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INCOME DISTRIBUTION AND ECONOMIC GROWTH: A PANEL DATA ANALYSIS

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DECLARATION

We hereby declare that:

(1) This undergraduate research project is the end result of our own work and that due acknowledgement has been given in the references to ALL sources of information be they printed, electronic, or personal.

(2) No portion of this research project has been submitted in support of any application for any other degree or qualification of this or any other university, or other institutes of learning.

(3) Equal contribution has been made by each group member in completing the research project.

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LIST OF ABBREVIATIONS

AR	Autoregressive
ADF	Augmented Dickey Fuller
ARDL	Autoregressive Distributed Lag
CEE	Central and Eastern Europe
ECM	Error Correction Model
FDI	Foreign Direct Investment
FEM	Fixed Effect Model
GDP	Gross Domestic Product
GMM	Generalized Method of Moments
GNP	Gross National Product
GPT	General Purpose Technology
HO	Heckscher-Ohlin
INF	Inflation
LDCs	Less-Developed Countries
LM	Lagrange multiplier test
MDG	Millennium Development Goals
NAFTA	North American Free Trade Agreement

NMW	National Minimum Wage
NTB	Non-tariff barriers to trade
OECD	Organization for Economic Co-operation and Development
OLS	Ordinary Least Squares
PT	Torsten Persson and Guido Tabellini (1994)
POLS	Pooled Ordinary Least Squares
REM	Random Effect Model
SDG	Sustainable Development Goals
TRD	Trade
UHNWI	Ultra-High Net Worth Individuals
UK	United Kingdom
UN	United Nations
US	United Stated
VAT	Value-Added Tax
WDI	World Development Indicators

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PREFACE

This research paper is submitted in partial fulfillment of the requirement for Bachelor of Economics (HONS) Financial Economics. The research is under supervision by Mr. Cheah Siew Pong.

The inequality has gradually kept increasing. It is important to take note that the inequality has experienced a rapid increased in recent decades. A rapid increased of inflow FDI will lead to inequality. Hence, the gap between rich and poor must be concerned and the factors that lead to increase of inequality must be determined.

This study will investigate the relationship between income inequality (measured by the Gini coefficient) and economic growth, trade openness, FDI, and inflation. This research provides a result where the impact of macroeconomic variables on income inequality in developed countries and developing countries.

ABSTRACT

This research aims to examine the determinants of income inequality in 82 selected countries from the year 1996 to 2010. It is to study the relationship between macroeconomic determinants with income inequality in developed and developing countries. Determinants such as Gross Domestic Product (GDP), Trade (TRD), Foreign Direct Investment (FDI) and Inflation (INF) are chosen. The findings benefit the policy makers and economist. The results concluded that developed and developing countries have different impact on inequalities. In the developed countries, GDP, trade, FDI and inflation are found to be significant with income inequality while in the developing countries, trade has found to be insignificant whereas GDP, FDI and inflation are significant towards the income inequality.

CHAPTER ONE: RESEARCH OVERVIEW

1.1 Research Background

The GINI coefficient is the most common measurement of income inequality among the individuals and households in the world. A zero value states absolute equality while a hundred values represent absolute inequality (Human Development Reports, 2016). Many researchers used macroeconomics factors to determine the level of income inequality. Their studies more focused on the relationship between macroeconomic explanatory variables and the response variable. In this study, we are going to focus on whether there is significant impact on income inequality and macroeconomic factors such as Gross Domestic Product (GDP per capita), trade, Foreign Direct Investment (FDI) and inflation and also determine the different effects between the developed and developing countries.

1.1.1. Occupy Wall Street

The Occupy Wall Street movement was developed by 17 September 2011 in Zuccotti Park, New York. It is like political movement against and fights for the social inequality and democracy issue which 99% of people in America against the 1%. The Occupy Wall Street movement concerned about the problem of income distribution and income inequality. Thus, it has been succeeded theorizing the issue of income inequality into the media debate. The timing of protests and movement were significant towards the awareness of a decrease in economic growth and increase in unemployment. However, this movement has failed due to the leaderless movement and inefficient methods of protest (Keeley, 2015).

1.1.2. Government Roles

Income inequality has become the major issue in political clique. Some countries are trying to reduce the disparity between the poor and the

rich, however the problem still exists. The United Nations set a series of development targets that 191 world leaders agreed to accomplish by the year 2015 known as The Millennium Development Goals (MDGs). MDGs signed in September 2000 to overcome the poverty in several aspects. The first pillar of the MDGs is aimed to eliminate extreme poverty and this specific target is the main concern on the economic development. Overall, the proportion of people living in the extreme poverty has largely reduced since 1990. The MDGs had reached the goal of reducing by more than half of the number of people suffering in extreme poverty. However, the extreme poverty could not be lifted out completely and unequal attainment occurs in many regions. The seriousness of the extreme poverty could worsen economic growth which associated with income inequality (Persson & Tabellini, 1994).

Before tax and benefit, overall, some countries have higher level of income inequality. High income inequality among countries has become an important issue needs to be concerned. Government has been regarded about this issue by taking some actions and policies.

Government also plays an important role towards issue of income inequality which is intervening fiscal policy in order to reduce the gap between rich and poor. First and foremost, government was employing progressive income tax system. The tax items included direct taxes which are personal income tax and payroll taxes, and indirect tax which is value-added tax (VAT). This is the tax to tax at higher rates on higher income group relative to lower income group. In Canada, during the recession in 1980s and 1990s, income tax system was offset after-tax income inequality. But this pattern has changed after that which the market income inequality hit at higher level, the tax system become less redistribution and this leading to an increase in after-tax income inequality (Heisz & Murphy, 2016). This also caused by lower income household paying the high payroll taxes.

Government spending programmes as one of the fiscal policies through direct and in-kind transfer. O'Dea and Preston (2010) mentioned

that cash transfer, especially for child support grant such as education and health services are helped to those poorer households to gain benefit more than their share of market incomes. Moreover, in-kind transfer is in the form of goods and services by providing subsidy or free rate. Bently (1987) reported that the U.S. government income transfer programs which are Medicare Medicaid, food benefits from the Food Stamp, housing benefits from public or subsidized rental housing programs. In United Kingdom, the government spent about 65% of budget on cash and in kind benefits (Bhattarai, Haughton & Tuerck, 2015).

Furthermore, the government has taken an action on low pay policy with Coalition government. This strategy has been made with the National Minimum Wage (NMW) as a statutory pay floor (Goulden & Christoforou, 2012). The policy is more focused on public sector pay and the government has made a clear statement about this. In the sense of rescuing the gaps between richest and poorest households, government has offered some protections for low public. But, in this situation may cause the labor market failures that including discrimination.

The Sustainable Development Goals (SDGs) are the new targets to follow by the UN member's states over the next 15 years to eliminate the poverty and reduce the inequalities. It adopted by the world's leaders in September 2015 at a historic UN Summit. It is also known as Global Goals because it applies to all countries especially in poor and middle-income countries. SDGs are expanded on the success of MDGs which expired at the end of year 2015. In the year of 2002 to 2012, the proportion of world population living in extreme poverty has declined by half, from 26 percent to 13 percent. Although the SDGs are not legally bindings, but government should launch national framework and take their rights to achieve their goals. Enhancement of social security programs and plan of target benefits on the poverties. Social security programs contain social assistance, for instance, cash transfers, social pension and public work programs. Other types of social protection are social insurance services and labor market interventions which include disaster insurance, disability pensions, maternity interest, and injury compensation. Only one in five of poor

people are in the social security system that can obtain any form of the benefit compared with two in three in upper-middle-income countries (The Sustainable Goals Report, 2016).

Higher inequality has significant impact for growth and macroeconomic stability such as economic instability and crisis risk increases (Donnan, 2015). Alesina and Rodrik (1994) have found that income inequality has negative relationship between economic growth which the level of inequality increases will reduce the economic growth. According to Wahiba and Wariemmi (2014), inequality has negative effect on economic growth that higher inequality slow down the economic growth. Besides, countries with higher level of inequality will lead to growth inefficient in reducing the poverty. Income inequality affects the speed at which growth achieves the reduction of poverty (Ravallion, 2004).

1.1.3. Income inequality in Developed and Developing Countries

The Organization for Economic Co-operation and Development (OECD) is an international organization of countries with highly developed economies and democratic governments with 34 countries. These countries are Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Israel, Italy, Japan, South Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom and United State. The OECD member countries are categorized into developed countries as well as high income country. The countries with higher income are considered to have high income inequality. In contrast, for the middle or low-income did not seem to have high and greater degrees of inequality.

According to the study of Martin and Forster (2013), the OECD countries had larger gap between rich and poor. In a majority of countries, household incomes of the richest 10% grew faster than those of the poorest 10%. Thus, the income inequality became wide. Higher income inequality

will consider the issues of employment, living standard, GDP growth, poverty and education. The English-speaking countries have much greater unequal income than in some European countries (Thewissen et al., 2015). Chile has the widest income inequality gap that inequality has been keep increasing in a long term phenomenon from 1974. Since the return to democracy in 1990, the economic growth has risen and poverty has reduced associated with employment creation (Hourton, 2012). Mexico was the second worse with a high ratio of 27:1 and follows by Turkey, United State and Israel. In the United States, the economic growth tended to rise although their unequal income is very high (Keeley, 2015). However, in Nordic countries, which are Denmark, Iceland, Norway, and Sweden have traditionally below average inequality and poverty. These countries have relatively narrow wage range, leading to low unemployment.

1.1.4. The Global Population by Income Group

There are several levels of income among countries such as low income, middle income, upper middle income, lower middle income and high income. According to the analysis of Pew Research Centre (2015), the bar chart presents the different income groups of global population. Overall, each level of income has increased from the year of 2001 to 2011. However, one of the income groups decreased dramatically from 2001 to 2011.

In low income group, the global population grows from 50% in 2001 to the highest population of 56% in 2010. For middle income group, the percentage of global population from 2001 to 2011 was nearly double increased, which is from 7% to 13%.

Moreover, there was a slightly increase in the percentage of global population for upper middle group in the year of 2001 until 2010. The global population was only 7% and rose to 9% from 2001 to 2011. Similarity to high income group, the percentage of global population went up very slightly by merely 1%, which is from the lowest of 6% in 2001 to 7% in 2011. On the other hand, there was almost a twofold reduction in the

percentage of global population by poor income group. The global population dropped from 29% in 2001 to 15% in 2011.

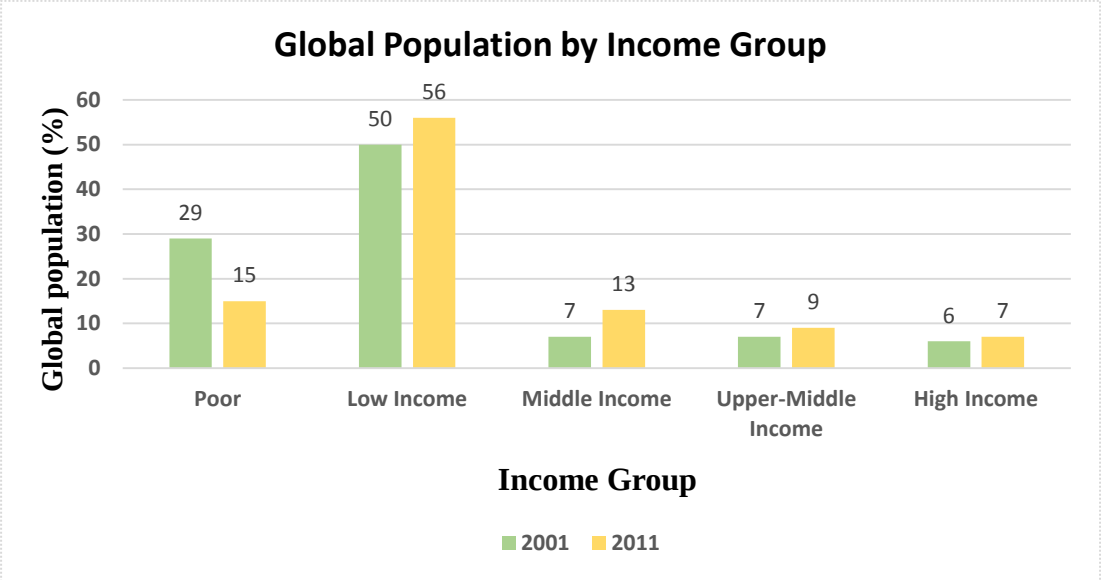

Figure 1.1: Global Population by Income Group

Source: Pew Research Center analysis of data from World Bank Povcal Net database (Center for Global Development version available on the Harvard Data verse Network) and the Luxembourg Income Study Database, August 2015

1.1.5 The Millionaires of the World

As reported by the Global Wealth Report (2016), increasing inequality will enhance the speed at which new millionaires are created. The number of millionaires and Ultra-High-Net-Worth Individuals (UHNWI) are increased by 155% and 216% in 2016. The United Stated has the highest percentage of world millionaires 2016 but it dropped from 46% to 41%. Besides, United Kingdom's now placing at third place in the millionaire ranking as the Japan increased from 6% to 9%. Japan increases because the exchange rates appreciate. Moreover, China rose from 4% to 5% in 2016. However, the percentages of millionaire in other countries which are France, Germany, Italy, Canada, Australia, Switzerland, Taiwan and Spain remained constant in 2016. The pie chart below shows the percentage of world millionaires by country.

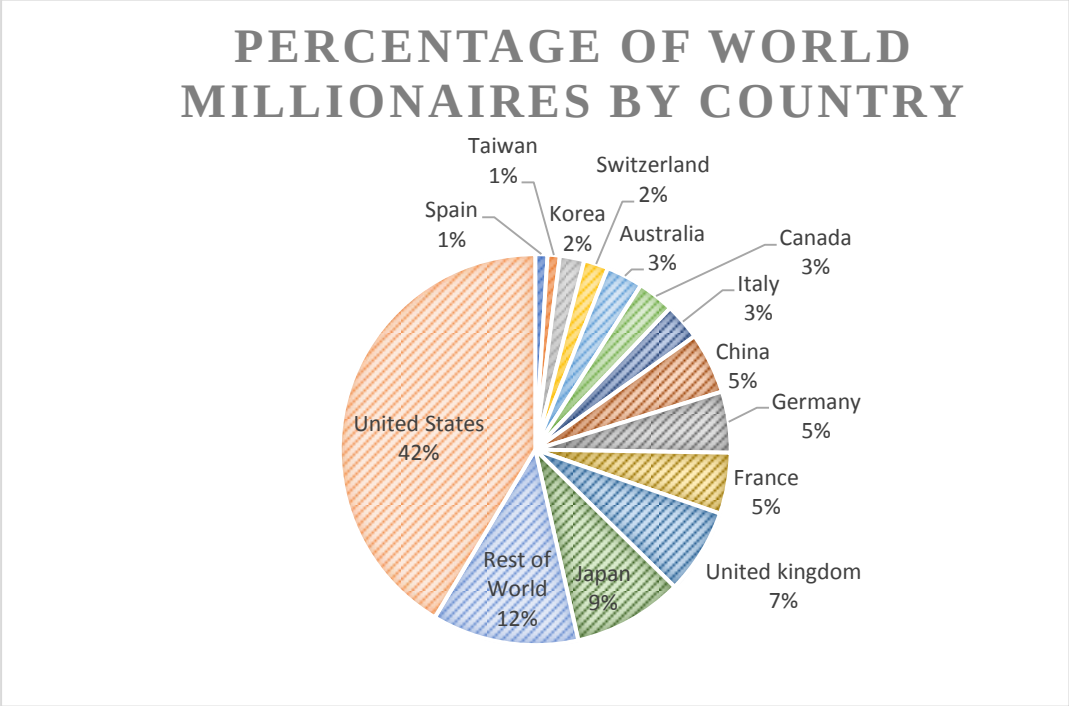

Figure 1.2: Percentage of the World Millionaire by Country

Source: Credit Suisse Research Institute, Global Wealth Report 2016, November 2015

1.2 Problem Statement

In recent years, income inequality becomes a debated issue of public. Imposing of income tax system in a nation will it brings any effects on income inequality towards the nation. Some of the policy in countries changed, such as increase in minimum wage, tax credit payments and National Insurance contributions will slightly reduce the gap in inequality of disposable and post-tax income.

