 1981-2014	Nigeria	The result of OLS method is showed the inflation and economic growth are negative relationship. While the Granger causality results stated that inflation do not Granger cause the economic growth

Appendix D： Summary table of unemployment rate

Author (year)	Variables	Data	Country	Findings
Cuaresma (2003)	• Unemployment rate	Data frequency: Annually Period of study: 1965-1999	US	The result showed that there is having negative relationship between economic growth and unemployment.
Kreishan (2011)	• Real GDP • Unemployment rate	Data frequency: Annually Period of study: 1970-2008	Jordan	The empirical results reveal that Okun's law cannot be confirmed for Jordan.
Chand, Tiwari and Phuyal (2017)	• GDP • Unemployment rate	Data frequency: Annually Period of study: 1991-2016	India	The findings stated that there are having strong negative correlation between unemployment and GDP.
Seth, John and Dalhatu (2018)	• GDP • Unemployment rate	Data frequency: Annually Period of study: 1986-2015	Nigeria	The results showed that the unemployment rate did not cointegration to economic growth in long term. In the short run, the relationship between unemployment rate and economic growth is negative, and positive relationship in long run.

Appendix E： Summary table of foreign direct investment

Author (year)	Variables	Data	Country	Findings
De Mello (1999)	• Output growth • FDI • Total factors productivity	Data frequency: Annually Period of study: 1970- 1990	32 OECD countries and non-OECD countries	The results showed that the FDI had positive impact on the output, without country-specific terms.
Ericsson and Irandoust (2001)	• Real GDP per capita • The rate of change of FDI inflows	Data frequency: Annually Period of study: 1970-1997	Denmark, Finland, Norway and Sweden	There is no Granger cause between FDI and output growth for the Denmark and Finland, but for the Norway and Sweden are having bi-dictional.
Johnson (2005)	• Average annual growth rate of real GDP per capita • Inflows of FDI as percentage of GDP	Data frequency: Annually Period of study: 1980-2002	90 countries	The result showed the FDI has positive effect on the economic growth in developing countries, but not in the developed countries.
Kharroubi and Ouahiba (2018)	• GDP • FDI • Local investment • Total trade.	Data frequency: Annually Period of study: 1970-2017	Malaysia	The FDI is bringing negative effect on the economic growth but it has positive impact on the local investment.
Bouchoucha and Ali (2019)	• GDP growth • FDI	Data frequency: Annually	Tunisia	There are having positive impact and significant on the economic growth in the short term rather than in the long term

	• Domestic investment • Human capital across secondary school gross enrollment ratio • The sum of imports and exports	Period of study: 1980-2015		