THE IMPACT OF FOREIGN DIRECT INVESTMENT ON INCOME INEQUALITY IN IRELAND (1989 – 2017)

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1 Contents

2 Abbreviations

MNC	Multinational Company
FDI	Foreign Direct Investment

3 Abstract

Income inequality has increased in advanced and emerging economies during the previous decades in the time of growing globalization. There is still no consensus, whether foreign direct investment (FDI) as one of the main drivers of globalization has resulted in a higher-level income inequality. This study analyses the influence of FDI on income inequality using multiple regression model between 1989 and 2017 in Ireland. By using multiple regression mode that includes inflation, trade, FDI, GDP per capita and government expenditure on education, FDI tends to increase income gaps but the results are not significant in many models. Furthermore, government expenditure on education tends to increase income disparity in our model as well. In contrast, trade and GDP per capita tend to decrease the income inequality in Ireland. Finally, these findings show that FDI do affect income distribution in Ireland.

4 Introduction

Globalization is one of the most significant activities which are influencing the world via growing integration in the economy across the globe. FDI and liberalization are two main elements of economic globalization (Mah, 2003). Economic development had been regarded as a main explanation for decreasing poverty, therefore, many emerging economies have undergone reforms applying liberalization actions towards FDI for obtaining higher level of economic growth.

There have been contradictory opinions about the effect of FDI on the recipient nations. In the accordance with the neoclassical theory, FDI increases economic development and production level in the recipient economies. It is a general view amongst many economists and global organizations that aside from filling the resource gap up FDI can bring to advanced level economic development and expansion in the recipient country via technology distribution, improvement of human capital and managerial competency and conncetion to the export market (Li and Liu, 2005).

Compared to neoclassical view is dependency view, that claims that the dependence in the economy on advanced nations has an adverse public and economic effect on emerging nations, especially in the long-term. Followers of dependency view claim that FDI influences the economic development of emerging nations negatively and leads to inequalities and separation in the country (Firebaugh and Beck, 1994). Multinational Companies (MNCs) results in the procedure of separation of manufacturing, it is anticipated that FDI leads to a rise in disparity between qualified and unqualified labour forces. This high wage inequality leads to a bigger inequality in the entire society. Tsai promoted dependency view as well by making a conclusion that FDI has resulted in unequal wage allocation in the eastern and southern part of East Asian economies (Tsai, 1995). An academic work on dependency view recommends that the influence of FDI on income disparity is determined by domestic circumstances in the recipient nations especially absorbing power, technical distribution and government approaches (Wu and Hsu, 2012).

Many academic studies are accessible on economic development, allocation of wage that have displayed various outcomes about the effect of development on the decrease of poverty and disparity. Mundell stated that a higher FDI in emerging economies decreases disparity in wage allocation (Mundell, 1957). Another research on South Korea applying figure between 1975 and 1995 outlined that FDI did not impact wage allocation in Korea (Mah, 2003). A research that was carried out on many underdeveloped economies discovered a positive

connection between FDI and development in the economy but additionally brought to the conclusion that it does not have an impact on wage allocation (Sylwester, 2005).

Conversely, many research papers support that FDI is positively linked with income disparity. Ranci (2011) claimed that growing worldwide markets and launch of IC technique process has raised the economic development in the urban part but it has led to increasing the difference in wage and working circumstances and public segregation of society. Choi (2006) in his research of 119 nations brought to the conclusion that a rise in FDI brings to higher-level wage disparity estimated as Gini coefficient. It was stated by Wu and Hsu (2012) that the influence of FDI on disparity is measured by recipient nation's ability to apply modern technique and came to the conclusion that FDI brings to higher-level wage disparity in nations with lower-level absorbing ability whereas it has a small effect on disparity in economy that possess better absorbing ability.

The increasing income disparity, especially in emerging nations during the last two decades has led to a discussion on the effectiveness of FDI in decreasing poverty and disparity in recipient economies. A demand has been thought to examine the main forces that lead to an alteration in wage allocation in the economy. However, there are few research papers that analyse the link between FDI and disparity. Additionally, there are contradictory evidence in academic literature about the influence of FDI on income disparity.

4.1 Research Rationale

Many studies on the influence of FDI pays attention to the effect on development of the host country and productive capacity. In the recent time there are many researches on the link between FDI in host economies and other variables. However, the topic of income inequality is often neglected (Figini and Görg, 1999). Analysis on the distributional influences of FDI is especially rare in Europe. To gain a clear comprehension of the impact of FDI on wage inequality and if all people in a country take advantage to the similar degree, it is important to analyse this phenomenon (Liebrand, 2018). Ireland is an attractive country for FDI. According to the 2018 FDI Confidence Index, Ireland was ranked 19th up from 23rd in 2017. The investor interest in the economy stays considerable, although, FDI have been inconsistent in the recent years (Whelan, Russell and Maitre, 2016).

4.2 Research Aim and Objective

Aim:

The present research intends to investigate the causal connection existing between FDI and Income Inequality between 1989 and 2017 in Ireland.

Objectives:

- To identify the roles of independent variables FDI and Income Inequality in Ireland
- To explore the evidences of link between FDI and Income Inequality within 1989 and 2017 in Ireland
- To recommend the measures in which FDI impacts in Ireland can balance Income Inequality

4.3 Research Questions

Main research question:

"How does foreign direct investments (FDI) influence domestic income inequality for Ireland between 1980 and 2017?"

Research sub-questions:

- What roles do FDI and Income Inequality play in Ireland?
- What is the causal relationship established by FDI on the Income Inequality considering additional independent variables?
- How can the evidence-based exploration create understanding the link between FDI and Income Inequality between 1989 and 2017 in Ireland?