Adam Smith stated that the true measure of a nation's wealth is not the size of its king's treasury of the holdings of an opulent few but the wages of "the labouring poor". He hoped to make sure all members of society could satisfy with their basic needs, but he did not affect by relative differences in income and wealth (Rasmussen, 2016). However, the GINI coefficient in many countries is

still appeared with a large numeric in recent years. For example, in developed country such as Canada, since year 1996, its GINI coefficient was 29.0545 but in recent years 2010, its GINI increased to 31.6672. In Singapore, its GINI raised from 40.1071 to 42.2344. However, some of data showed that GINI coefficient dropped in some developing countries such as Mexico, Thailand, Philippines and Malaysia. Without a proper handling to reduce with this high GINI coefficient as soon as possible will bring severe impacts toward a country and other countries as well. In this research, we are going to examine what is the suitable way to reduce the income inequality between these countries in future.

Nowadays, people generally worry about inequality suppress economic growth, prevent mobility of social, undermine democracy, or against some standard of fairness. Yet, in this research explore whether economic growth in control over a society's resources facilitates or hinders income inequality. High income inequality will bring a huge negative impact on economy. Negative impacts like reduce education opportunities for the poorer as they cannot afford for high tuition fees, and diminish productivity and growth as health get affected negatively. There is some empirical evidence shows that income inequality may bring effect on population health. From previous research, Wilkinson and Pickett (2006) identified 168 analyses in 155 papers reporting finding on the correlation between income distribution and population health. From there, a large majority of seventy percent suggests that health is less good in societies where income differences are larger.

There are many problems facing by developed and developing countries with wealth and income inequality issue. The problems are the gap between the very rich and everyone else is wide, huge transfer of wealth from the middle class and the poor to the wealthiest people in the country, advancement in technology and productivity, and working longer hours for lower wages (Income and Wealth Inequality). We are concerning is that these are the factors which will affect the income inequality? Different development of a country shows different level of average Gini coefficient. For instance, Singapore, a developed country, its Gini coefficient went down from 0.463 in 2015 to 0.458 in 2016, considered as a high inequality country (Yong, 2017). However, some developed countries like Belgium (0.268), Austria (0.28), France (0.294) and Switzerland (0.295) are

consider as a low inequality country although they are developed countries. Besides, there are also have medium inequality developed countries such as Korea (0.302), Canada (0.322), Italy (0.325) and Japan (0.33) (OECD, 2016).

1.3 Research Objectives

1.3.1 General Objective

Given the above problem statement, the general research objective in this study is to examine the effect of economic growth, FDI, and trade and inflation on income inequality in developed countries and developing countries.

1.3.2 Specific Objective

This study specifically aims to investigate the following:

1. To investigate economic growth, FDI, trade and inflation have a significant impact on income inequality.
2. To determine whether the effect of economic growth, FDI, trade and inflation on income inequality are different between developed and developing countries.

1.4 Research Questions

The research questions in this study are:

1. Do economic growth, FDI, trade and inflation have a significant impact on income inequality?
2. Do the effects of economic growth, FDI, trade and inflation on income inequality are different between developed and developing countries?

1.5 Significance of the Study

By using panel data techniques, with observations across 82 countries and over the period of 1996-2010, in this study, we focus on the outcome of the macroeconomic variables—economic growth, FDI, trade and inflation that may lessen the gap of income. We aim to present a panel analysis on how growth influences income distribution, particularly the income shares of the developing and developed countries.

Through this study, government may know how to tackle the problem of inequality and implement suitable policy to maintain it and identify which channel or mechanism can be used to reduce income gap. Therefore, penury can be lowered and eventually contribute additional resources (Castro, 2011). If improper policy is implemented may worsen the disparities of income.

This study classified the chosen countries as developing and developed countries by employing the categorization of their level of development. Before this, there is lack of comparison study between developed and developing countries. Appropriate governmental policies may improve the uneven income distribution from rich to poor in both developed countries and developing countries.

We employ the GMM first-difference estimation approach in lieu of Ordinary Least Square (OLS), Fixed Effect Model (FEM) and Random Effect Model (REM). GMM estimator is a more appropriate method because this estimator can overcome the endogeneity problem of the regressors and provide consistent estimation results.

1.6 Chapter Layout

This paper is ordered into several sections. Section 2 discusses about the literature review on the effect of economic growth (GDP), Trade, Foreign Direct Investment (FDI), and Inflation on income inequality. Section 3 details the data

source, variables presented, model specification and empirical methodology adopted. Section 4 presents the data analysis and empirical results on the consequence of income inequality. Lastly, Section 5 is conclusion, implication and limitations of study and recommendation for future research.

CHAPTER TWO: LITERATURE REVIEW

2.1 Economic Growth and Inequality

There are some researchers have studied the connection between income inequality and economic growth (GDP). In earlier 1955, Simon Kuznets studied the relationship between income inequality and economic growth and his finding formed the famous Kuznets' hypothesis (Kuznets, 1955). The inverted U-shaped curve in the long run co-integration is explained by Kuznets (1955) hypothesis that income distribution in industrialized countries is more equal than in agricultural countries. The inequality increases initially and becomes more equal to the stage of industrialization. Simon Kuznets collected the data change in income distribution for United States and United Kingdom and this supports the hypothesis that the income inequality of both countries has dropped after World War I. In this study, they demonstrated income inequality and output are corresponded with Kuznets inverted-U relation hypothesis by endogenous mechanism.

In England, Germany and the United States, the relationship between inequality and development is inverted U-curve with time series data (Kuznets, 1955). Ahluwalia (1976) has formed with the base of forecast for inequality and poverty in Ahluwalia et al. (1979) by using cross sectional data to investigate the link between inequality and development. Ahluwalia (1976) has tried to use cross sectional data analysis from 60 developed countries and developing countries to examine the relationship between these two variables. Galor and Tsiddon (1996) studied the relationship between income inequality and output growth in China with Kuznets hypothesis. In this study, they demonstrated income inequality and output are corresponded with Kuznets inverted-U relation hypothesis by endogenous mechanism.

There are also much of other empirical studies ascertained the existence of Kuznets curve, as it is visible that the income inequality is raising at the first

stages and then will reduce in later stage of economic development (Ahluwalia, 1976). For instance, Banerjee and Duflo (2003), Perotti (1993) and Aghion and Bolton (1997) have examined the relationship between income inequality and output growth with the inverted U-shaped hypothesis. In the initial stage of development, the rich is getting richer but the poor is getting poorer in the presence of imperfect market (Perotti, 1993; Aghion & Bolton, 1997). However, Robinson (1976) mentioned U-curve has been observed in both developed countries and modern developing countries by using cross sectional data. This is because in the study of Robinson (1976), Kuznets process is analysed with the existence of within-sector inequality. Based on the study of Shahbaz (2010), the Kuznets' inverted U-curve in Pakistan is existed. The occurrence of S-shaped curve inverted is resulted from the extension of Kuznets' specification. In addition, income inequality and economic growth have co-integrated movement in long run (Khattak, Muhammad & Iqbal, 2014). Kuznets (1963) argued that the spread of economic power will broaden the income differentials. Jenkins (1991) had made the confirmation of the income distribution became wider in 1980. Ahluwalia (1976) and Papanek and Kyn (1986) have suggested that higher growth rate will expand the income differentiation. But after the discussion, they did not find any evidence to support with this (Ahluwalia, 1976; Papanek & Kyn, 1986; Fields, 1989).

The theory of classical approach determines positive relationship of income inequality and economic growth, income inequality increases in higher income group, and saving rates, thus stimulus accumulation of capital and economic growth (Stiglitz, 1969). "Political economy" approach, however, will generate pressure to distribution policies, changes of these policies to countries that adversely affect the accumulation of physical and human capital, and economic growth. If the saving of the richest more than the poorest, the capital accumulation to the poorest will decrease and slow down the growth (Fields, 1989). The curve in the shape of U inverted is existed in political economy approach (Banerjee & Duflo, 2003). Johnson and Webb (1993) found that the changes in taxes and benefits and economic activity have larger influenced to income inequality.

During mid-90s, Deininger and Squire (1996) constructed the first large panel data the set for inequality to ensure consistency which have narrowed the measurement error and improved the inequality statistic. Also, they have collected the largest data set to measure the income inequality. Ravallion and Datt (1996) and Ravallion and Chen (1997) applied the econometric analysis to study the effect of change of GDP per capita on inequality and poverty. Other than Deininger and Squire (1996), Birdsall and Londono (1997) also found that the income of poor people has increased due to increase in aggregate growth. Ravallion and Datt (1996) found that income increases has lowered the poverty in India. However, Ravallion and Chen (1997) concluded that the aggregate income growth does not have impact on inequality.

The previous discussion has shown findings of positive and negative effect of growth on inequality. Barro (2000) found the economic growth and income inequality have positive association in developed countries but there is negative relationship in developing countries. Alesina and Rodrik (1994), Persson and Tabellini (1994) and Perotti (1993) found income differentials and growth rates are negative relationship. In the US and UK, economic growth decreases the income inequality (Dimelis & Livada, 1999). Panizza (2002) were used cross state data to access the relationship between inequality and growth and he found the evidence to support a negative relationship between these two series. On the contrary in Partridge (1997), both between Gini index and growth and between third quintile and growth have positive connection by using pooled OLS in the period of 1960-1990. Moreover, in the US, income inequality and growth is positive related by using the panel estimation (Li & Zou, 1998). The empirical result with cross-country data from Alesina and Rodrik (1994), Persson and Tabellini (1994) and Perotti (1996) have showed inequality and economic growth in adverse correlation. Binatli (2011) found a negative connection between income inequality and economic growth in the seventies but positive relation in the nineties.

List and Gallet (1999) and Tribble (1996, 1999) use Ordinary Least Square (OLS) analysis and observed existence of Kuznets' U-curve. Besides, ARDL model to be used and approached to co-integration which is proposed by Johansen (1991) is more advantageous in making the estimation of income inequality and

economic growth (Pesaran et al., 2001). Furthermore, Araujo and Cabral (2015) were using panel data approach and employing the Generalized Method of Moments (system GMM) that is previously set by Arellano and Bover (1995). Similar to Lim and Sek (2014) also applied GMM estimation approach and found that unidirectional causality from economic growth to income inequality and have positive impact in high income group.

The relationship between economic growth and income inequality mainly depends on the different income levels (Delbianco, Dabus & Caraballo, 2014). Negative coefficient GINI is detrimental to economic growth, especially in low income countries. Higher income inequality arouses social issues that harmful the investment, in turn, economic growth. Yet, the richest people in high income countries stimulus economic growth as this are consistent with the classical approach. Barro (1990) and Castelló-Climent (2010) reported that the current expenditure coefficient is negative. Besides that, Levine and Renelt (1992) found that coefficient of inequality is negative and it is significant negative associated with economic growth. Public investment and public expenditure have statistically lessened income inequality without harming the output (Muinelo-Gallo & Roca-Sagales, 2011). Sirine (2015) reported a negative relationship between income inequality and economic growth in developing countries.

2.2 Trade and Inequality

When literature starts to look at the relationship between trade and inequality, it comes out many arguments. Standard trade models predict that trade openness will reduce the wage gap between the skilled and unskilled worker in developing countries through tariff reduction. In result, it will reduce the income inequality (Mundell, 1957; Rybczynski, 1955; Stolper & Samuelson, 1941). The Hecksher-Ohlin theorem suggested that the inequality will decrease in countries with relatively unskilled labor abundant while increase in trade, the wage inequality will increase in countries with skilled labor abundant (Figini & Gorg, 2011). According to Harrison, McLaren, and McMillan (2011), trade will increase inequality in rich countries and lowers inequality in poor countries if the factors

are the skilled and unskilled worker. Therefore, trade liberalization is not always reduced the income inequality.

In addition, there are a different relationship between trade and inequality in term of services and goods. Trade in services only has a long run impact toward inequality but trade in goods has both long run and short run impact (Cassettea, Fleuryb & Petitc, 2012). They also found that trade in services will increase the inequality in long run not only for the group of high income and low income but also for the group of high income and medium income. Trade in goods has a stronger impact toward inequalities compare with trade in services in the long run while it is inverse correlation in the short run (Cassette, Fleury & Petit, 2009).

Besides, Forbes (2001) found there is a positive and significant relationship between trade and wage inequality in low-skill countries and in high-skill countries. Hurrell and Woods (1995) have the similar result that trade and inequalities are significantly positive. Trade openness increases might have the effect on inequality through the ability of government on redistributing income via taxes (Anderson, 2005).

However, Savvides (1998) found that trade policies are highly significant and negative related to inequality in developing countries. The author said that the result different with other studies may be due to the different measurement of trade restriction. According to Angeles-Castro (2011), trade will decrease the income inequality. Other than that, he also found that the countries with high governance and macroeconomic stability can obtain benefit from trade. Faustino and Vali (2011) also supported that trade openness is negatively related to income inequality. Trade openness are encouraged the equality of income distribution with the negative significant coefficients in the case of Vietnam (Trinh, 2016). Income inequality will be more serious in developing countries with trade liberalization (Savvides, 1998). Globalization may also worsen the inequality in developing country through several channels such as negative effects of financial instability and difference in initial endowment (Lee, 2014).

Wu and Hsu (2012) found trade is significantly negative related with inequality in the high degree of electric power consumption and composite

infrastructure index. This indicates that international competition to trade openness can improve efficiency in resources allocation and improve the income distribution (Wu & Hsu, 2012). But, the trade protection does not have a significant impact on income inequality in developed countries (Monnin, 2014; Savvides, 1998). On the contrary, Cassettea, Fleuryb and Petitc (2012) suggested that income inequality will increase in the following years if the trade increases in developed countries.

Furthermore, there are several studies found a non-linear relationship between trade openness and inequality. Atolia (2007) found that the result is consistent with H-O theory where trade has a negative impact on inequality in short run but positive impact in long run. The reason is that of the asymmetries in the speed of adjustment in the export and import sectors (Atolia, 2007). The similar result can be found in Barro (2000) and Bowman (1997). Franco and Gerussi (2012) found that trade have the non-linear effect in transition countries after comparing with Fixed Effects estimators and Least Squares Dummy Variables Corrected estimators.

Yet, Gourdon (2011) argued that relationship between trade openness and inequality are no clear or mixed as some studies found trade openness increased inequality in developing countries and some find no evidence of trade on inequality. This argument is supported by Yang and Greaney (2016) where trade openness has a mixed result on inequality and growth. For instance, trade openness increased the inequality in China and reduced in the United States while no significant in Japan and South Korea (Yang & Greaney, 2016).