4.4 Limitation of the study

The major limitation of this study is that it concentrates on FDI without taking into account the significance of local investment, that could affect economic development and income inequality as well. The Gini coefficient applied in this study is not the best measurement of income inequality, but it is still the most widely used. The research has data limitations, that shows the need of additional effort on data gathering. Many models show that FDI is not significant, however, there is significant in the single regression models. This indicates high level of multicollinearity. In order to eliminate this effect further studies are necessary.

4.5 Research Structure

The present research takes an attempt to investigate about the FDI impacts on income inequality between 1989 and 2017 in Ireland. The first chapter provides the introduction towards this topic. In chapter two, the existing literature in relation to the issue will be detailed. Chapter three includes the necessary tools and methods to apply while analysing the research

issue. Chapter four comprises the research analysis and finally chapter five infer the discussion for the research. The last chapter contains the conclusion part of the study.

5 Literature review

5.1 Introduction

FDI is known as an outlay or investment related to a business. FDI is often denoted as a powerful engine for the improvement of an economy. FDI also plays an important role in maintaining the balance of distribution of income. Income disparity is defined as the utmost concentration of wage of a small number of people. Eventually, income disparity can also be defined as a gap in between the poor and the rich people. The current chapter will include different facets of study on FDI and its links to the income inequality of Ireland.

5.2 The importance of investment

The rate of investment is vital element of economic improvement (Bekana, 2016). The GDP growth shows how fast an economy is growing. Investment is a tool to format capital which is converted into goods and services. Investment in a country can be divided into national and foreign. The streams of FDI into the receiving economies can play an essential role because it raises the supply of finances for domestic investment, throughout an efficient spillover effect, from the more developed technique and leadership technique practiced by foreign companies (Pegkas and Tsamadias, 2016). In general, FDI is regarded by various worldwide institutions, decision makers and economists as an element that leads to economic advancement in the recipient economy (Eren and Zhuang, 2015).

5.3 Foreign Direct Investment

Globalisation is an important process to influence the growing integration across the world, especially globalisation in the worldwide economy has been a significant factor in forming the world. The important elements of the globalisation in the economic sector are liberalisation, FDI and international trade. Globalisation is explained as a phenomenon where nations integrate into the global economy throughout trade, FDI and movements of technology advancement, workers, humanity and capital. FDI is a significant factor of the globalisation and is regarded as a tool for development in the recipient country (Bhandari, 2007). FDI is frequently considered as a proxy for globalisation or global integration in academic literature.

Due to the importance of FDI as a measure of worldwide integration, economies strive for obtaining more FDI to reach more integration process into the worldwide system in the

economy, since the accomplishment of economies is considered to be defined by their position in international trade and capital transfers (Dicken, 2011).It is anticipated that recent worldwide crisis would inversely influence dependent nations of the southern hemisphere but some nations in the southern part of the world have displayed a development in their status in worldwide economy together with the increase in their degree of socio-economic improvement. This is restricted, partial and based on experimental studies simply as it does not take into account the importance of economic power in defining the link between nations (Wall, 2016).

FDI is a measurement of nation's integration into the worldwide economy and it is anticipated to result in positive impacts on the host nation. The FDI brings to faster economic development and expansion and enhances the capital movement for the improvement in local capitals (Asiedu, 2002). However, there is an absence of studies on factors of FDI for nations with various degrees of integration into the worldwide economic cycle and it is not adequate to anticipate that FDI leads to the same impacts (Blonigen and Wang, 2004).

The majority (around seventy percent) of global exports are managed by MNCs, and about thirty percent is made up of FDI. Because of the competition of worldwide market, higher than 80% of FDI is hosted by 20 nations (Mukim and Nunnenkamp, 2012). FDI is explained as an investment by an MNC situated in one nation, in order to have control unit in a recipient nation. The power of MNC increases in the worldwide economy with the increase in FDI. Because of the higher increase of FDI as comparing to the growth in trade, currently FDI has become a major element of worldwide economic integration (Dicken 2011). FDI occurs when an MNC makes a decision to relocate some of its divisions to another nation. The importance of FDI across the globe has grown and it is increasing faster.

FDI plays a crucial role in the improvement of global trade and creating long-run economic links between nations (Groh and Wich, 2012). It is a main factor of growing worldwide economic integration (OECD, 2008a). The distribution of FDI according to geographical location is determined by the value-added divisions of MNC due to local benefit of various locations affects the subsidiary company decisions of multinational companies, therefore, MNCs want to settle down in locations which help their operations (Dunning, 1998). Furthermore, government policy is affected by multinational companies' decisions regarding location since MNCs favour to move their divisions in places with the favourable institutional conditions (Wallerstein and Wallerstein 1998). Institutional structure in emerging economies, together with legislation and regulation influences investment decisions of foreign companies (Meyer and Estrin, 2001). The different governmental approaches affect the creation of domestic measures which make the place special and hard to transfer and move elsewhere

(Dunning 1998). The main elements of location which influence the MNC's capital movements incorporate demand for produced items, supply, accessibility of inputs, local infrastructure, cost of component, the structure of institutional surroundings (Wall, 2016). Since nations move in the directions of the knowledge- based economic structures, these elements become more important for decisions of MNCs to establish their activities in a foreign location. The rights on properties which are considered as an intangible asset and then there are domestic elements such as local infrastructure, state policies, and connection with worldwide systems (Dunning 1998). Company's strategies to make investment in foreign nations are separated into four categories. First is market-searching investment which intends to support new markets, resource searching FDI is capital investment in removal and producing of natural resources due to exporting or selling in domestic market, productivity searching FDI is an investment in manufacturing goods and services for the worldwide market, and finally, the FDI that search for asset which intends to obtain cutting-edge assets and connections with domestic companies for safeguarding or increasing MNC's benefits (Dunning, 1998). MNCs that are searching for market and asset favour to settle down in semi-regional locations and they are interested in the horizontal form of FDI which intends to copy manufacturing of their parent firm or connect to new market opportunities. However, resource and efficiency searching MNCs aim to operate in locations where they can growth their revenues by creating production divisions and benefiting from local resources that are available in the nature, this category of capital investment is named vertical FDI (Mukim and Nunnenkamp, 2012). According to the sectoral view, divisions with more reasonable benefits encourage more FDI in comparison to those which have the competitive drawback (Qiu, 2003).