2.3 Foreign Direct Investment and Inequality

After looked into the relationship between trade and income inequality, the researchers also studied the relationship between FDI and income inequality. According to Tsai (1995), he proposed two theories, which are Modernization theory and Dependency theory in the research. Modernization theory focused on the sufficient output must be first produced before it has been distributed. Inequality is generally explained as a necessary presupposition for eventual

improvement of everyone's income. Dependency theory holds that it is the social control and organization of production, rather than economic output and wealth, which affect income inequality. He found that also FDI does give rise to more unequal income distribution in the host less-developed countries (LDCs). There is significant correlation between FDI and income inequality. There is supported by the evidence from stronger version of Kuznets hypothesis.

Sylwester (2005), Halmos (2011), Figini and Gorg (2011), Bhandari (2007) and Herzer and Nunnenkamp (2011) found that FDI has a positive and significant relationship with income inequality. According to Figini and Gorg (2011), there is a concave relationship between FDI and inequality for developing countries. For non-OECD countries, inward FDI has a positive effect on inequality, this relationship is non-linear. Bhandari (2007) found that a positive impact on income inequality in the fixed effects model. Besides, he found also income inequality is not being affected by FDI, but wage inequality increases due to FDI. However, the other researchers they found positive effect in the short run. Ireland and Spain have an increase in FDI is because increase in inequality (Herzer & Nunnenkamp, 2011).

According to researcher Choi (2006), the increase in the FDI intensity is measured by not only inward FDI, but also outward and total FDI stock as a percentage of GDP proved to increase the income inequality. From researchers Basu and Guariglia (2007) found that FDI promotes inequality and growth, and tends to reduce the share of agriculture to GDP in the recipient country. In the same year, researchers Jensen and Rosas (2007) found that increased FDI inflows are correlated with a decrease in income inequality within Mexico's thirty-two states.

Furthermore, researchers Wei, Yao and Liu (2009) did a research to examine regional inequality from three perspectives, there are, interprovince, intra-region, and inter-group. From their result, FDI has been an important factor for regional growth differences in China. It is uneven distribution of FDI itself that caused regional growth differences. Thus, FDI cannot be blamed for rising regional inequality. With the same factors, they have a significant effect with national-level data have an alike effect with regional-level data. They found also

FDI is picked over to play a significant and positive effect on growth differences in all norm except for the west region and the combined west or central regions. Besides, they found that FDI is highly unequally distributed among the regions, with a very small share in the west region.

Moreover, some researchers such as Figini and Gorg (2011), Herzer and Nunnenkamp (2011), Trinh (2016), Angeles-Castro (2011) and Franco and Gerussi (2013) found there is negative effect on income inequality. For OECD countries, FDI has a negative effect on inequality while Herzer found that in Europe the long-run effect of FDI on inequality is negative. From their research, some Europe countries such as Finland, Germany, Italy and United Kingdom, an increase in FDI is correlative with a decrease in income inequality.

Carry on, a research from Clark et al. (2011) found that FDI is generally correlated with positive technological spillovers, economic growth, and increasing income inequality. However, a research done by Chintrakarn, Herzer and Nunnenkamp (2011) found that FDI unleash a significant and robust negative effect on income inequality in U.S. This result does not imply that FDI reduces income gaps in every individual state. An assessment about the impact of China's stock of foreign direct investment on its regional income inequality had been done by Yu et al. (2011) suggested that China's stock of FDI has taken up only two percent of its regional income inequality. Furthermore, they found out the contribution ratio of per capita FDI stock to China's regional income inequality steadily decline since 2002. Nevertheless, from this research, they found also other two important determinants, which are province location and educational level.

Wu and Hsu (2012) found out that FDI is harmful to those host countries with low levels of absorptive capacity income inequality. From the OLS results, it showed that an increase in FDI leads to a more unequal income distribution. FDI has a small effect on the income distribution for countries with better absorptive capacity. From their research, they suggested that the relationship between foreign direct investment and income inequality is not linear. In other words, the findings lend strong support to intuition that income inequality and FDI do not take the form of a linear relationship.

According to researchers Rivera and Castro (2013) found that FDI investment does not have a significant effect on the Gini coefficient. FDI tends to flow to high population, and to more developed regions with more infrastructures and higher average income and also, they did not find evidence that foreign direct investment creates income inequality within regions. Herzer and Nunnenkamp (2013) found that inward and outward FDI have a negative long-run effect on income inequality. While there is a positive short-run effect appears when there is a clear negative long-run effect. They found out that there are huge cross-country differences in the long-run effects on income inequality are positive. From an empirical result of Lin, Kim and Wu (2013) found a significant sill level of human capital, below which FDI apply a disproportionately positive impact on the relatively poor and thereupon improves income distribution. Over this critical level, FDI benefits the nonpoor most and thus intensifies income inequality.

Herzer, Huhne and Nunnenkamp (2014) continued their study on the contribution of FDI on income gaps in Latin American. From their research found a significant and positive effect on income inequality. However, there is no evidence for reverse causality. These findings suggested that the North-South model does not only hold for Mexico and the free trade conditions dominating among NAFTA members. A research done by Farhan, Azman-Saini and Law (2014) which studied the impact of FDI inflows on income distribution in Indonesia, Malaysia, Philippines, Singapore and Thailand. From the empirical result shows that FDI inflows have an inequality-reducing effects in Malaysia, Thailand and the Philippines. For Singapore and Indonesia, FDI perpetuates inequality.

Mihaylova (2015) used two more theories to explain the relationship between FDI and income inequality, World-systems theories and International Trade theory. According to the Heckscher-Ohlin model and Stolper-Samuelson theorem, from International Trade Theory they predict that FDI should take advantage of the abundance of low-skilled labor in developing countries. From the research, found that although FDI inflow in Central and Eastern Europe (CEE) countries decreased as a result of the global crisis, FDI stock is significant and has the potential to practice significant influence on their economic and social development. Besides, she found also FDI entry might increase the wages in

traditional sectors, accompanied by a more capital-intensive production, which shows higher unemployment and contributes a rise in inequality. Trinh (2016) found that FDI activities in Vietnam tend to reduce the income gap by employing low-skilled workers. Meanwhile, from the outcomes of overall regression done by Angeles-Castro (2011) suggested that FDI has an adverse effect on income distribution.

2.4 Inflation and Income Inequality

After examined the relationship between FDI and income inequality, inflation may also affect uneven income distribution. Inflation may create the issue of uneven distribution of wealth between the poor and rich via the impact on wage distribution. However, inflation does not harm all the households in the same way as different households have different level of income. Inflation can change the income distribution with the purpose of influencing each household dissimilarly.

Inflation may reduce the income inequality. First, unanticipated high inflation is likely to shift wealth from creditors to debtors. According to Heer and Süssmuth (2003), inflation may increase their burdens as it drives the progressive personal income tax into higher tax brackets. In this regard, due to inflation, tax brackets creeps may reduce income inequality through tax system. Taxpayers get benefits as their debt can be cleared from the collections from the debtors. They disputed that if debt takes the form of governmental interest charges as the repayment of taxation, higher income groups pay higher tax than federal bondholders in early mid 1950s and early 1970s. Hence, inflation reduces income inequality (Bach & Ando, 1957).

As summarized by Bach and Stephenson (1974) and Blinder and Esaki (1978), the redistribution of income to the low-income quintiles and labor income, this makes the income distribution evenly. Sun (2011) suggested that inflation has a positive link with aggregate output, consumption inequality, price dispersion and average price. In the interim, inflation lowers average wealth and income inequality.

Moving to other countries, Maestri and Roventini (2012) found that the link between hourly-wage inequality and inflation is still ambiguous. Net income inequality is negatively associated with inflation in Canada but positively associated with inflation in the US, Germany and Sweden. They also suggested that inflation has not much influence to higher income earners. Tiwari and Shahbaz (2013) have found that inflation is related with high rural-urban income inequality in Indian economy. Satti et al. (2015) analyzed income inequality in Kazakhstan during the period 1991 until 2011 and found the relationship between income inequality is negative because of the predict error in inflation.

Coibion et al. (2012) suggested that the inflation is increases steadily and permanently which aimed to reduce the income inequality. Similarly, high level of inflation will marginally decrease the income inequality. High inflation is likely to reduce the inequality of both the distributions of factor income of individuals and disposable income after the first time of expansionary shock, even if it is only to a degree (Heer & Maussner, 2011).

Surprisingly, some researchers believed that, prices will rise faster than the money wages do when inflation arises, and it causes the income moves from the wage receivers to earnings. In this regard, inflation pressing more issue on the poor compare to the rich (Fischer & Modigliani, 1978). Kai and Hamori (2009) found that the inflation is positively associated with inequality by providing a cross-country sample of 61 developing countries. They concluded that inequality become worse as high inflation has unfavorable effect especially on the poor and eventually the number of the poor will increase.

According to Laidler and Parkin (1975), inflation hurts the youths but good for elderly as young people usually have more burden debt than elderly. Hence, inflation worsens income distribution. Mushtaq et al. (2014) found empirical evidence that higher inflation is related with more inequality because it brings more impact on the poor than the rich. As when the purchasing power of the poor falls but the rich still can hedge against the inflation. They also proved that when the inflation arises in a country is likely to increase the population of the poor. Concretely, the inflation may cause major impact on income distribution.

Blejer and Guerrero (1990) suggested that the inflation is found as a regressive tax in their study. The low-income groups bear more tax burdens than the high-income groups as they have less power to protect their income. This is due to they do not or rarely have any assets that can keep their real value during inflation. However, for the high-income groups, they can protect their real income well from inflation because they own a big portion of real asset in Philippines.

Ivaschenko (2002) held that for the nominal income receivers who are not adjusted with the inflation worsen their incomes. This situation will deteriorate the income distribution. Milanovic (1994) used a sample of 80 countries over the time period from 1970 to 1991 to capture the parabolic relationship of the Kuznets hypothesis by using Gini coefficient. He concluded that the hyperinflation countries are strong when the inflation is associated with more income inequality.

Al-Marhubi (1997) employed the method of positive political-economy to examine the relationship between inequality and inflation. He found that countries with higher inflation average rate are likely to have higher inequality. Ang (2010) studied the income inequality in India and concluded that the monetary instability does not harm the distribution of income significantly. Theoretically, inflation may generate an adverse effect on real agricultural wages which leads to income inequality.

Inflation is claimed to have a positive effect on inequality in South America. The inflation is caused by high inflation and some bursts of hyperinflation countries which are Argentina, Peru, Uruguay and other poor countries for more relying on cash holdings and turn out exposed to more inflation tax (Erosa & Ventura, 2002). High inflation contributed to high earnings inequality in Brazil during 1983 until 1994 (Bittencourt, 2009). Increase in tax on consumption compensate the reduction of inflation can avoid the high level of income inequality (Correia, 2009). Easterly and Fischer (2011) investigated 38 countries and suggested that the poor suffer more than the rich as inflation increases as inflation makes their daily consumption more burden.

Albanesi (2007) examined positively correlated cross-country between the average inflation and income inequality by using 51 industrialized and developing countries over the period 1966 to 1990. He found that inflation is positively

related to uneven income distribution between low and high income groups. This indicated that high inflation causes greater inequality subject to the fiscal policy implementation via various mechanisms, which reveals that the greater the uneven income distribution of the low income groups, the higher the inflation in economy.

Galli and van der Hoeven (2001) theoretically showed that there is a non-linear link between income inequality and inflation. The initial inflation rate will reduce or increase inequality. When initial inflation rate is high, lower inflation is corresponding with high inequality. Bulir (2001) has examined 130 observations which taken from 18 developed and developing countries. He found that inflation and income inequality have a non-linear relationship. Those countries with below 5 per cent a year, reduce in inflation arises income inequality whilst those countries with high inflation will lower down the income inequality.

Romer and Romer (1998) found that the relationship between inequality and inflation is nonlinear, they claimed that the consequences of inflation on the income of the poor are vary between cyclical and long term aspect. In short run, increase in unanticipated inflation reducing unemployment which will relatively advantage the poor. In long term, unemployment can be lowered down through high inflation. However, high inflation is unable to decrease unemployment permanently in long term and the inflation will harms the poor. The impacts of unemployment on distribution of income are stronger during past decades than nineties.

Hess and Morris (1996) concluded that anti-inflationary policies are costly in the short run. The potential impacts of inflation are inflation uncertainty, real growth variability and volatility of relative price. These impacts worsen economy as economic efficiency will be reduced, and thus the real economic activity and consumer welfare as well. They suggested retaining inflation from increasing from the low level will result a long-run welfare.

2.5 Summary of Empirical Studies

2.5.1 Empirical Studies of Economic Growth

Summary Empirical Results for Economic Growth and Inequality

Author	Variable	Findings
(Kuznets, 1955)	Economic growth	• The narrowing of income inequality in the developed countries is relatively recent and probably did not characterize the earlier stages of their growth. Likewise, the various factors that have been suggested above would explain stability and narrowing in income inequality in the later rather than in the earlier phases of industrialization and urbanization. • While the coverage is narrow and the margin of error wide, the data show that income distribution in these underdeveloped countries is somewhat more unequal than in the developed countries during the period after the Second World War.
(Ahluwalia, 1976)	GDP, GNP per capita	• The share of agriculture in GDP is not significantly related to the income shares of the lowest groups, but it is positively related to the income shares of the middle groups and negatively related to the income share of the top 20 percent. • There is strong support for the proposition that relative inequality increases substantially in the early stages of development, with a reversal of this tendency in the later stages. • The cross section results do not support the view that a faster rate of growth is systematically associated with higher inequality than can be expected given the stage of development achieved.
(Ahluwalia, Carter & Chenery, 1979)	GNP per capita, Economic growth	• Differences in distributional policies have been at least as important to poverty alleviation as differences in aggregate growth rates. • The time series evidence supports the cross section, results as far as the worsening phase of inequality is concerned. There is no documented case of a country that has avoided the initial worsening in income distribution that is implied by uneven sectoral growth.
(Galor & Tsiddon, 1996)	Economic growth, Human capital	• The analysis suggests that a relatively poor economy which values equity as well as prosperity may confront a difficult trade-off between equity in the short run and prosperity in the long run. • In the initial stage of development growth rates are relatively low and income inequality is rather large. At a later stage, growth rates increase and income inequality narrows.
(Banerjee & Duflo, 2003)	Economic growth	• Using non-parametric methods, we show that the growth rate is an inverted U-shaped function of net changes in inequality: Changes in inequality (in any direction) are associated with reduced growth in the next period.