As a result, the decisions that are made by MNC's in order to locate elsewhere are affected by a mixture of tangible and intangible assets provided by receiving nations because MNCs seem to move to locations where domestic environment meet their needs. As a result, operations of MNCs and the circumstances regarding property rights in receiving countries influence the impacts it has on host nation's development on human resource, employment position, technological improvement and form of trade.

5.3.1 The importance of FDI

Despite globalisation, the crucial role of FDI in economic widening has not altered (Lall and Narula, 2004). FDI should deliver positive beneficial spillovers to domestic enterprises in the receiving country (Behera, 2015). FDI has become a significant topic locally and globally nowadays. FDI has influences on economic expansion in different ways. They are complex

regarding economic improvement, FDI would bring new cutting-edge technologies, improve managerial skills, know how, increases production level and global production connection, develops ties to foreign markets and decrease unemployment rate. FDI symbolizes a real source of foreign trade and technological movement, particularly to emerging country (Noor, Ali, Khandaker and Islam, 2016).

FDI affects economic growth by increasing overall productivity and, more frequently, the efficient implementation of source in the host country. For the multinational enterprises, that deliver the main capital in FDI, it is a chance to become larger. While for the host countries FDI is an essential tool of development (Chrzanowski, 2012). The effects of FDI on foreign traffic of the recipient country vary remarkably among nations and economic sectors. The FDI impact on income inequality can be different in various economies such as negative, positive or no significant link between FDI and income disparity. The main advantage of FDI for emerging economies is the long-term contribution to unifying the receiving economy closer into the world economy that includes more imports and exports

5.3.2 Distributional effects of FDI

The link between economic improvement and FDI start to gain higher level recognition in the academic literature since 1990s due to the significant trade liberalization in developing economies in that time. The influence of FDI on wage disparity, especially in terms of Europe, has got less attention, most likely due to the limited availability of figures and the absence of literature learning probable theoretical connections between the two factors (Suanes, 2016).

Various studies, experts give various theories and expectations in terms of the links between FDI and disparity. Empirical researches frequently lead to conflicting conclusions or give debatable outcomes. Regarding trade openness, experts have summarized that changing channels may have an impact on inequality. Jensen and Rosas (2007) recommend the extra wage that foreign companies seem to pay for skilled workers can be known as the main contribution by which FDI might affect income inequality. As discussed by many experts, the channel broadens the gap between qualified and unqualified worker and leads to different wages. By contrast, if these foreign companies pay more wages to unskilled people, FDI would lead to a decrease in wage disparity. Other theories consider more contributions, Velde (2003) stated three elements that FDI might influence inequality. First, Velde (2003) determined a composition impact, which the consequence of sectoral segmentation. This classification shows that foreign companies seem to invest into sectors that are more skill-intensive than local

firms are and therefore strengthen the situation of qualified workers in comparison to the unqualified.

This interpretation is in accordance with Feenstra and Hanson (1997), who claim that worldwide outsourcing increases the need for educated labour force in advanced and emerging economies. Every company looks for minimum skills, even the most basic manufacturing methods need basic skills, particularly when these certain processes are connected global manufacturing channels. Secondly, FDI may influence the supply of qualified labour force throughout training courses and specified contributions to education. Finally, FDI can encourage the growth of productivity level of labour faster in domestic- and foreign companies because of technology movement and secondary impacts.

According to Bekman, Bound and Machin (1998), this one-sided influence of the growth in productivity for qualified people increases the income differences between qualified and unqualified people. In the line with the rises in disparity in emerging and advanced economies in the time of liberalization, this improvement has been puzzling for experts. In the case of FDI, liberalization brings to more imports of cutting-edge machinery and techniques. Since these imports are typical in different type of FDI, these could cause inequality. According to Harrisch and Hanson (1999), the knowledge-biased technological transformation rises the skill reward because new advancement in technology is not in line with the knowledge of the unqualified labour.

5.4 FDI overview of Ireland

FDI was and will be the key root of Ireland's economic growth (Iammarino, 2018). The contribution made to the economic system has been far- reaching and has been estimated that 20% employment among the private sectors has been indirectly or directly attributed to FDI. Contribution is also made towards the taxation revenue with the Exchequer; it also helps in generating different commercial activities around the whole Ireland economy and also helps in driving investment, innovation and research. IDA Ireland is said to be the investment agency that is related to economic promotion of the state and is also tasked with sustaining and growing FDI in the state of Ireland. Ireland is able to retain and attract FDI only due to the various factors and compatible policy made by the government since last few years.

On the basis of FDI, the success rate of Ireland is reflected by the number of leading companies of the world that have established their operation under the jurisdiction of Ireland. In the face of increasing competition globally, the government of the country gives a flawless effort to retain Ireland's attractiveness to the FDI. The sectors from which Ireland generally

attracts businesses are ICT, finance related services, life sciences, services related to business and also engineering. Ireland's success can be noticed when it is seen from the FDI point of view that a large number of leading companies from all over the world have established their operations within Ireland.

Ireland receives a huge benefit from FDI still it focuses to ensure that the advantage of FDI is spread all over the country. Through FDI an entity is allowed to achieve the emerging opportunities in the market (Howard, 2019).