		• The results indicate that there is a sharp non-linearity.
(Perotti, 1993)	Growth, Education	• The essence of this paper is that when growth is associated with redistribution, the benefits spin over to some extent to the poor; when the spillover is substantial, this enables the poor to qualitatively change their pattern of education.
(Aghion & Bolton, 1997)	Wealth distribution, Capital accumulation	• When the rate of accumulation is sufficiently high, the economy converges to a unique invariant wealth distribution. • The distribution of wealth from rich to poor and middle-class borrowers improves the production efficiency of the economy both because it brings about greater equality of opportunity and also because it accelerates the trickle-down process. • The process of capital accumulation initially has the effect of widening inequalities but in the later stage it reduces them, in other words, it generates Kuznets curve.
(Robinson, 1976)	-	• A common empirical finding in the analysis of countries which have undergone economic development is that income distribution first became more unequal, and only in the later phase did it become more equal. • This empirical observation has been seen in modern developing countries-at least the increasing inequality phase-and has acquired the force of economic law. It has a name: the U hypothesis.
(Shahbaz, 2010)	GDP per capita, FDI, Unemployment, Urbanization effects	• Real GDP per capita is associated positively and significantly with income inequality, i.e. lower Gini-coefficient present with lower GDP per capita. • FDI is also major contributors in income inequality to rise. • The empirical evidence provides support for the existence of Kuznets inverted-U as well as inverted S-shaped curve in Pakistan.
(Khattak, Muhammad & Iqbal, 2014)	GDP, Inflation	• Empirically, results have shown that there is positive and significant relationship of inequality with economic growth and long run. • The empirical results show that there exists a log run relationship between inflation and income distribution. • Kuznets hypothesis exists in Pakistan, despite the fact that inequality is affected positively by inflation.
(Kuznets, 1963)	Economic growth, Income tax, GNP	• In general, the distribution of income in the underdeveloped countries and in many developed countries is less unequal within the agricultural sector than within the non-agricultural sector as a whole. • Sustained and marked increases in per capita income are a constituent feature of economic growth. The size distribution of income among families or consuming units today is more unequal in the less developed countries than in the developed countries.
(Jenkins, 1991)	Income distribution	• Applying the Lorenz checks to FES data for the 1970s and 1980s indicates that the income distribution was more unequal in the mid- to late 1980s than in the early 1980. • With the gains most marked in the 1980s and amongst the rich, the poorest have gained little.
(Papanek & Kyn, 1986)	Economic growth, per capita GNP	• There is no systematic relationship between equality and the rate of economic growth. • Our result did not support that government intervention increases equality in mixed economy.
(Fields, 1989)	Economic growth	• In this analysis economic growth nearly always is associate d with a reduction in absolute poverty. There are exceptions, but the tendency is for the poor to be rendered less poor by economic growth and poorer by macroeconomic decline. • No statistically significant relation is found between inequality in the initial distribution of income and subsequent

		economic growth.
(Stiglitz, 1969)	-	• The aggregate capital accumulation behavior is independent of the distribution of wealth. • We then show that the basic conclusions are unaltered under a variety of alternative savings assumptions, where savings is a function of wealth or of the distribution of income, or where savings is a nonlinear concave function of income.
(Johnson & Webb, 1993)	Economic activity, Income tax	• There has been an increase in UK income inequality in the 1980's has been shown to be true for all standard relative inequality measures. • Imposing the I979 tax and benefit system has appeared to account for half of the increased inequality.
(Deininger & Squire, 1996)	Region, Household size	• They do find a strong positive relationship between growth and reduction of poverty. • We find that for most of the growth episodes in our sample, growth of average income, even if accompanied by increases in inequality, led to an increase in incomes for the members of the lowest quintile.
(Birdsall & Londoño, 1997)	Aggregate growth, Capital accumulation, Education	• Higher initial income inequality is negatively associated with long-term growth, and as noted elsewhere, differences in the rate of capital accumulation account for an important part of differences in growth rates across countries. • Moreover, when we introduce a variable measuring change for the worse in the distribution of income, it becomes clear that growth in the incomes of the poor is negatively affected by deterioration in the overall distribution of income. • Our results are straightforward: an unequal distribution of assets, especially of human capital, affects overall growth, and it affects income growth of the poor disproportionately, presumably because an unequal distribution penalizes the poor.
(Ravallion & Datt, 1996)	Urban growth, rural growth	• The relative effects of growth within and between each sector reinforced the importance of rural economic growth to national poverty reduction in India. • Urban growth had adverse distributional effects within urban areas, which militated against the gains to the urban poor. And urban growth had no discernible impact on rural poverty.
(Ravallion & Chen, 1997)	-	• It finds that changes in inequality and polarization were uncorrelated with changes in average living standards. Distribution improved as often as it worsened in growing economies, and negative growth was often more detrimental to distribution than positive growth. • We find strong evidence that higher rates of growth in average living standards are associated with higher rates of poverty reduction. • For the developing countries as a whole, there is no significant trend distributional effect for or against the poor.
(Li & Zou, 1998)	GDP, Education	• In light of both theoretical models and empirical findings, the association between income inequality and economic growth is a very complicated matter. • Our finding is consistent with the general theoretical prediction that income inequality and economics growth relates to each other ambiguously, in general, and positively, sometimes
(Forbes, 2000)	Education, Price level of investment	• The results reported that income inequality and economic growth have negative relationship. • Pooled OLS estimates resulted that relationship between inequality and growth are insignificant. • Taken as a whole, this paper's finding of a positive relationship between inequality and growth has disappointing

		implication.
(Alesina & Rodrik, 1994)	Primary school enrolment, democracy	• Inequality in income and land distribution is negatively associated with subsequent growth. • Distribution of assets is predetermined and remains constants. • Voting decisions in any period affect growth in subsequent period, which, in turn affects distribution and future voting decisions. • The countries that experienced a land reform in aftermath of World War II and hence reduced the inequality in land ownership should have had higher growth then countries with no land reform.
(Persson & Tabellini, 1994)	Growth, Political Participation, Average Skills, Level of Development	• Income share accruing to the third quintile always has a positive and highly significant coefficient. • The effects of equality on growth are also quantitatively significant • Income inequality is harmful for growth, because it leads to policies that do not protect property rights and do not allow full private appropriation of returns from investment. • Equality affects growth by promoting investment, and this effect is present only in the democracies.
(Galor & Zhang, 1997)	GDP, Primary school enrollment rate and Public education expenditure	• The empirical section provides strong support for the empirical implications of the theoretical model. • The empirical analysis shows that the combined effect of fertility and income distribution is substantial in explaining per-worker (per-capita) output and growth performance across countries. • Countries with a large family size tend to have unequal distribution of income and that both large family size and high inequality are negatively correlated with per-worker growth rates.
(Dimelis & Livada, 1999)	Gross domestic product (GDP), inflation rate, and unemployment rate	• Some regularity can be observed in the cyclical pattern of inequality indices in these countries. • At the aggregate level, inequality indices move counter cyclically with real per capita GDP in the U.S. and the United Kingdom. • The evidence is mixed for Italy while a procyclical behavior prevailed in Greece. • In the case of the U.S., the cross correlations of aggregate inequality indices and quintiles with unemployment were consistently stronger than those of inflation. • Inequality indices showed a countercyclical behavior with both inflation and unemployment in US, United Kingdom, and Italy. • On the other hand, the small economy of Greece, with highly regulated labor markets, exhibited a procyclical behavior with respect to inflation and no correlation with unemployment.
(Panizza, 2002)	Economic growth	• Does not find evidence for a positive relationship between inequality and economic growth. • Economic impact of inequality on growth is smaller than in the case of cross country studies are not surprising. • There is some evidence in support of a negative relationship between inequality and growth. • By using similar of cross-state data, finds a positive and significantly relationship between the GINI index and growth
(Partridge, 1997)	Economic growth, human capital	• The states with more income inequality at the beginning of the period actually experience greater subsequent economic growth, but states in which the middle quintile had a larger share of income also had faster growth. • Overall state income-distribution results (Gini) are not consistent with a large share of the actual inequality discussion and the empirical findings in PT.

		• The welfare measure and the previous decade's employment growth are negatively related to the ensuing decade's per capita income growth, although the welfare variable is insignificant. • Midwest and West had lower economic growth, while the negative coefficients on most of the nonfarm share variables suggest that states with greater initial shares in services and traded goods (the omitted category) experienced greater economic growth.
(Perotti, 1996)	GDP, secondary enrollment, Government Expenditure, Marginal tax rate	• More equal societies have lower fertility rates and higher rates of investment in education. • A higher coefficient of the income distribution variable in rich economies is more difficult to rationalize in the context of the borrowing constraint/investment in education approach. • In richer countries and in countries with a higher stock of human capital, for any given distribution of human capital the average return to education is higher, and therefore the investment in education is higher. • Secondary school enrollment is highly influenced by cultural factors and other characteristics that are not likely to be picked up by the level of GDP per capita.
(Binatli, 2012)	GDP, Primary education enrollment	• The relationship between income inequality and growth is still ambiguous. • This analysis shows that the negative influence of income inequality on growth may be due to the dominating effect of data prior to 1985. • A changing relationship between economic volatility and income inequality.
(List & Gallet, 1999)	Population, sulfur dioxide and nitrogen oxide emission	• Our major finding that state-level EKCs differ from one another does not serve to indict those who have used the isomorphic model to test for a Kuznets (inverted-U) relationship between emissions or ambient pollution levels and a measure of income.
(Tribble, 1996)	per capita GNP	• Kuznets-Lewis process confirms an increase in PGNP coinciding with an increase in aggregate inequality. • The income share going to the middle class increases, the income disparity between its black and white members narrows. • The income share to the upper class increases, the income disparity between its white and black members is narrowing.
(Tribble, 1999)	per capita GNP	• Economic growth is associated with an increase in income inequality as the share accruing to the upper class exceeds the combined share going to the middle and lower classes. • The empirical findings for the United States economy confirm that the per capita GNP–inequality relationship is best explained by the S-curve hypothesis rather than Kuznets' inverted U-curve or the proposed U-curve espoused by others.
(Johansen, 1991)	-	• The results are corollaries of Theorem which gives the asymptotic distribution of the estimator under a smooth hypothesis on the parameters.
(Pesaran, Shin & Smith, 2001)	Broad money (M2), international trade	• Growth in real income stimulates growth in international trade (both exports and imports) and money supply in Cyprus. • Growth in imports of goods and services also stimulates an increase in exports of goods and services in Cyprus.
(Araujo & Cabral, 2014)	Average years of schooling of individuals, life expectancy of	• For the system GMM, confirming the positive connection between income inequality and per capita income in the short term, although this relationship is inversed in the long term.

	individuals	• Life expectancy also showed an inverse and significant relationship with the Gini and Theil coefficients. • Average years of schooling, education, as well as the other variables analyzed, there is a positive effect to the detriment of income inequality.
(Arellano & Bover, 1995)	-	• The absence of information about the parameters of interest in the levels of the variables results in the loss of what sometimes is a very substantial part of the total variation in the data.
(Lim & Sek, 2014)	Growth, enrollments of primary education, price level of investment and trade openness	• There is a one-way relationship between income inequality and growth, i.e. income inequality has no significant impact on growth in all income groups but growth has positive significant impact on income inequality in high income group. The movements of income inequality and growth do not impacted by income groups as income groups do not lead to significant differences in their movements.
(Delbianco, Dabús & Caraballo, 2014)	Economic Growth rate, Education, share richest population and Population growth	• The relationship between inequality and economic growth depends heavily on the level of income • Our evidence shows that inequality is generally harmful for economic growth. • Higher inequality promotes economic growth, so that the relationship becomes positive
(Barro, 1990)	Output per worker, per capita growth rate, government consumption expenditure	• Kormendi and Meguire found no significant relation between average growth rates of real GDP and average growth rates or levels of the share of government consumption spending in GDP. • They found a significantly negative relation between the growth of real GDP and the growth of the government share of GDP, although most of the relation derived from the 24 OECD countries. • He found significantly negative relations between the growth rate of real GDP per capita and the level of government consumption expenditures as a ratio to GDP. • They also found that the share of government investment in GDP had a statistically insignificant effect on growth, although the point estimate was positive.
(Castelló-Climent, 2010)	Human capital inequality, economic growth	• The results show a different effect of inequality on growth depending on the level of development of the region. • A negative effect of income and human capital inequality on economic growth, both in the sample as a whole and in the low and middle-income economies, an effect that vanishes or becomes positive in the higher-income countries.
(Levine & Renelt, 1992)	Average growth rate, average share of investment, investment, share of trade, shares of export	• Positive and robust correlation between the share of investment in GDP and the average share of trade in GDP. • We found that all findings using the share of exports in GDP could be obtained almost identically using the total trade or import share. • We find a robust, negative correlation between the initial income and growth over the 1960-1989 periods when the equation includes a measure of the initial level of investment in human capital; but this result does not hold over the 1974-1989 period.
(Muinelo-Gallo & Roca-Sagalés, 2011)	GDP per capita, Private investment, Population growth, Trade, Inflation	• Our results also show that different fiscal policies have significant redistributive effects: an increase of public expenditure (current or in public investment) produces significant reductions in income inequality. • The effect of increasing the size of the public sector (through current expenditures and direct taxes) has statistically insignificant on the distribution of income at the expense of economic growth.
(Sirine, 2015)	Growth, Primary Education, Secondary Education, Higher Education	• There is a negative relationship between inequality and economic growth for a set of developing economies.

2.5.2 Empirical Studies of Trade

Summary Empirical Results for Trade and Inequality

Author	Variables	Findings
(Anderson, 2005)	Openness to trade	• An increase in the openness of a country, to international flows of goods and services, factors of production, and technology, can affect inequalities in income between individuals within it. • Greater openness can affect asset inequality by affecting the real incomes of credit-constrained groups, or by affecting relative factor returns. • Greater openness can also affect gaps between regions in the real incomes of immobile factors of production, by affecting the spatial concentration of economic activity. • Greater openness can also reduce "residual" wage gaps between men and women, at least in theory, by increasing the relative demand for female labor or by reducing discrimination. Finally, greater openness may affect inequality by reducing the ability of the government to redistribute income via taxes and transfers. • On the other hand, cross-country econometric evidence suggests that increased openness has had little impact on overall inequality in developing countries, when controlling for other observable influences on inequality. This is a puzzle, because we would expect a rise in the relative demand for skilled labor to increase overall inequality, all else being equal. • Greater openness may affect inequality through several channels, of which changes in the relative wage of skilled labor is only one, and not necessarily the most important, in terms of accounting for changes in overall inequality.
(Angeles-Castro, 2011)	FDI, Trade, Inflation rate and secondary school enrollment	• The overall sample indicates that trade reduces income inequality. • The outcome of the overall regression suggests that FDI has an adverse effect on income distribution. • Therefore, the result indicates that inflation has an effect on inequality through the increase in money supply. • Higher levels of employment are associated with less inequality. • Countries with macroeconomic stability and high governance can mitigate the adverse effect of FDI on income distribution, while there is evidence that they can obtain benefits from trade.
(Atolia, 2007)	Wage inequality, Trade liberalization	• liberalization results in reallocation toward less skilled-labour-intensive industries; the effect on wage inequality is temporary • The model is also consistent with other empirical facts regarding the effects of trade liberalization. In the model, the higher relative demand of skilled labor is accompanied by a higher ratio of the imported capital to GDP as found by Robbins (1996) for a number of countries in Latin America. • The model also reproduces the positive empirical relationship between rate of export growth and extent of rise in wage inequality. The rise in wage inequality in low-income exporters, in accordance with the evidence in Kijima (2006), is very plausible in the model contrary to the counterfactual prediction of Wood (1997).
(Barro, 2000)	Real GDP, Rule-of-law index, Democracy index, Inflation rate, Years	• For growth, there is an indication that inequality retards growth in poor countries but encourages growth in richer places.

	of schooling, total fertility rate, Growth rate of terms of trade	• differences in GINI coefficients for income inequality have no significant relation with subsequent economic growth • the effect of inequality on growth is negative • For values of per capita GDP below $2070 (1985 U.S. dollars) and then becomes positive. • investment ratio does not depend significantly on inequality, as measured by the GINI coefficient • There is no evidence that the aggregate saving rate, which would tend to influence the investment ratio, depends on the degree of income inequality. • Growth is positively related to the contemporaneous growth rate of the terms of trade. • Investment is insignificantly related to the level of the schooling variable, negatively related to the fertility rate, and insignificantly related to the growth rate of the terms of trade. For richer countries, active income redistribution appears to involve a trade-off between the benefits of greater equality and a reduction in overall economic growth
(Bowman, 1997)	real GDP per capita	• For those cases which lacked data on inequality at RGDP levels below the turning point (Costa Rica, Greece, and Japan) country inequality experts supplemented the data and confirmed the dynamic of growth-with-equity or equity hen-growth in each case. • For Brazil, South Korea, and Taiwan, both the data and the country experts repudiate the Kuznets inverted-U and the turning point. • The only case that can be construed to support Kuznets is Turkey. • From eight post-1950 cases, only Malaysia exhibits an unambiguous inverted-U relationship between economic growth and income inequality. • From my research of the individual cases, a patterned relationship between inequality and socio-political forces took shape. • As a country develops in the post war period, an assault on the traditional elite (especially the large landholders) with a resulting shift in class power relations appears to be a necessary and sufficient condition for low levels of inequality. • In Greece, Japan, South Korea, and Taiwan, the traditional elites were all displaced and class power relations shifted significantly during the 1940s and 1950s.
(Cassette, Fleury & Petit, 2009)	Trade Openness, FDI, Education, GDP and Inflation	• There is evidence of a significant impact of international trade on inequality both in the long run and in the short run. • In the long run, the impact of international trade in goods on inequality is stronger than for the international trade in services whereas the inverse holds in the short run. • The long-run effects of international trade differ among countries.

(Cassettea, Fleuryb & Petitc, 2012)	Openness trade, FDI, Education, Inflation rate, Technological progress, Institutional context on the labor market, and GDP	• Relationship between international trade and inequalities differs between goods and services: in the long run, trade in commercial services increases inequalities not only between top incomes and low incomes, but also between top incomes and medium incomes, whereas this latter effect is not verified for the goods sector. • in the short run, international trade in services has no significant impact on inequalities • Not only low-income workers, but also median-income workers in the services sector, are threatened by international trade to experience rising inequalities compared to top-income workers, in developed economies。
(Faustino & Vali, 2011)	Trade, GDP per capita, Unemployment, long-term unemployment, inflation, companies and FDI	• Trade liberalization has a negative effect on the Gini index, suggesting that globalization by trade decreases income inequality in rich OECD countries. • The static and dynamic models also confirm the Kuznets hypothesis of a positive relationship between inequality and economic growth. • The paper could not confirm an inverted U relationship between per-capita GDP and income inequality, measured by the GINI index, because the quadratic term (PCGDP2) is not significant. • The variable FDI is statistically significant, with a positive effect on inequality in the static model, as was expected. Globalization through FDI increases inequality. However, the effect of FDI on inequality is insignificant when we control for potential endogeneity using the system GMM estimator with the Windmeijer correction for small samples. • Unemployment and inflation increases income inequality in OECD countries if we use a static analysis. In dynamic estimations, both variables were found to be insignificant.
(Figini & Gorg, 2006)	Wage inequality and Inward FDI	• There is evidence of a concave relationship between FDI and inequality for developing countries. • There is evidence of a different quadratic relationship between FDI and inequality: inequality seems to be negatively linked to FDI, but this effect diminishes as the FDI inward stock increases. • Increases in GDP per capita are associated with reductions in wage inequality for developing countries, but for developed countries we find an insignificant, although positive, relationship. • There is evidence of a positive relationship between level of education and wage inequality in developing countries. • For non-OECD countries, inward FDI has a positive effect on inequality and that this relationship is non-linear, in line with the theoretical expectation. For OECD countries, the interaction term indicates that the effect of FDI is negative.

(Forbes, 2001)	Wages for high-skill and low-skill workers, Total trade, Capital stock, Labour market rigidities, Relative skills	• Straightforward measures do not exist for many of the key variables that form the basis of the HOS theory, and even if the correct measures do exist for one country, they are not consistently measured across countries. • When skills are classified by more accurate measures than broad income groups, trade with lower-skill countries has a significant positive relationship with wage inequality in high-skill countries. This relationship is large and highly robust and is driven by the negative relationship between trade and low-skill wages (instead of a positive relationship between trade and high-skill wages.) • This negative relationship between trade and low-skill wages is also large and highly robust. • When skill abundance is ranked according to education or wages, increased trade with lower-skill countries has a positive effect on wage inequality in high-skill countries.
(Gourdon, 2011)	Trade openness, Human capital, Arable land, and Physical capital	• There are no clear cut empirical results on the relation between trade liberalization and income inequalities in developing countries. • Changes in inequality are correlated with changes in trade policy which are quite robust to inclusion of various controls and to changes in sample periods. • The conditional correlation between trade liberalization and inequality has the conventional effects suggested by HOS trade theory with larger sample.
(Harrison, McLaren & McMillan, 2011)	Openness indicators, FDI, Education, Inflation rate, and GDP	• There is evidence of a significant impact of international trade on inequality both in the long run and in the short run. • In the long run, the impact of international trade in goods on inequality is stronger than for the international trade in services whereas the inverse holds in the short run. • The long-run effects of international trade differ among countries.
(Hurrell & Woods, 1995)	Globalisation	• Globalisation affects regions of the world in different ways. This is due to unevenness of increased flows and interconnectedness, the spread of technology, trade, and communications which is most heavily concentrated among OCED countries. • Impact of globalisation is also conditioned by political inequalities, at both the international and domestic levels. • Globalisation is profoundly affected by inequalities among states, regions, and non-state actors. The fact is underplayed in liberal interpretations of globalisation, which offer a fairly optimistic account of globalisation and which skate far too quickly four significant problems. • The standards of economic and political reform which are emerging both at the international and regional levels are overwhelmingly formulated by a small group of powerful states. The loss of autonomy associated with globalisation falls unevenly.

(Lee, 2014)	Trade openness, Natural log of GDP per capita, Financial integration indicator, Secondary school enrolment ratio, and FDI	• Globalization may worsen income inequality through several channels. • The growth of outsourcing, expansion in trade of intermediate goods and rapid increase in FDI could increase income inequality in advanced countries. • Globalization could make income inequality higher in developing countries too, through several mechanisms including the difference in initial endowment and detrimental effects of financial instability. • Financial integration exert significantly negative effects on income inequality and poverty. • International trade improves income distribution and poverty, showing threshold effects associated with the level of education and growth.
(Monnin, 2014)	Openness to trade, Inflation rate, Economic development level and Unemployment	• We find a significant negative correlation between long-run inflation and income inequality in both models. • For low inflation levels, more inflation correlates with decreasing income inequality and that for high inflation levels, more inflation coincides with increasing income inequality. • A positive link between economic development level and income inequality. • A slightly significant positive link between unemployment and inequality. • There is no any significant link between openness to trade and income inequality in our model. • There is a significant negative correlation between unionization rate and income inequality.
(Mundell, 1957)	International trade and Factor mobility	• Tariff will stimulate factor movements. • The tariff has eliminated trade, but after the capital movement there is no longer any need for trade. • At constant prices production changes in one country cancel out production changes in the other country. • It makes no differences in which country a commodity is produced if commodity price is equalized. • An increase in trade impediments encourages factor movements.
(Rybczynski, 1955)	-	• An increase in the quantity of one factor will always lead to a worsening in the terms of trade, or the relative price, of the commodity using relatively much of that factor • Despite the change of the relative prices of the two commodities the patterns of production and consumption may remain unaltered, or change in favour of one good or the other. • If it is now assumed that the commodity using relatively much of the factor, the quantity of which had been increased, is an item of export, this means that external terms of trade will deteriorate; conversely, should the commodity be an import, the terms of trade must improve.
(Savvides, 1998)	Economic growth, NTB protection, Human capital investment.	• Trade protection and changes in income distribution are negatively related for the LDCs in our sample. • Economic growth and human capital accumulation have an equalizing effect on income distribution, though the latter is not always significant. • Trade protection does not contribute significantly to increased inequality in developed countries.

(Stolper & Samuelson, 1941)	-	• If factors of production are not comparable between countries, or if production functions differ, nevertheless, so long as the country has only two factors, international trade would necessarily affect the real wage of a factor in the same direction as its relative remuneration. • Even in the two factor case our argument provides no political ammunition for the protectionist. For if effects on the terms of trade can be disregarded, it has been shown that the harm which free trade inflicts upon- one factor of production is necessarily less than the gain to the other • Heckscher-Ohlin theorem does not necessarily hold in the case of constant costs or multiple factors of production • Trade necessarily increases the real income of a country, and in the classical case the proportion of income going to the respective factors cannot be changed by trade. • Real wage in terms of the good using little labour is necessarily harmed by the introduction of trade.
(Trinh, 2016)	FDI, Secondary education, Trade openness, Inflation rate, GDP per capita, and population	• FDI is found to have a negative and statistically significant influence on income inequality, indicating that FDI activities in Vietnam tend to reduce income gap by employing predominantly low-skilled workers. • Secondary education and trade openness are likely to promote the equality of income distribution with the negative and statistically significant coefficients. • Inflation rate, GDP per capita, and population by province have positive and significant relationship with income inequality, suggesting that these factors tend to exacerbate the income gap in the case of Vietnam.
(Wu & Hsu, 2012)	Schooling, Inflation, and Trade	• An increase in FDI leads to a more unequal income distribution. • FDI has a nonlinear effect for countries with different levels of infrastructure. FDI appears to be associated with more inequality in countries that have less absorptive capacity, whereas in the case of countries with better absorptive capacity, FDI has only a small effect on the income distribution. • GDP coefficients are positive and significant in countries with Elect and PCM below the threshold value, but they become insignificant for countries with higher degrees of Elect and PCM. • For higher degrees of Elect and PCM, trade is negatively and significantly associated with the Gini coefficient. This implies that openness to international competition could improve efficiency in resource allocation and lead to better income distribution.
(Yang & Greaney, 2016)	Economic growth, Export, Trade, Investment, Labor force, School enrolment, Fertility rate, and Government Consumption.	• Long-run relationship between inequality and income levels tends to be statistically significant more often than their short-run dynamic relationship. • Short-run dynamic relationships between economic growth and change in inequality in either direction are mostly statistically insignificant. • Mixed results on the effect of trade openness on income inequality. • Although fiscal redistributive measures reduce inequality in Japan, they play no major roles in the other three countries. • With regard to the inequality-GDP per capita relationship, we find that increased inequality benefits the economy for the U.S. Japan, and China, and hurts the economy for South Korea. • All countries except for China show a negative effect of fiscal redistribution on GDP per capita. However, for Japan, fiscal redistribution may have hampered economic growth, but, it successfully reduced income inequality.

2.5.3 Empirical Studies of Foreign Direct Investment

Summary Empirical Results for Foreign Direct Investment and Inequality

Authors	Variables	Findings
(Angeles-Castro, 2011)	Trade, FDI, Inflation on inequality, Secondary school enrolment	• The overall sample indicates that trade reduces income inequality. • The outcome of the overall regression suggests that FDI has an adverse effect on income distribution. • Therefore, the result indicates that inflation has an effect on inequality through the increase in money supply. • Higher levels of employment are associated with less inequality. • Countries with macroeconomic stability and high governance can mitigate the adverse effect of FDI on income distribution, while there is evidence that they can obtain benefits from trade.
(Basu & Guariglia, 2007)	FDI, GDP	• FDI promotes both inequality and growth, and tends to reduce the share of agriculture to GDP in the recipient country.
(Bhandari, 2007)	FDI, GDP per capita, Square of GDP per capita, Unemployment rate, Inflation rate, Government expenditure, Population, Transition index	• FDI has a positive and significant impact on wage inequality in the fixed effects model. • Income inequality is not being affected by FDI, but wage inequality increases due to FDI.
(Chintrakarn, Herzer & Nunnenkamp, 2012)	Inward FDI	• In the long run, FDI exerts a significant and robust negative effect on income inequality in the United States. • This result for the United States as a whole does not imply that FDI narrows income gaps in each individual state. • There is considerable heterogeneity in the long-run effects of FDI on income inequality across states, with some states (21 out of 48 cases) exhibiting a positive relationship between FDI in income inequality.
(Choi, 2006)	FDI, Per capita GDP, Real per capita GDP growth rate	• Income inequality, defined as the Gini coefficient, increases as FDI stocks as a percentage of GDP increase. • Increases in per capita GDP and real per capita GDP growth rate reduce income inequality in a country, whereas an increase in GDP deteriorates income distribution. • The increase in the FDI intensity measured by inward, outward and total FDI stock as a percentage of GDP proved to increase the income inequality. • Bigger countries tend to have a less equal income distribution.
(Clark, Highfill Campino & Rehman, 2011)	FDI, Technology spill over, Economic growth	• In many context policies that exacerbate income inequality come under special scrutiny even if they are welfare enhancing. • FDI is generally associated with positive technological spill over, economic growth, and increasing income inequality.
(Farhan, Azman-Saini & Law, 2014)	FDI	• The empirical results, based on quantile regression analysis and data over 1970-2011 period, reveal that FDI inflows have an inequality-reducing effects in Malaysia, the Philippines and Thailand. • However, the findings for Singapore and Indonesia suggest that FDI perpetuates inequality.
(Figini & Gorg, 2006)	Inward FDI, Wage inequality	• There is evidence of a concave relationship between FDI and inequality for developing countries.

		• There is evidence of a different quadratic relationship between FDI and inequality: inequality seems to be negatively linked to FDI, but this effect diminishes as the FDI inward stock increases. • Increases in GDP per capita are associated with reductions in wage inequality for developing countries, but for developed countries we find an insignificant, although positive, relationship. • There is evidence of a positive relationship between level of education and wage inequality in developing countries. • For non-OECD countries, inward FDI has a positive effect on inequality and that this relationship is non-linear, in line with the theoretical expectation. For OECD countries, the interaction term indicates that the effect of FDI is negative.
(Franco & Gerussi, 2013)	Trade, Inward FDI	• We recognize that GDP is usually negative even though significant.
(Halmos, 2011)	FDI, Exports, GDP	• The relationship between FDI, exports, GDP and income inequality in Eastern European countries shows positive and significant relations between increasing income inequality and increasing level of FDI stock in Eastern-European states. • Higher level of GDP has only a slight effect on the GINI index. Besides between FDI inflow and GINI index, the relation was not demonstrable. • The higher level of high-technology export's diverting effect on income inequality. • Increased trade and capital movements have led to grater specialization in production and the elements of a modern supply chain are usually established in geographically distant locations.
(Herzer, Hühne & Nunnenkamp, 2014)	FDI	• The panel co-integration analysis typically reveals a significant and positive effect on income inequality. • There is no evidence for reverse causality. • The findings are fairly robust to the choice of different estimation methods, sample selection and the period of observation. • These findings suggest that the North-South model of Feenstra and Hanson (1997) does not only hold for Mexico and the free trade conditions prevailing among NAFTA members.
(Herzer & Nunnenkamp, 2011)	Percentage share of FDI in GDP	• FDI has a positive effect on inequality in the short run, whereas the long-run effect of FDI on inequality is negative in Europe. • There appears to be considerable heterogeneity in the long-run effects of FDI on income inequality across countries. • Finland, Germany, Italy, Malta, the Netherlands, Norway, Sweden, and the United Kingdom—an increase in FDI is associated with a decrease in income inequality. • Ireland and Spain—an increase in FDI is associated with an increase in inequality.
(Herzer & Nunnenkamp, 2013)	Inward FDI, Outward FDI	• Both inward FDI and outward FDI have, on average, a negative long-run effect on income inequality. • This result is robust to employing alternative estimation methods, controlling for potential outliers, using different measures of FDI and inequality, and changing the period and sample selection. • While the long-run effect of inward and outward FDI on income inequality is clearly negative, their short-run effect appears to be positive. • Long-run causality runs in both directions, suggesting that an increase in inward and outward FDI reduces income inequality in the long run, and that, a reduction in inequality leads to an increase in inward and outward FDI.