5.5 Generating economic growth

The economy of Ireland is the knowledgeable economy which focuses on services of life science, high technology and financial industries. The country has an open economy and is ranked first because of its high-value flows of FDI. The country followed a period where there was continuous growth in the economy. However, the economy of the country was affected by the post-2008 Irish Financial Crisis. This gave rise to compounded domestic economic issues which were related to the collapse of the Irish Property Bubble. The country experienced a short recession from Q2 - Q3 of 2007 and a long recession from Q1 - Q4 of 2008 -2009. It has been implied by theoretical models that FDI proves beneficial for the development of the host country. This belief is widely shared among the policymakers of Ireland. However, this view of theoretical models is not supported by empirical evidence. A gap has been bridged between the country's empirical and theoretical literature by calibration exercises and a model which examines the local financial market's role in Ireland. There are gaps in the existing literature of the country FDI still stimulates the economic growth of the country in the following ways.

FDI provides with capital: The capital of Ireland is brought by FDI. it helps in the higher rate of investment which helps to achieve the increased target of growth which has a relation with the country's national growth (Iamsiraroj, 2016). Balance of payments constraint is removed by FDI. The inflow of resources of foreign exchange in Ireland is provided by FDI. This, as a result, helps to remove the constraints that are associated with the balance of payment. FDI helps to bring marketing and management skill, technology. In Ireland FDI brings assets that are crucially scared or missing in the economic market of the country. These assets are marketing skill, management skill and technology. Without these assets, the economic market of the country can never be developed. A competitive environment is generated by FDI. Entry of multiple foreign organisation in the domestic market of Ireland generates an environment where competition prevails between the national and foreign

organisations which are in operation at the domestic market of the country (Hardiman and MacCarthaigh, 2017). As a result, the efficiency of the organisation increases, and a consumer gets a wide range of choices.

5.6 Inequality

Permanent poverty and inequality are the urging problems and lowering poverty and wage gap are important priorities and challenge for emerging countries. However, decreasing poverty is the first objective in United Nation's Millennium Development Goals, unfortunately, wage inequality has not gained similar attention but simultaneously, it is one of the main social problems over the globe (Alvaredo, 2015). Inequality shows itself in different formations. It is widely split into two main forms: inequality in economic sector (such as revenue and salary) and inequality in culture (such as classes in society, race, gender). Many academic literatures have essentially concentrated on various size and measurement of inequality in economic sector. This is determined in many ways. The three main forms of economic inequality such as wage, income and consumption. This paper also deals with inequality in economic sector. There are several ways to estimate wage inequality for example Lorenz curve, the Gini coefficient index, Atkinson Index and the Palma Index, percentile ratios. However, Gini is the most commonly applied measurement (Morelli et al., 2015). Many former papers have defined inequality by examining income allocation within countries. However, Gini index is the most frequent measurement of wage disparity.

A study carried out by Kuznets (1955) created the link between inequality regarding allocation of income and economic development of the nation. He stated that since the nation shifts from agriculture to industrial economic structure, the degree of inequality rises due to higher wage gap between qualified and unqualified labour force. After achieving a particular level of advancement, inequality begins to decrease because economic improvement filter into the bigger segment of population. This was described by his study because of the urban-rural movement, the growing proportion of metropolitan community bring to higher inequality. In the time of the method of economic development, the rural-urban difference in per capita wage seems to grow since per capita efficiency in urban activities seems to grow quicker than the rural activities in the agriculture. As a result, total wage inequality rises with the growth in economic expansion. During the starting periods of industrialisation, wage inequality increases especially in old economies where the formation of industrialisation has devastating impacts on former economic and social organisations. As soon as the starting period of industrialisation and urbanisation finishes, many forces occur which result in the penetration of improvement

into the lower-level income class and lower-level inequality. This link between economic expansion and wage inequality was demonstrated as inverted U-shaped curve (Kuznets, 1955). In accordance with a neo-liberal discussion because of the growing economic integration amongst nations. The worldwide income gap and poverty has decreased in the last twenty years for the first time in past century.

On the other side, in accordance with dependency theory argument, the world income inequality and poverty are rising due to the unchecked forces of globalisation. This approach suggests control of public policies on the operation of market forces. In addition, this anti-neoliberal group offers a larger number of solutions for reducing inequality as compared to the neo-liberal group (Wade, 2004). Most of the previous studies on international inequality used GDP per capita which measured inequality across countries. Another type of studies tried to incorporate income distribution in the country. Due to non-availability of survey data, these studies use Gini coefficients or other measures for estimating income distribution using a single statistic. Milanovic argued that both of these approaches are not satisfactory because firstly, a single statistic of disparity cannot represent the wage allocation and secondly, assumption that all countries have the same distribution of income is not acceptable. Since the 1980s more accurate studies used survey data but household surveys were used to get income shares, not the actual incomes. During 1990s studies started to use household surveys but their focus was a measurement of poverty rather than inequality. Milanovic's study on international inequality was the first study that was entirely based on household survey data and this derived world income distribution in a similar way as it is aggregated for a country from regional income distribution. The study shows that world inequality is very high, and it further increased between countries as well as within countries during 1988 and 1993. But between countries inequality was relatively higher and caused an increase in overall inequality (Milanovic, 2002). Whereas Melchior argued that inequality between countries has declined since the late 1960s. Here international inequality is measured as Gini coefficient of per capita income that is weighted by population. The major reason is that some developing countries, particularly in Asia, have grown faster than many developed countries. He suggested that while measuring global inequality it should be clear that whether we want to measure inequality between countries or persons. For instance, when inequality is measured using average per capita income than it only measures inequality between countries. Paper further suggests that increased inequality within countries leads to divergence or higher inter-country inequality (Melchior, 2001). Wade tested the empirical basis of neo-liberalisation argument and argued that found that neoliberal argument is supported when inequality is measured as population-