		• There are large cross-country differences in the long-run effects on income inequality are positive.
(Jensen & Rosas, 2007)	Foreign direct investment inflows	• Increased FDI inflows are associated with a decrease in income inequality within Mexico's thirty-two states.
(Lin, Kim & Wu, 2013)	FDI, Human capital	• We find a significant threshold level of human capital, below which FDI exerts a disproportionately positive (negative) impact on the relatively poor (rich) and hence improves income distribution. • Beyond this critical level, however, FDI benefits (harms) the nonpoor (no rich) most and thus exacerbates income inequality.
(Mihaylova, 2015)	FDI, Education, GDP per capita	• FDI has the potential to exert influence on income inequality but this effect varies depending on the level of education and economic development of the host countries. • Although FDI inflow in CEE countries decreased as a result of the global crisis, FDI stock is significant and has the potential to exercise significant influence on their economic and social development. • Although FDI entry might lead to an increase of wages in the traditional sectors, it is most likely to be accompanied by a more capital-intensive production, which results in higher unemployment in the traditional sectors, thus contributing to a rise in inequality. As for the other determinants of income inequality, we find that inflation and the expansion of the service sector have contributed to the increase of income inequality in CEE economies.
(Rivera & Castro, 2013)	FDI, GDP per capita, Population, Per capita government expenditure on education, Government expenditure on transportation and communications per capita, Per capita landline telephones	• FDI investment does not have a significant effect on the Gini coefficients of the federal entities in any of the five specifications. • FDI in Mexico does not tend to flow to less developed regions or to federal entities where unskilled and cheap labour is more abundant. • FDI tends to flow to big markets, in terms of population, and to more developed regions with more infrastructure and higher average income. • In this study, we do not find evidence that foreign direct investment creates inequality within regions.
(Sylwester, 2005)	Economic growth, FDI	• FDI is positively associated with economic growth within this sample of countries. However, there is no strong association between FDI and changes in income inequality within these same countries and over this same time period. • Regarding the distribution of income, there was not found to be a significant association between FDI and changes in income inequality. There is no evidence that FDI leads to more income inequality in developing nations, at least in the sample of LDCs considered here. • Taken together, these results show that in a sample of countries where FDI is positively associated and may indeed cause economic growth there was no evidence that FDI further skews the distribution of income. Although this is a negative finding in that it is one where a coefficient is not statistically significant, it is an important one.
(Trinh, 2016)	FDI, Secondary Education, Domestic Investment, Trade Openness, Annual Inflation Rate, GDP per capita, Population Size	• FDI is found to have a negative and statistically significant influence on income inequality, indicating that FDI activities in Vietnam tend to reduce income gap by employing predominantly low-skilled workers. • Secondary education and trade openness are likely to promote the equality of income distribution with the negative and statistically significant coefficients. • Inflation rate, GDP per capita, and population by province have positive and significant relationship with income

		inequality, suggesting that these factors tend to exacerbate the income gap in the case of Vietnam.
(Tsai, 1995)	FDI, Real per capita GDP, Human capital, Agriculture labor force, Share of government services in real GDP, Trade, Average annual growth rate of real per capita	• The statistically significant correlation between FDI and income inequality widely obtained in earlier studies might capture more of the geographical difference in inequality than the deleterious influence of FDI, and to the extent that FDI does give rise to more unequal income distribution in the host less-developed countries (LDCs). • There is evidence supporting the stronger version of Kuznets hypothesis, the results in general do not support the existence of the intertemporal Kuznets curve. • Neither the role of government in the economy nor the rate of short-term economic growth has statistically significant impact on economic inequality. • The spread of education helps reduce inequality, whereas social-political dualism and a large share of primary exports contribute to greater inequality. • Even after controlling regional-related variables such as education, social-political dualism and structure of exports, income distributions do differ significantly among the geographic regions.
(Wei, Yao & Liu, 2009)	Gini coefficient of mainland China, GDP per capita, FDI	• FDI has been an important factor responsible for regional growth differences in China. • However, it suggests that FDI cannot be blamed for rising regional inequality. • It is the uneven distribution of FDI itself that has caused regional growth differences. • Regional income inequality rises in the data period. • Regions can converge to their own steady only after controlling for the differences in saving rate, population growth, human capital endowment, transportation, and, above all, FDI and exports. • The same factors that have a significant effect with national-level data have a similar effect with regional-level (or groups of regions) data. • FDI is singled out to have played a consistent and positive effect on growth differences in all specifications except for the west region and the combined west/ central regions. • FDI is highly unevenly distributed among the regions, with a very small share in the west region.
(Wu & Hsu, 2012)	FDI	• FDI is likely to be harmful to the income distribution of those host countries with low levels of absorptive capacity. • It is shown that international trade can lead to more equal income distribution. • We also find that the coefficients of the initial Gini are positively significant, which indicates that income inequality exhibits inertia. • For the linear relationship, the OLS results show that an increase in FDI leads to a more unequal income distribution. • FDI appears to be associated with more inequality in countries that have less absorptive capacity, whereas in the case of countries with better absorptive capacity, FDI has only a small effect on the income distribution. • We suggest that the relationship between income inequality and FDI is not linear and propose that absorptive capacity plays an important role in this relationship. • FDI makes the income distribution more unequal for countries with a smaller degree of infrastructure, whereas on the other hand FDI has little effect on the income distribution of better-off countries. • The lack of an identifiable trend suggests that FDI may not have an impact on income inequality. In other words, this finding lends strong support to our intuition that income inequality and FDI do not take the form of a linear

		relationship.
(Yu, Xin, Guo & Liu, 2011)	China's stock of foreign direct investment, Province location, Education level	• Our results suggest that China's stock of foreign direct investment has accounted for merely 2% of its regional income inequality. • Furthermore, the contribution ratio of per capita foreign direct investment stock to China's regional income inequality has relatively been on a steady decline since 2002. • The decomposition results also reveal that provincial per capita physical assets account for over 50% of the nation's income inequality are 65% of the increases in income inequality since 1990. • The other two important determinants of regional income inequality are province location and educational level. • However, educational level is found to have a decreasing effect on regional income inequality.

2.5.4 Empirical Studies of Inflation

Summary Empirical Results for Inflation and Inequality

Author	Variable	Findings
(Ang, 2010)	per capita growth rate of real GDP, inflation rate, trade openness, and a variable that captures the effect of finance	• Although the finding that financial liberalization is leaving the poor behind seems plausible in the context of India, the results do not necessarily suggest that repressing the financial system is an effective device for reducing inequality. • The results show that income inequality decreases as the financial system deepens and broadens. • However, liberalization of the financial systems appears to have a harmful effect on income distribution.
(Satti et al., 2015)	Real GDP per capita, financial development, inflation and trade openness	• The findings from this study indicate that economic growth impedes income distribution, financial development reduces income inequality, inflation benefits income distribution; and trade openness improves income distribution. • We note the existence of a U-shaped relationship between financial development and income inequality.
(Al-Marhubi, 1997)	Openness, political stability, Turnover of central bank governors	• I find that countries with greater inequality have higher mean inflation, even after controlling for other country-specific inflation correlates. • The coefficients on openness and political instability are significantly negative and positive, indicating that inflation is lower in countries that are more open and stable. In addition, countries with more independent central banks have lower inflation. Thus, accounting for the standard control variables actually strengthens the result of a statistically significant positive correlation between inflation and inequality.
(Albanesi, 2007)	Households, tax rate, nominal interest rate	• Even with weaker restrictions on the structure of labor income taxes, a positive correlation between inequality and equilibrium inflation might arise. Cross-country evidence on inflation and income inequality suggests that they are positively related. • A political economy model is presented in which equilibrium inflation is positively related to the degree of inequality in income due to the relative vulnerability to inflation of low income households. • GDP per capita, which is an important indicator of the ability to collect revenues from direct taxation and is negatively correlated with average inflation across countries.
(Laidler & Parkin, 1975)	Inflation, employment, monetary expansion rate, fiscal policy	• Inflationary process can produce important effects on the distribution of income and wealth and on the level of real income and employment. • Increases or decreases in aggregate demand from such sources will have only short lived effects on the rate of change of prices unless they also lead to changes in the rate of monetary expansion. • The prevalence of inflation can only be explained by postulating that Governments believe that there are gains from imperfectly anticipated inflation, or losses from reducing the inflation rate in such a way that the change is not anticipated. • Integral part of the mechanism whereby an imperfectly anticipated inflation accelerates is a fall in unemployment. • Slowing down an existing inflation rate' imposes costs in terms of higher unemployment before the benefits of such a policy are perceived.

(Milanovic, 1994)	Purchasing power GDP, Share of state sector workers, Share of cash and in-kind social transfers in GDP, ratio of per capita income	• The population in countries in which assets are highly unequally distributed and in which, consequently, inequality in original income is high will have an interest to vote for large social transfers. • We have found that social choice variables (social transfers and state sector employment) uniformly, in all formulations of the regressions, show a statistically significant negative impact on inequality.
(Easterly & Fischer, 2001)	Inflation and high prices, recession or unemployment, money enough to live in, education quality	• This reinforces the finding that those who are more averse to inflation are relatively disadvantaged on several different dimensions the poor, the uneducated, and the un-skilled (blue-collar) workers. • We found that high inflation tended to lower the share of the bottom quintile and the real minimum wage, while tending to increase poverty.
(Bittencourt, 2008)	Inflation, unemployment rates, minimum-wage index, coefficient of variation	• Extreme rates of unanticipated and anticipated inflation had significantly increased inequality during the period.
(Ivaschenko, 2002)	GDP per capita, inflation, share of unemployed in total labor force, general government consumption, industry value added, private sector share	• I find support for a normal U-shaped relationship between income inequality and per capita GDP for the transitional region as a whole. It suggests that for a country below (above) some threshold level of development economic growth is associated with falling (rising) income inequality. • Hyperinflation makes the distribution of income more unequal.
(Correia, 2009)	Inflation, consumption tax	• There is a strong connection between inflation and inequality, even when the change of inflation, and the associated inflation tax, is not coupled with a decline of government expenditures. • Given the higher concentration of wealth when compared with earnings, the increase in the labor income tax is worse for inequality than the increase in the consumption tax.
(Mushtaq, 2014)	Inward FDI stock, trade openness, inflation rate	• Trade openness has a positive and statistically significant impact on income inequality. • Inward FDI leads to improvement of income distribution in these selected countries. • Annual inflation has a negative and statistically significant impact on income inequality.
(Blejer & Guerrero, 1990)	Productivity, underemployment, real government spending, the real exchange rate, the real rate of interest, inflation rate	• Underemployment, inflation, and government spending worsen income distribution, while productivity gains, the real interest rate, and the real exchange rate were found to improve distribution.
(Erosa & Ventura, 2001)	Money demand, inflation, preferences, production technology, and government consumption	• The economy with uninsurable income risk, we find that inflation has only negligible effects on the distribution of wealth. • We find that the burden of inflation is substantially higher for individuals at the bottom of the income distribution than for those at the top.
(Kai & Hamori, 2009)	Globalization, GDP per capita, financial depth, vector of control variables	• Globalization deteriorates inequality. • The disequalizing effects of globalization decrease as a country's economic development increases. • Financial deepening reduces inequality. • Globalization reduces the equalizing effects of financial deepening.
(Heer & Süssmuth,	level of contemporaneous inflation,	• We find that a longer duration between two successive adjustments of the income tax schedule reduces employment,

2003)	unemployment rate	savings, and output significantly. • The duration of the cold progression, i.e. the time period between two successive income tax schedule adjustments, is more important for equilibrium values of aggregate savings and average labor supply than the annual change in the tax rates due to cold progression.
(Bach & Stephenson, 1974)	Inflation, growth in stock value, rate of return, increase in rate of stock value growth from preceding period, increase in rate of return from preceding period.	• The redistributional effect of inflation as between debtors and creditors has apparently been large.
(Blinder & Esaki, 1978)	Unemployment rate, inflation rate	• Inflation are less firm, it appears that inflation is a slightly progressive tax in that the poor and middle classes lose relatively less than the rich. More to the point, the effects of inflation on the income distribution simply are much less important than those of unemployment.
(Sun, 2011)	Price levels, inflation	• Inflation can improve welfare when income taxation is imposed. • Inflation has non-trivial effects on aggregate output, price levels, price dispersion, average wealth, and inequality of wealth, income and consumption.
(Maestri & Roventini, 2012)	GDP, inflation, unemployment, share prices, private and public consumption	• Unemployment is confirmed to be an important channel for the transmission of business cycles to inequality, although we find that is negatively correlated with consumption inequality. • We also find a negative correlation between inflation, share prices, on the one side, and most sources of inequality. An exception is private consumption, which is positively correlated with higher levels of consumption inequality.
(Coibion, 2012)	Inflation, unemployment rate, expenditure	• Contractionary monetary policy shocks appear to have significant long-run effects on inequality, leading to higher levels of income, labor earnings, consumption and total expenditures inequality across households, in direct contrast to the directionality advocated by Ron Paul and Austrian economists. • Monetary policy shocks cannot account for the trend increase in income inequality since the early 1980s, they appear to have nonetheless played a significant role in cyclical fluctuations in inequality and some of the longer-run movements around the trends.
(Bach & Ando, 1957)	Inflation, net worth level, occupation and age of head of household	• The weakness of debtor-creditor status as an explanation of rate-of-return or common- stock price improvement during the inflation periods.
(Tiwari, Shahbaz & Islam,2013)	GDP per capita, trade openness, consumer price index, financial development	• Financial development significantly against the reduction of the rural-urban inequality in the long run process but if it is developed more it helps is minimization of gap in rural-urban income levels. • Economic growth and inflation all are working in the direction of increasing rural-urban inequality in the long run. • Trade openness is able to help in increasing the income of rural group.
(Heer & Maussner, 2012)	Government, Inflation, Market structure, Production, Productivity types, Preferences, Demographics	• An expansionary monetary shock is found to decrease the inequality of both the distribution of factor income and disposable income after the first period of the shock, even though only to a small extent.
(Fischer& Modigliani, 1978)	Income tax rate, inflation rate	• As nominal incomes rise, and nominal tax brackets are not adjusted, the proportion of income that is taken by the personal income tax rises.

		• As of a given debt equity ratio, and given a constant real interest rate and marginal product of capital, the real return to stockholders would tend to increase.
(Galli & van der Hoeven, 2001)	CPI inflation rate, real GDP growth rate	• The relationship between inflation and inequality is mixed, with examples of both positive and negative correlation. • Inequality decreasing as inflation moves from high to low rates, and increasing as inflation is further reduced from low to lower rates. • In the short run restrictive monetary policy can be expected to deteriorate income distribution unambiguously, in the long run the net impact can be different depending on the initial rate of inflation

CHAPTER THREE: METHODOLOGY

3.1 Data

To match with the research objective of examine the significant impact between macroeconomic variables and income inequality, this study employs the following variables namely Gross Domestic Product, Foreign Direct Investment, Trade, and Inflation for Generalized Method of Moments (GMM).

The Gross Domestic Product used to indicate the economic growth of a country (Adeleye, Adeteye & Adewuyi, 2015). Foreign Direct Investment chosen to represent an investment made by a company or an individual in a country in business interests in another country, in the form of either establishing business operations or acquiring business assets in other countries. Trade represents export and import of goods and services or the exchange of goods or services between countries (Jayakumar, Kannan & Anbalagan, 2014). Inflation uses for indicating the rate of the general level of prices for goods and services is rising and caused the purchasing power of currency is falling (Hussain & Malik, 2011).

For the data, all variables are secondary data and of annually frequency. The period covered from 1996 to 2010, the number of country observed are 82 countries, which mean there are 1230 observations. Some series are demonstrated in logarithm in order to make comparison relationship among the series. The source of data collected from The World Bank. Detail descriptions of the data and variables are tabularized and present in the table.

Variable	Descriptions	Data source
GINI	**Gini index** Measures the distribution of income among individuals or households.	The World Development Indicators (WDI)
GDP	**Gross Domestic Product per capita growth (annual %)** Based on constant local currency; divided by midyear population.	The World Development Indicators (WDI)

TRD	**Trade** Sum of export and import of goods and services measured as a share of GDP.	The World Development Indicators (WDI)
FDI	**Foreign Direct Investment** Net inflow of investment to purchase a lasting management interest in an enterprise operating other than home country.	The World Development Indicators (WDI)
INF	**Inflation** The rate of price change measured by the annual growth rate of the GDP implicit deflator.	The World Development Indicators (WDI)

Table 3.1 Descriptions of the Data and Variables

3.2 Econometric Framework

3.2.1 Ordinary Least Square (OLS) Model

Ordinary Least Square (OLS) regression is a statistical method of analysis that estimates the relationship between one or more independent variables and a dependent variable. This method minimizes the sum of the squares in the difference between the observed and predicted values of the dependent variable deployed as a straight line. By using this method, require some assumptions related to the residuals and to the models. One of the assumptions is the independent variable and the residual are uncorrelated (Souza & Junqueira, 2005). However, OLS has some limitations. It must be fulfilled all the assumptions in order to get precise estimation. Otherwise, this will result in inconclusive conclusion. Thus, we decide to use Difference Generalized Method of Moments (GMM) to conduct the study.

3.2.2 Difference Generalized Method of Moments

GMM estimator with instruments variables are introduced by Arellano and Bond (1991) for estimating the dynamic panel data. Arellano-Bond estimator is transforms all the regressor, usually by differencing and uses the GMM with the lags as the instrument, and it called difference GMM. Arellano-Bover estimator augmented the Arellano-Bond estimator by adding an assumption that first different of instruments variable are uncorrelated with the fixed effects (Roodman, 2009).

There are some advantages of GMM. Firstly, the estimator able to deal with major modelling concerns such as fixed effects and endogeneity of regressors as well as avoiding the dynamic panel bias (Nickel, 1981). Secondly, the flexible GMM framework is formulated to accommodate unbalanced panels and multiple endogenous variables assisted by electronic software through instrument which is the independent variable structure (Blundell & Bond, 1998; Doornik, Arellano & Bond, 2002).

GMM is a common tool and econometric trick that often measures for dynamics in the regression model. As a lagged independent variable as a regressor variable in the model, GMM estimator is more efficient because it may provide unbiased and consistent estimation. GMM is more straightforward for the specification of model. It is also a more powerful estimator that can capture the problem of endogeneity. Moreover, GMM is more efficient when there is a heteroscedasticity problem in model (Baum, Schaffer & Stillman, 2003). However, OLS could not handle this problem and will no longer efficient because it will provide biased and inconsistent estimator. Therefore, we choose Differences GMM to conduct our study.

Below is the estimated dynamic GMM model of this study:

$$GINI_{i,t} = \beta_0 GINI_{i,t-1} + \beta_1 GDP_{i,t} + \beta_2 TRD_{i,t} + \beta_3 FDI_{i,t} + \beta_4 INF_{i,t} + \varepsilon_{i,t} \quad (3.1)$$

Where β_0 represents the coefficient of previous year's GINI of the country; β_1 is the coefficient of GDP of the year for a country; β_2 is the coefficient of trade; β_3 is the coefficient of FDI; β_4 is the coefficient of inflation; and $\varepsilon_{i,t}$ is the error terms of estimators in this regression model. GINI indicates Gini coefficient, GDP is Gross

Domestic Product per growth, TRD is Trade, FDI is Foreign Direct Investment, INF is Inflation, and ε is the error term. The *i* and *t* indicate the index of cross-country and time period respectively, while *t*-1 is the one-lagged time period. GDP and Inflation are estimated to have a negative relationship with GINI while Trade and FDI have a positive relationship in the sampled countries.

The expected sign for β_1 is negative means that the inequality will increase when the economic growth is dropped (Alesina & Rodrik, 1994; Persson & Tabellini, 1994; Perotti, 1993). However, there is also expected the β_1 have positive sign which means the higher the number of high income group, there is bigger the income inequality (Stiglitz, 1969). While the expected sign for β_2 is positive. The reason is increase in trade will increase the inequality (Anderson, 2005). Apart from this, β_2 is expected to have negative sign if the countries with high governance and macroeconomic stability (Angelas-Castro, 2010). The expected sign for β_3 is positive because increase in FDI will lead to inequality increase (Sylwester, 2005; Halmos, 2011; Figini & Gorg, 2011). In addition, the expected sign for β_3 could be negative for OECD countries such as Finland and Germany (Figini & Gorg, 2011). The expected sign for β_4 is negative. When the inflation increases, the inequality will decrease as well (Heer & Maussner, 2004). It is also could be expected to have positive sign for β_4 as Mushtaq et al. (2014) found empirical evidence that higher inflation is related with more inequality because it brings more impact on the poor than the rich.

Once the Difference GMM estimators are obtained, the validity of the model must be checked. We are using the Sargan–Hansen test to verify our instrumental variable. Our instrumental variable is population and unemployment.

We focus on the micro panels where the cross-sectional dimension (N) is large and the time-series dimension (T) is small because the asymptotic approximations consider the number of time-series observations is constant, the existence of non-stationary integrated series does not affect the nature of asymptotic distribution causes in the similar way that it adjusts for the particular time series or for the panel data with large T (Bond, Nauges & Windmeijer, 2005).

3.3 Diagnostic Checking

3.3.1 Sargan-Hansen Test

The purpose of conducting Sargan-Hansen Test is to detect whether the instruments are valid or invalid. This test is over identifying restrictions. The hypothesis testing of this test is the instrumental variables are uncorrelated to some set of residuals, therefore they are acceptable and healthy instruments (Blundell & Bond, 2000). The following are the hypothesis statement of Sargan-Hansen Test.

H_0: The instruments are valid (Uncorrelated with the error term).

H_1: The instruments are invalid (Correlated with the error term).

If the null hypothesis is not rejected, it can be concluded that the instruments are valid. If the null hypothesis is rejected, then it can be concluded that the instruments are invalid. This Sargan-Hansen test was proposed by Sargan (1958) and Hansen (1982) to identify the restrictions validity can be tactful to the number of restrictions being tested.

3.3.2 AB Serial Correlation Test

This AB Serial Correlation Test was proposed by Arellano and Bond (1991) to detect the serial correlation in the noises. The presence of serial correlation in the noises will affect the validity of some instruments (Bra ñas-Garza, Bucheli & Garc á-Mu ñoz, 2011). There is the hypothesis statement for AB Serial Correlation test:

H_0: There is no serial correlation (The instruments are valid).

H_1: There is serial correlation (The instruments are invalid).

When the null hypothesis is not rejected, this means the instrumental variables are valid. If, there is rejection in null hypothesis, we can conclude that the instrumental variables are invalid. We tested serial correlation of noises using difference instead of level. To test serial correlation of order 1 in level form, we checked for correlation of order 2 in differences.

3.4 Comparison between Developed and Developing Countries.

$$GINI_{i,t} = \beta_0 GINI_{i,t-1} + \beta_1 GDP_{i,t} + \beta_2 TRD_{i,t} + \beta_3 FDI_{i,t} + \beta_4 INF_{i,t} + \varepsilon_{i,t} \quad (3.2)$$

$$GINI_{i,t} = \Omega_0 GINI_{i,t-1} + \Omega_1 GDP_{i,t} + \Omega_2 TRD_{i,t} + \Omega_3 FDI_{i,t} + \Omega_4 INF_{i,t} + \gamma_{i,t} \quad (3.3)$$

$$GINI_{i,t} = \delta_0 GINI_{i,t-1} + \delta_1 GDP_{i,t} + \delta_2 TRD_{i,t} + \delta_3 FDI_{i,t} + \delta_4 INF_{i,t} + \mu_{i,t} \quad (3.4)$$

The equation of 3.2 is used to examine the effect of GDP, trade, FDI and inflation on GINI in total sampled countries which are the 82 countries. β_0 is the coefficient of GINI lagged one year ; β_1 is the coefficient of GDP; β_2 correspond to coefficient of trade; β_3 is the coefficient of FDI; β_4 is the coefficient of inflation while $\varepsilon_{i,t}$ is the error term for the total sampled 82 countries. While equation of 3.3 was developed to test the effect of GDP, trade, FDI and inflation on GINI in developed countries (e.g. Australia, Canada, Germany and United States). The Ω_0 is the coefficient of past year GINI; Ω_1 represents coefficient of GDP of current year; Ω_2 is the coefficient of trade; Ω_3 stands for coefficient of FDI; Ω_4 is the coefficient of inflation; and $\gamma_{i,t}$ represents the error term for the developed countries. In the other hand, the equation 3.4 was developed to examine the effect of the macroeconomic variables on GINI in developing countries (e.g. Singapore, Thailand, Pakistan and Mexico). The δ_0 delegate the coefficient of previous year GINI; δ_1 represent the coefficient of GDP; δ_2 is the coefficient of trade; δ_3 stands for the coefficient of FDI; δ_4 behalf for the coefficient of inflation; and the $\mu_{i,t}$ represents the error term for the developing countries. In our research, we determine whether the effects of these macroeconomic variables on income inequality are different between total sampled countries, developed countries and developing countries.

CHAPTER FOUR: DATA ANALYSIS

4.1 Descriptive Statistics

Table 4.1 indicates the descriptive statistics of all the variables used in this study. The table indicates the mean, median, maximum, minimum and standard deviation for each variable used.

4.1.1 Descriptive Statistics for Total countries

Variables	Mean	Median	Maximum	Minimum	Standard Deviation
GINI	3.610966	3.623431	4.182096	3.007690	0.237257
GDP	8.689112	8.752309	11.23088	1.574644	1.537435
TRADE	4.264756	4.268116	6.085994	2.749548	0.490573
FDI	4.333226	3.049393	87.44259	-16.07077	5.591956
INF	9.417474	4.916770	958.6464	-26.29999	31.54376

Table 4.1: Descriptive Statistics for total countries

Table 4.1 shows descriptive statistics for the total 82 countries from the year 1996 to 2010. Based on the table 4.1 above, mean of GINI, GDP, TRADE, FDI and INF are 3.610966, 8.689112, 4.264756, 4.333226 and 9.417474 respectively. The medium of GINI, GDP, TRADE, FDI and INF are 3.623431, 8.752309, 4.268116, 3.049393 and 4.916770 respectively. Obviously, the value of mean and medium for each GINI, GDP and TRADE is very close. For GINI, its maximum value is 4.182096 and the minimum value is 3.007690. Overall, GINI has the lowest standard deviation of 0.237257.

4.1.2 Descriptive Statistics for Developing countries

Variables	Mean	Median	Maximum	Minimum	Standard Deviation
GINI	3.721238	3.179325	4.182096	3.113359	0.190497
GDP	7.924011	8.049909	10.74870	1.574644	1.268806
TRADE	4.219589	4.194668	6.085994	2.749548	0.520219
FDI	3.732913	2.893028	26.52121	-5.007236	3.590440
INF	10.74675	6.859282	316.7933	-26.29999	18.19303

Table 4.2 shows descriptive statistics for developing countries

Table 4.2 shows descriptive statistics for developing countries among the variables for 15 years. Mean of GINI, GDP, TRADE, FDI and INF are 3.721238, 7.924011, 4.219589, 3.732913 and 10.74675 respectively. The medium of GINI, GDP, TRADE, FDI and INF are 3.179325, 8.049909, 4.194668, 2.893028 and 6.859282 respectively. The maximum value and the minimum value of GINI are 4.182096 and 3.113359. Its standard deviation (0.190497) is the lowest as compare to other variables. However, maximum value of INF is 316.7933 and minimum value is -26.29999. The highest standard deviation is 18.19303.

4.1.3 Descriptive Statistics for Developed countries

Variables	Mean	Median	Maximum	Minimum	Standard Deviation
GINI	3.398298	3.391363	3.826521	3.007690	0.161870
GDP	10.16102	10.45953	11.23088	8.229642	0.721610
TRADE	4.351862	4.377414	5.247601	3.097822	0.414521
FDI	5.489543	3.435094	87.44259	-16.07077	8.046743
INF	6.847752	2.625237	958.6464	-9.572880	47.67073

Table 4.3 shows descriptive statistics for developed countries

Table 4.3 presents descriptive statistics for developed countries. Mean of GINI, GDP, TRADE, FDI and INF are 3.398298, 10.16102, 4.351862, 5.489543 and 6.847752

respectively. The medium of GINI, GDP, TRADE, FDI and INF are 3.391363, 10.459533, 4.377414, 3.435094 and 2.625237 respectively. Based on the value of mean and medium, every variable which are GINI, GDP and TRADE has quite similar value. This result shows the data is symmetrical distribution. The standard deviation of GINI, GDP, and TRADE are 0.161870, 0.721610 and 0.414521 respectively. For GINI, the maximum value is 3.826521 and minimum value is 3.007690.

4.2 Difference GMM approach for Total Countries

4.2.1 Results of Dynamic Panel Difference GMM Estimations

Dependent Variable: Income Inequality (GINI)

Variables	Two-Step Difference GMM (Dependent: GINI)	
	OLS	GMM
$GINI_{t-1}$	-	0.623640
		(0.0000)***
Gross Domestic Product	-0.059387	-0.035044
	(0.0000)***	(0.0000)***
Trade	-0.089002	0.010318
	(0.0000)***	(0.0000)***
Foreign Direct Investment	0.003715	0.000065
	(0.0016)***	(0.0048)***
Inflation	0.000494	-0.000240
	(0.0115)**	(0.0000)***
No. of Obs	1064	1064
No. of Countries	82	82
Sargan Test	-	80.38234
		(0.373640
AR(1)		-1.600216
		(0.1096)
AR(2)		1.277006
		(0.2016)

Notes: - ***, **, and * represent significant level at 1%, 5%, and 10%, respectively.
- Figures in parentheses are p-values.

Table 4.4: Result of dynamic panel GMM estimations in total countries

Table 4.4 represents the dynamic panel GMM estimations for the income inequality in all the countries. The macroeconomic indicators are Gross Domestic Product (GDP), Trade, Foreign Direct Investment (FDI) and Inflation.

In general, Table 4.4 shows the estimated models by using Ordinary Least Square (OLS) and GMM methods are well stated. From the result of OLS estimation, at 1 per cent significance level, the coefficient of GDP is negative. Levine and Renelt (1992) found that inequality is significant negative associated with economic growth. Trade is negatively and significantly correlated with income inequality. Faustino and Vali (2011) also support that trade openness is negatively related to income inequality. FDI has positive and statistically significant impact on income inequality. Basu and Guariglia (2007) found that FDI promotes inequality and growth. However, inflation shows as a positive sign at 5 per cent significance level. Mushtaq et al. (2014) found that inflation brings more impact on the poor than the rich as the rich can hedge against the inflation.