weighted PPP- adjusted per capita income of countries. Inequality has increased since the 1980s when it is measured for whole distribution or cross-sectional data based on household survey or measures of combine inequality within and across countries. The wage disparity within countries was either declining or stagnate between 1960s to 1980s and since the 1980s it has been continuously increasing. Income disparity is much greater in manufacturing industry across the world. At the same time, the absolute wage disparity is also increasing fast. On the whole, he argued that due to the large regional variation in economic growth, a different way of measurement produces different outcome, therefore, the trend of global income distribution depends on the selection of countries and the technique of measurement as there is no unique best method to measure global income disparity. Several methods have been used to measure inequality which includes per capita GDP in UD dollars or adjusted to Purchasing Power Parity (PPP), countries considered as one unit or weighted by population. There are measures of income distribution viz. Gini, some average coefficients, ratios of income of 1st and 10th deciles of world population and ratio of average incomes of rich and poor countries. Measurement also varies with sources of figures on income for example National Accounts data and Household Survey data, selection of sample countries as well as the time period (Wade, 2004). A considerable number of researches have displayed the association between disparity and development. There is some contradiction about whether inequality across countries has increased or decreased during last few decades but a longer trend of the ratio between rich and poor countries shows an increase in inequality (Basu, 2006).

It is evident from the literature that wage disparity is a major social issue, particularly in emerging nations. Examinations have shown that most of the African countries have highest wage disparity in the world. The overall wage disparity in Africa increased between 1988 and 1993 whereas there has been a sharp increase in disparity through African economies meanwhile intra-country disparity has slightly decreased but still it is bigger than rest of the globe (Nissanke and Thorbecke, 2006).

5.6.1 Aggregate FDI and income inequality

Notwithstanding many theoretical studies emphasizing the ways how FDI can affect inequality, the real studies on the connection between FDI and disparity is not convincing. Several European countries experience the widening income gap and many attributes the problem to globalization and the existing political and economic discourses. The results of distributional outcomes of FDI in these countries is scarce. Using panel co-integration and causality techniques, Herzer and Nunnenkamp (2011) examined the connection between FDI

and income disparity in ten European countries between 1980 and 2000. They noted that FDI has a positive but short-run effect on wage inequality in Europe. The long-run effect is, however, adverse on average. The causality in long run moves in the same direction. The suggestion made here is that income disparity reduces with an increase in FDI and higher disparity result in lower level FDI. In a cross-country frame, numerous macro researches state that FDI rises inequality. For example, studies carried out by Reuveny and Li (2003), Alderson and Nielsen (1999), Choi (2006) observed a positive link of FDI stocks and income disparity. According to Tsai (1995), the link between FDI and bigger disparity is restricted to geographic regions because he just discovered especially strong relationship in East Asia in the early 70s.

Numerous researches on one country conducted by several scholars such as Nunnenkamp et al. (2006) on Bolivia, Mah (2002) on South Korea, Feenstra and Hanson (1997) on Mexico conclude also that FDI causes higher inequality.

The second category of empirical works discover that FDI lowers income disparity in the receiving country. According to Jensen and Rosas (2007), FDI results in a decrease in income disparity at the regional level in Mexico. A comparable outcome is achieved by Chintrakarn et al. (2010), that state that FDI reduces disparity in America, although, this impact is also similar over states.

A third category of researches, which are unable to find out any link between FDI and wage inequality. A research conducted by Milanovic (2002) employs panel figure on 88 economies between 1985 and 1991 and discover that FDI does not have an impact on wage disparity. In a research on 29 growing nations from 1970 to 1990 carried out by Sylwester (2005) is again unable to figure out the link of income inequality effect of FDI.

In this section FDI general terms were defined then the different empirical research results were compared. This brings to the conclusion that there is not a common consensus on topic because many different studies resulted in various outcomes such as positive, negative no connection between FDI and wage disparity. Accordingly, further researches such as in the case of Ireland would be value added. In the next section the theoretical perspectives will be discussed.

5.6.2 Link between FDI and income inequality

The link between FDI and economic development had begun to gain more attention during the 90's in the studies that are related to literature and the reason behind this was that the liberalisation process for major trades have undergone among the developing economies in that span of time. The literature which helps in studying the link between income disparity and

the FDI has paid quite a less attention to the aspect that might prove to be significant for the understanding of the effect or effect on emerging economies by the FDI. There seems to be a reason if the FDI being hypothesizing though not having the similar impact whichever sector in the economic system receives it. Eventually, it is also something that cannot be determined by aggregate analysis (Raza and Shah, 2017). If it is seen from the other side, it can be observed that FDI has a tendency to decrease the amount of income disparity. In order to calculate the rate of income disparity, the Gini coefficient is generally used.

The above-mentioned Gini coefficient mainly varies from null to one, where zero defines the value of complete equality and one defines entire inequality. As a result, the higher value of Gini coefficient, the greater will be the disparity. High disparity of Ireland market wage clearly defines the uneven distribution of earnings of labour.

5.7 Theoretical Framework

5.7.1 FDI and Income inequality: Neo-Classical Perspective

There is a difficult link between FDI and wage disparity. According to the survey discussed by Basu and Guariglia (2007), few empirical writings have shown the link between FDI and disparity. The opinion in relation to this link is classified between neo-classical and dependency theories.

The neo-classical view shares an optimistic opinion about impacts of FDI on wage disparity and states that FDI results in higher level of economic development and smaller inequality. A general belief amongst followers is that FDI can cause higher level of economic improvement and advancement in receiving country throughout technical transfer, human capital and improvement in managerial skills and availability to the export market (Li and Liu, 2005). Researches carried out by Mah (2003), Sylwester (2005) emphasized that few empirical examinations have shown that FDI does not have an impact on wage disparity.

5.7.2 FDI and Dependency Theory Perspective

Dependency theory describes the developing nations by examining their actions with advanced nations and claims that inequality amongst economies is connected to these links. It explains that growing nations might not automatically take advantage of the economic advancement in developed countries rather economic movements of developed countries might lead to large problems in poor countries. By contrast, neoclassical view did not forecast similar probability. Dependency theory illustrates that inequality in poor economies in comparison to their connection with developed countries and emphasized that inequality is the result of these connections.