Based on the GMM method, the four variables are statistically significant at 1 per cent significance level. The GDP is negative related with income inequality. An increase 1% in GDP, the GINI coefficient will decrease 0.035044%, on average, holding others variable constant. Alesina and Rodrik (1994) found income differentials and growth rates have negative relationship. Inflation and income inequality have negative correlation. Kai and Hamori (2009) found that the inflation is negative associated with inequality by providing a cross-country sample of 61 developing countries. An increase 1% in inflation, the GINI coefficient will decrease 0.000240%, on average, holding other variables constant. In contrast, trade is statistically positive associated with income inequality. An increase 1% in trade, the GINI coefficient will increase 0.010318%, on average, holding other variables constant. Hurrell and Woods (2000) have the similar result that trade and inequalities are significantly positive. FDI is positively associated with income inequality. Bhandari (2007) found that a positive impact on income inequality in which income inequality is not being affected by FDI, but wage inequality increases due to FDI. An increase 1% in FDI, the GINI coefficient will increase 0.000065%, on average, holding other variables constant.

4.3 Developing countries and Developed countries

4.3.1 Results of Dynamic Panel Difference GMM Estimations for Developing Countries

Dependent Variable: Income Inequality (GINI)

Variables	Two-Step Differences GMM (Dependent: GINI)	
	OLS	GMM
$GINI_{t-1}$	-	0.668085 (0.0000)***
Gross Domestic Product	0.025106 (0.0000)***	-0.054513 (0.0000)***
Trade	-0.096983 (0.0000)***	0.002475 (0.2826)
Foreign Direct Investment	0.001616 (0.4050)	0.001761 (0.0000)***
Inflation	-0.002094 (0.0000)***	-0.000127 (0.0000)***
No. of Obs	807	700
No. of Countries	54	54
Sargan Test	-	48.30318 (0.501292)
AR(1)		-0.009496 (0.9924)
AR(2)		0.005265 (0.9958)

Notes: - ***, **, and * represent significant level at 1%, 5%, and 10%, respectively.
- Figures in parentheses are p-values.

Table 4.5: Result of dynamic panel GMM estimation in developing countries

Table 4.5 represents the dynamic panel GMM estimations for the income inequality in developing countries. In OLS analysis, the GDP is positively correlated with income inequality. Partridge (1997) suggested that income inequality and growth is positive related with the panel estimation in the US. Trade has negative correlation with income inequality. Savvides (1998) found that trade policies are highly significant and negative related to inequality in developing countries. On the other hand, the coefficient of Foreign Direct Investment is positive but insignificant. Mihaylova (2015) found also FDI entry might increase the wages in traditional sectors, accompanied by a more capital-intensive production, which shows higher unemployment and contributes a rise in

inequality. Inflation is negative statistically significant with income inequality specifies that high inflation harms income inequality. Coibion et al. (2012) suggested that the inflation is increased steadily and permanently which aimed to reduce the income inequality.

Additionally, in GMM method, GINI, GDP, FDI and inflation are statistically significant at 1 per cent significance level. The positive coefficient of FDI indicates a positive correlation with inequality. An increase 1% in FDI, the GINI coefficient will increase 0.001761%, on average, holding other variables constant. Bhandari (2007) found income inequality is not being affected by FDI, but wage inequality increases due to FDI. Coefficient of trade is positive but insignificant at 10 per cent due to its value exceeds the p-value. An increase 1% in trade, the GINI coefficient will increase 0.0002475%, on average, holding other variables constant. Anderson (1995) suggested that trade openness increases the inequality through the ability of government on redistributing income via taxes. GDP have a negative relationship with income inequality. An increase 1% in GDP, the GINI coefficient will decrease 0.054513%, on average, holding other variables constant. Binatli (2012) reported that there is a negative relationship between GDP and inequality in developing countries. The coefficient of inflation is negative which indicates that inflation reduces the inequality. An increase 1% in inflation, the GINI coefficient will decrease 0.000127%, on average, holding other variables constant. As summarized by Bach and Stephenson (1974) and Blinder and Esaki (1978), the redistribution of income to the low-income quintiles and labour income, this makes the income distribution evenly.

4.3.2 Results of Dynamic Panel Differences GMM Estimations for Developed Countries

Dependent Variable: Income Inequality (GINI)

Variables	Two-Step Differences GMM (Dependent: GINI)	
	OLS	GMM
$GINI_{t-1}$	-	0.716808 (0.0000)***
Gross Domestic Product	-0.011237 (0.3217)	0.039165 (0.0054)***
Trade	-0.042581 (0.0383)**	-0.029053 (0.0030)***
Foreign Direct Investment	0.004642 (0.0000)***	-0.000325 (0.0003)***
Inflation	-0.000104 (0.5332)	-0.000149 (0.0000)***
No. of Obs	419	364
No. of Countries	28	28
Sargan Test	-	21.68717 (0.597932)
AR(1)		-0.010227 (0.9918)
AR(2)		0.015763 (0.9874)

Notes: - ***, **, and * represent significant level at 1%, 5%, and 10%, respectively.
- Figures in parentheses are p-values.

Table 4.6: Result of dynamic panel GMM estimation in developed countries

Table 4.6 represents the dynamic panel GMM estimations for the income inequality in developed countries. Based on the results in table above, GMM method is observed to be better than OLS estimation. As the result of OLS estimation, GDP is negative statistically insignificant as a determination to affect income inequality. Muinelo-Gallo and Roca-Sagales (2011) found income differentials have negative impact on growth rates. However, inflation is statistically insignificant and has negative correlation with income inequality. Bach and Ando (1957) proved that inflation reduces income inequality as higher income groups pay higher tax than federal bondholders. Moreover, trade is negative statistically significant associated with income inequality at 5 per cent significance level. Trinh (2016), Angeles-Castro (2011) and Franco and Gerussi (2013) found trade has negative effect on income inequality. The coefficient of FDI is

positive, which reveal that more inflow of FDI worsens income inequality. Wu and Hsu (2012) found out that FDI is harmful to those host countries with low levels of absorptive capacity income inequality. From the OLS results showed that an increase in FDI leads to a more unequal income distribution.

However, all of the variables are statistically significant to reject the null hypothesis at significance level of 1 per cent by using GMM method. The GDP has positive relationship with income inequality. An increase 1% in GDP, the GINI coefficient will increase 0.039165%, on average, holding other variables constant. Lim and Sek (2014) found the economic growth is positively affected income inequality in developed countries. Trade has negative correlation with income inequality. An increase 1% in trade, the GINI coefficient will decrease 0.029053%, on average, holding other variables constant. Wu and Hsu (2012) found trade is significantly negatively related with inequality as trade openness can improve efficiency in resources allocation and improve the income distribution. Inflation has adverse relation with income inequality. An increase 1% in inflation, the GINI coefficient will decrease 0.000149%, on average, holding other variables constant. Heer and Süssmuth (2003) suggested that inflation may increase the low-income groups' burdens as it drives the progressive personal income tax into higher tax brackets. The coefficient of FDI is negative. An increase 1% in FDI, the GINI coefficient will decrease 0.000325%, on average, holding others variable constant. Jensen and Rosas (2007) found that increased FDI inflows are correlated with a decrease in income inequality.

4.4 Developing countries versus Developed countries

Based on the dynamic panel GMM estimations for income inequality, the results from developing and developed countries are slightly different. For the developing countries, $GINI_{t-1}$, GDP, FDI and inflation are statistically significant at 1 per cent significance level, except for trade in developing countries, it is insignificant at 10 per cent. In the contrast for developed countries, all of the variables which are $GINI_{t-1}$, GDP, Trade, FDI and inflation have statistically significant at 1 per cent significance level. Besides that, the signs of variables in developing and

developed countries are dissimilar, except inflation. Inflation remains the same to have negative effect on income inequality in countries. The negative GDP sign, -0.054513 demonstrates a negative relationship between income inequality and economic growth in developing countries. However, in developed countries, positive GDP (0.039165) means GDP is positively related to income inequality. Moreover, trade and FDI in developing countries have positive association with income inequality. Unlike in developed countries, the negative values in both trade and FDI are showing that there is statistically significant an adverse effect on income inequality.

4.5 Diagnostic Checking

4.5.1 Sargan-Hansen Test

The p-value of the models as reported in Table 4.4 is 0.373640; Table 4.5 is 0.501292; Table 4.6 is 0.597932. All of the p-values are more than significance level 10 per cent. Hence, we do not reject null hypothesis as the p-values are more than significance level. This indicates that instruments are valid for all the countries include developed and developing countries. Reject null hypothesis indicates that the instruments are whichever there are correlation of errors or the variables are omitted in the model.

4.5.2 Arellano-Bond Serial Correlation Test

The null hypothesis represents there is no first order serial correlation (AR (1)) which is failed to reject at 10 per cent level. In the absence of second order serial correlation (AR (2)) is failed to reject as well. The lagged endogenous variable of GINI is statistically significant, which indicates that the estimation of Difference GMM is efficient and can be depended upon for statistical inference.

CHAPTER FIVE: Discussion, Conclusion and Implications

5.0 Conclusion

Income inequality is the major issue facing the whole world. Some countries are trying to reduce the gap between the poor and the rich, however, the problem still exists. The wealth and income inequality issue in developed and developing countries are facing many problems. Besides, there are various studies are carried out to examine whether the inequality is affected by macroeconomics variables. However, there is lack of comparison study between developed and developing countries. Therefore, the purpose of this research is to investigate the differences of impact of income inequality in the developed countries and developing countries.

This study examines the relationship between income inequality (measured by the GINI coefficient) and economic growth, trade openness, FDI and inflation for the 82 selected countries over the period 1996–2010 by using panel data techniques. We are using Difference GMM to conduct our empirical analysis as this method can solve endogeneity problem of the regressors and provide consistent estimation results.

Overall, the results show that GDP, trade, FDI, and inflation are statistically significantly associated with income inequality, particularly in the total countries and developed countries. In the total 82 countries, the negative values of GDP and inflation show there is statistically significant and negative relationship with income inequality while trade and FDI are positively associated with income inequality.

In developing countries, GDP, FDI, and inflation are statistically significant to affect income inequality. However, trade is insignificant to affect the income inequality. The GDP and inflation have a negative correlation with income inequality while FDI and trade have a positive effect on income inequality.

For the developed countries, the relationship between income inequality and GDP, trade, FDI, and inflation are statistically significant. GDP is positively link with income inequality. However, trade, FDI and inflation have an adverse effect on income inequality.

5.1 Implications of Study

Based on the findings of this research, it had pointed out some of the important messages that may help to the policymaker of a country to make a better decision.

The significant empirical set determines the growth-inequality nexus is positive in developed countries. This indicates that increase in economic growth will raise inequality. The government can implement tax progressive system which can increase the income-tax rate for the rich people and lower down income-tax rate for the poor. Hence, the government can reduce the wage gap by redistributing the income. For developing countries, the economic growth is good for inequality as increase in economic growth will reduce inequality. The government need to expand the economy by increasing spending in order to create more jobs opportunities in the market. At the same time, government will lower down the tax and this will increase the purchasing power of the consumers. The demand of goods and services will rise as the consumption increase due to purchasing power increase. Therefore, policymakers may lower down the inequality by boosting the economic growth in developing countries.

Besides, there is empirical finding shows that trade are positively related to inequality in developing countries. The government should pay more attention to the trade of their countries as it will worsen off the inequality if it rises. Therefore, the policymaker can impose barriers to trade to increase the tariff and reduce import quota. A high tariff and a low quota are able to restrict foreigners to import goods and services to the home country. Thus, the mechanism to reduce the inequality is through large trade openness in the countries. On the other hand, trade will benefit the income distribution in developed countries. The policymaker can lower the trade barriers such as tariff, import quota and embargoes toward the countries in order to encourage more trade to reduce the inequality in developed countries.

For the FDI, the major findings emerge that FDI and inequality are positively related for the developing countries in our sample. The firms invest abroad will create job opportunities for the foreign countries. However, this action will induce high rate of unemployment and threaten the income of the citizens as there are lesser job opportunities in the home country. The policymakers can implement more policies which provide more job opportunities in the local country. This is important in terms of reducing unemployment rate which seems to be an

essential requirement to minimize negative distributional impacts of FDI. Therefore, the implementation of Employment Guarantee Schemes by the government can enhance employment opportunities. The government acts as the employer of last resort to raise the income of poor by creating job directly. Nevertheless, FDI has the potential to exercise major impact in reducing inequality in developed countries. FDI entry will contribute to a fall in inequality. Therefore, the government should lower down the interest rate by using the monetary policy. Such action is the reason many developed countries are encouraged to attract FDI as a means of reducing the inequality.

Lastly, the positive results of inflation from our study lead to some policy recommendations for the developed and developing countries. Although high inflation can reduce inequality, the government should monitor the inflation rate as the high inflation rate will bring down the economy such as inflation crisis. The government may control the inflation by the monetary tools through inflation targeting. When the inflation rate above the target rate, the central bank may increase the interest rate while if inflation rate below the target, the central bank may reduce the interest rate. Hence, the inflation can control and help to reduce the inequality.

5.2 Limitations of Study and Recommendation for Future Research

There are some limitations in this research that need to improve for future research practice.

Firstly, this study is using the panel data which are focus on 82 countries from the whole world. Every country has different reasons that affect income inequality in their country. The results from our research are not analyzing the issues that affect a single country's income inequality. However, our results are illustrating the effect of macroeconomic variables towards the 82 countries' income inequality. Therefore, the results from our research might not be applicable for a single country.

Despite, we would like to suggest future researchers focus on the single country. Focus in a single country will result in a more precise factor that affecting the country's income inequality.

Hence, the researcher able to find out the best way to reduce the inequality gap in that particular country.

Secondly, this study focused on the effect of explanatory variable towards inequality in developed and developing countries. However, high-income, medium-income and a low-income group of people should be studied further as the richest and the poorest gap is huge between those groups. Consequently, we have not considered into our research.

Therefore, it is recommended for future researchers to consider those income groups into their research. As a result, the future researchers able to figure out the different effects of inequality contributed by the variables taking into account towards the income groups.

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Appendices

Appendix 1.1 Category of Developed countries

1. Australia
2. Austria
3. Bulgaria
4. Canada
5. Croatia
6. Cyprus
7. Czech Republic
8. Denmark
9. Estonia
10. Finland
11. France
12. Germany
13. Hungary
14. Iceland
15. Ireland
16. Italy
17. Latvia
18. Lithuania
19. Netherlands
20. New Zealand
21. Portugal
22. Romania
23. Slovenia
24. Spain
25. Sweden
26. Switzerland
27. United Kingdom
28. United States

Appendix 1.2 Category of Developing Countries

1.	Argentina	28.	Malaysia
2.	Armenia	29.	Mali
3.	Bangladesh	30.	Mexico
4.	Barbados	31.	Moldova
5.	Belarus	32.	Namibia
6.	Bolivia	33.	Nigeria
7.	Brazil	34.	Pakistan
8.	Chile	35.	Panama
9.	China	36.	Paraguay
10.	Colombia	37.	Peru
11.	Costa Rica	38.	Philippines
12.	Dominican Republic	39.	Poland
13.	Ecuador	40.	Russian
14.	Egypt, Arab Republic	41.	Senegal
15.	El Salvador	42.	Sierra
16.	Georgia	43.	Singapore
17.	Ghana	44.	South Africa
18.	Guatemala	45.	Sri Lanka
19.	Honduras	46.	Tanzania
20.	India	47.	Thailand
21.	Indonesia	48.	Tunisia
22.	Jordan	49.	Turkey
23.	Kazakhstan	50.	Uganda
24.	Korea, Republic	51.	Ukraine
25.	Kyrgyz, Republic	52.	Uruguay
26.	Macedonia, FYR	53.	Venezuela
27.	Madagascar	54.	Vietnam