Many research papers have described that FDI influences developing economies' improvement negatively and leads to differences and high level of income inequality calculated as Gini coefficient (Firebaugh and Beck 1994; Choi 2006).

Multi-National Companies outsource their manufacturing processes. This causes high inequality within the whole society. Research conducted by Tsai (1995) states that FDI has brought to unequal income distribution in east and south East Asian states. According to Ranci (2011), growing global markets and launch of IC technology has led to increase in towns but it has caused growing difference in income, job surroundings and social segregation in society.

In this section the two main theoretical approaches were compared. The two main views differ regarding FDI and income inequality. According to those theories, it is also difficult to conclude. This bring us to the point that further research will be beneficial. In the next section the research question will be addressed and detailed.

5.8 Lessons learnt from literature review

The literature review explains the main ideas detailed in the research and their connected reasoning. It recommends that FDI is an important element of globalization in an economy. FDI is rewarded to be a main channel for economic development. In spite of the growing movements of FDI many economies especially emerging nations are facing with growing disparity which attracts policy makers and economic professionals' attention. The link between FDI and income disparity is described by two major theories. Neo-classical approach claims that income disparity in the recipient economy decreases throughout higher-level capital movement in FDI form, and throughout the adaptation of recent technique, development of skill and availability to global market. By contrast, dependency view states that FDI not inevitably decreases the income disparity, however, its effect on disparity is affected by many elements linked with domestic circumstances of the host nation. There is a gap in the academic literature for analysis that examine the effect of FDI on income disparity in recipient nations. Additionally, there is no consensus between FDI impact on income disparity and there is no empirical analysis on Ireland between 1989 and 2017 which concentrated on income disparity and its connection with FDI. Lack of this effective implementation of the measurement aspects of Foreign Direct Investment has led to inefficient ideology of reducing income disparity of the citizens in Ireland. Therefore, these areas have been aimed to be addressed in the current research making it effective for future stances of economic stability in Ireland.

6 Research question

Main question:

"How does foreign direct investments (FDI) influence domestic income inequality for Ireland between 1989 and 2017?"

This study deals with the question whether FDI influences domestic earnings in Ireland for the period 1990-2018. Evidence on the wage disparity of FDI in receiving country is especially rare in the European context. The real and theoretical outcomes fail to give an unambiguous opinion on the effect of FDI on wage disparity. Disparity within Europe and as well within Ireland has been increasing in last growth period meanwhile significant FDI flows into the country. In the 1980s, 10% of the highest' average income was seven times more in comparison to 10% of the lowest' average income. Currently, it is roughly ten times more. In other words, the economic recovery has not changed the long-run tendency for growing income inequality because it is higher than ever (OECD, 2017). Regarding FDI, concerns are basically connected to the case when linked productivity-increasing spillovers are in accordance with increasing difference because of changes in the need for qualified labour (Herzer and Nunnenkamp, 2011). Furthermore, factual suggestion is lacking, therefore, this research questions intends to contribute to this academic and answer this question in the case of Ireland where FDI is an important economic factor.

This section addressed the research question that will guide author during research. The question is worthy for research because there are many studies on FDI and different variables such as economic growth, but there are not many on FDI and wage disparity particularly in the European context such as Ireland in the given period.

7 Research methodology

Since there is no general view of any academic frame to support empirical papers in the link FDI-disparity, the baseline model is assumed according to the description of past examinations within the FDI and disparity published writings. The measure used for income disparity is the Gini index and applied as a dependent element. This study intends to analyse the relationship between FDI and disparity for Ireland between 1989 and 2017. To analyse the effect of FDI on income disparity the below stated multiple regression model will be applied:

Gini coefficient = $\propto$ + β1 Inflation + β2 Trade + β3 FDI + β4 GDP per capita + β5 Government expenditure on education + ε

According to the academic literature, the multiple regression model includes independent variables that could influence income disparity omitting them could lead to biases and potential ambiguous impact in the estimation of the impact of FDI on wage disparity. In accordance with the literature on FDI and wage disparity, five basic independent variables are demonstrated in the equation: inflation, openness of trade, FDI, GDP per capita, government spending on education. The factor ε is the error term. In this research, only the macroeconomic components that influence the Gini coefficient with a focus on FDI are considered.

7.1 Dependent variable

Where GINI is Gini index that is an estimation of income inequality from the World Income Inequality Database (SWIID). This is the dependent variable within-country income disparity (Liebrand, 2018). The Gini index is the most frequently applied estimation of income disparity. It consists of capital earnings, incomes and self-employed salaries (Mihaylova, 2015). Although, this is not a perfect estimation of inequality, it is the most frequently described in empirical world (Couto and Center, 2018). The value varies between 0 and 1. If the value equals to 0, indicates that income is evenly split amongst all people in the society which shows that everybody has same income (Mushtaq et al., 2014). It indicates ideal equality of the allocation. However, if the value equals to 1, this displays that only one individual has all incomings. The value close to 0 shows more efficient allocation of income while value close to 1 indicates deterioration of income allocation. It is especially applied by analysts for the examination of income allocation (Balan et al., 2015).

According to Herzer and Nunnenkamp (2011), the Gini index has two major benefits. Firstly, it gives figures without any spaces, which is needed for analysing the effects in the short and long run. Secondly, this variable gives comparability amongst countries, ensuring that this information is totally similar throughout area and time (Liebrand, 2018). However, it has many drawbacks; for instance, if a country is big with unequal regions, the Gini index is confusing, or the Gini coefficient is an estimation of equality at a specific time, therefore, it does not consider lifetime amendments in earnings (Halmos, 2011).

The Gini Coefficient is lagged 2 periods back because any variables need time to influence the income inequality in the economy. In this research 2 periods lagged is used for Gini index in order to demonstrate this effect. A low p-value (less than 0.05) shows that the null hypothesis must be rejected. This indicates that independent variable seems to be significant to the model because changes in independent values are linked to changes in dependent variable. Inversely, a bigger (not significant) p-value shows that changes in the

independent variable are not linked to changes in the response. As a result, the changes in the independent variable of inflation is not related to the changes in the dependent variable.

7.2 Independent variables

7.2.1 Annual Inflation Rate

Effect of inflation on wage disparity might be positive or negative. Positive effect might be because of two causes. First, rise in the inflation rate influences impoverished more than the wealthy since the spending power of the impoverished reduces more than those who are wealthy. Moreover, proportion of the impoverished people might rise because of inflation in the nation as well (Mushtaq et al., 2014). As a result of this, inequality might rise. However, inflation might help income allocation since higher inflation result in rise in capital investment from manufacturing sector. It might bring to high development in economic sector and a rise in the creation of employment. Accordingly, need for and returns labour force might rise leading to more efficient income allocation. As a result, it is anticipated that the signal of inflation coefficient might be positive or negative.

7.2.2 Trade Openness

It is determined by the sum of exports and imports of goods and services as a proportion of GDP. The trade-to-GDP percentage is a primary measurement of trade openness and the integration in the economic sector. It indicates the dependency of exports and imports of the local nation in proportion to the nation's GDP.

This variable is encouraged by the research of Francois and Nelson (2003) and Heckscher and Ohlin (1991), who recommend that higher level trade in economies with a predominance in unqualified labour force should lower disparity. Furthermore, it should raise in economies where the qualified labour force is prevailing (Feenstra and Hanson, 2003). According to this model, it could be argued that the more open an economy to global trade, the more obvious the impact would be on income disparity. The previous empirical research on FDI and disparity is not accordance with this impact. In accordance with this paper, Jaumotte et. al. (2013) state that growing trade and globalization in financial area have independently noticeable and inverse impacts on income allocation. Where liberalization in trade sector and export development are discovered to be linked with lower level income disparity, growths in economical openness are linked with higher level disparity for advanced and emerging economies. Generally, trade and globalization in economy are main factors of income disparity as emphasised by Robbins (1996), Robertson (2000).

7.2.3 Foreign Direct Investment

FDI is the most important independent variable and it is calculated as FDI stock as a proportion of GDP. As Herzer and Nunnenkamp (2011) highlighted that the usage of FDI stock is better than FDI because FDI stocks records long-run impacts more effective than yearly FDI with the hypothesis that FDI makes contribution to the stock of general-purpose technology accessible in the scope of the economy (Liebrand, 2018).

The data on FDI as a secondary data is from UNCTAD's FDI statistics. Despite the different theories about the distributional FDI's effect, the symbol of β is scientifically unclear. The model contains many control variables that could influence wage disparity or FDI as leaving them out could lead to biases and probable false impacts in the approximation of the effect of FDI on income disparity (Liebrand, 2018).

Effect of FDI on income disparity might be positive or negative. FDI might deteriorate income allocation if it causes lower employment rate because of the intensified usage of processes that require more capital in the production. Furthermore, if it delivers cutting-edge technology in the receiving nations and rises need for qualified labour force more than need for unqualified labour force, it can widen wage inequality. On the other side, FDI might contribute to the improvement of income allocation since it helps to fill various gaps up in the receiving country. It might become a resource of higher capital creation, can generate more job opportunities and might become a resource of improvement of individuals of the receiving economy.

In addition, it can rise the economic development of the receiving economy and advantages of this economic improvement might be divided by the most people bringing to more efficient allocation of income (Mushtaq et al., 2014). As a result, anticipated feature of coefficient of FDI might be positive or negative depending on the correlative effects of FDI on disparity (Kratou and Goaied, 2016).

7.2.4 GDP Per Capita

The following independent element is GDP per capita. GDP per capita is a frequent measurement applied for approximating disparity. One of the major benefits from applying GDP per capita as a measure is that, this is frequently applied in the academic world the findings are, accordingly, no difficult to compare timely and according to location. Figures of GDP per capita has additionally been recommended being the most accurate measure accessible during a longer lifespan. It has been applied as a proxy for economic improvement. The anticipated evidence of the coefficient GDP per capita is either positive or negative.

Growth in the economy results in a higher level of wage disparity of an economy if the whole society cannot benefit from it evenly. Furthermore, economic development might result is a lower level income disparity if there is economic growth that absorbs labour and more adequate actions regarding the wage disparity. It is used in order to monitor for the probability that income disparity within a location can be influenced by the level of economic growth. The Kuznets curve is one of the most well-known, frequently mentioned theories on development in economy and income disparity in the academic world. This theory based on an inverted U-shaped wage allocation graph created by Simon Kuznets (Kuznets, 1955). In accordance with this theory, disparity increases in the start of economic development, but will then begin to lower once again when the economy achieves a certain degree of GDP per capita.

7.2.5 Government expenditure on education

The link between state spending and disparity is difficult and can move in two ways. Disparity can either be growing as a result of unequal state spending, or the degree of disparity can reduce as an outcome of state spending, for example as transfers (OECD, 2012). The variable for government expenditure applied in this research is based government spending on education. General state spending on school system is determined as a share of GDP.

Table 1: Measurement and Availability of independent variables

Independent variables	**Measurement**	**Database**
Inflation	Calculated as the most current year inflation in percent	World Development Indicators
Trade	Exports and imports total in the percentage of GDP	World Development Indicators
FDI	Foreign direct investment net flows in the percentage of GDP	World Development Indicators
GDP per capita	GDP per capita	World Development Indicators
Government expenditure on education	Government expenditure on education in the share of GDP	World Development Indicators

The F-test of multiple linear regression tests whether any of the independent elements in a regression model are significant. In the model, the F-value and Prob (F) statistics test the significance of the model. Particularly, it tests the zero hypothesis that the regression coefficients are equal to zero. A low value indicates that at least some of the regression parameters do not equal to null and the multiple regression equation does have explanatory power in fitting the figures.

The p-value tests the null hypothesis that the coefficient is equal to zero (no impact). A low value (less than 0.05) shows that the null hypothesis must be rejected. This indicates that independent variable seems to be significant to the model because alterations in independent values are linked to alterations in dependent variable. Inversely, a bigger p-value shows that alterations in the independent variable are not linked to changes in the response.

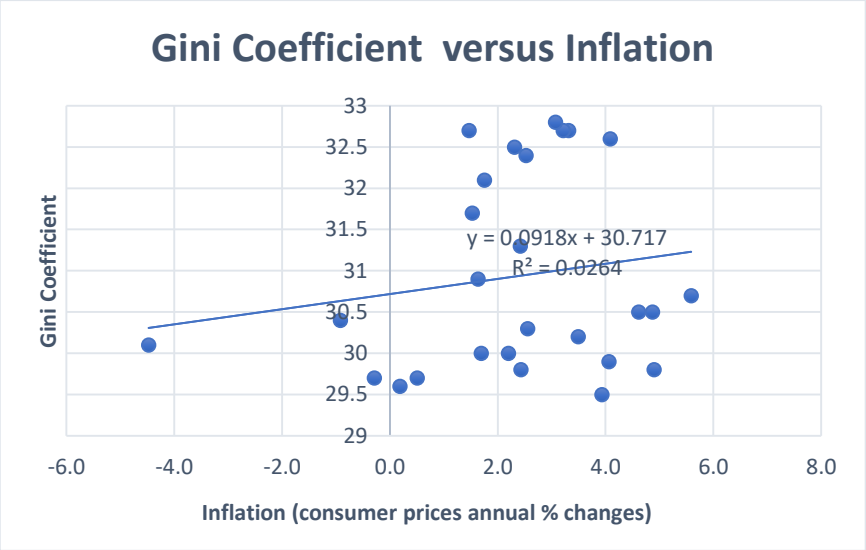
The belief held by the author that this quantitative method would be a robust research technic and can help to examine the link between FDI and income inequality in Ireland between 1989 and 2017.

8 Analysis and/Findings

The statistical examinations are divided into two main groups: single regression and multiple regression models. Most of the tables and graphs are included in the appendix part of the research. It is also required to give the proper descriptions and interpretations considering the result. This part shows the link of FDI and Gini coefficient.

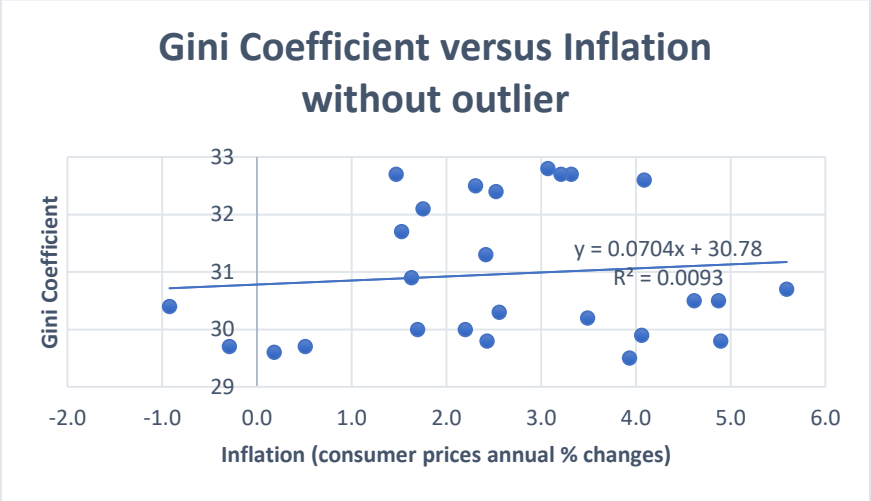
8.1 Analysis of Gini Coefficient and each of the independent variable in single regression model

Model 1 a): Gini Coefficient versus Inflation



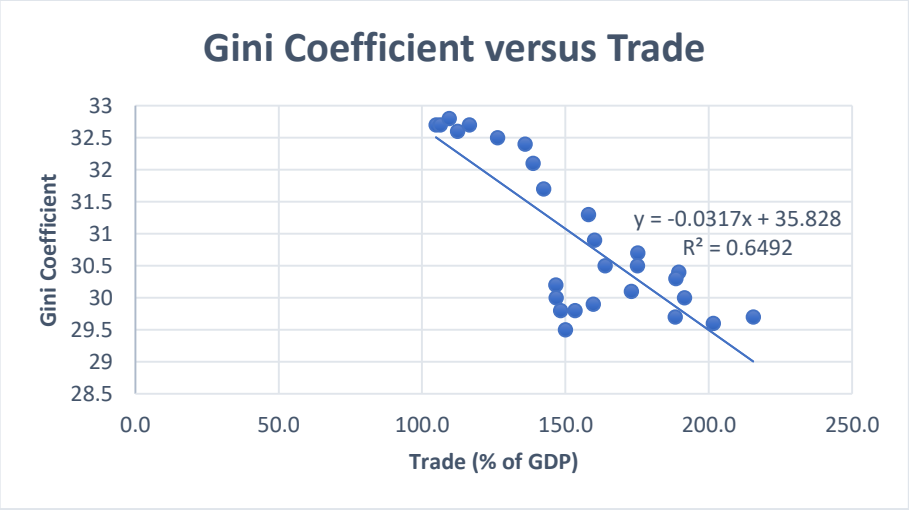
Model 1 a) examines the connection between the dependent variable and inflation in a single regression equation. There is an upward-sloping link between these variables. The relationship tends to go in line with theories. It was already mentioned above, that inflation can increase or decrease the wage disparity. The relationship is positive in this single regression model. The higher-level inflation brings to higher level of Gini Coefficient In this single regression, the p-value of 0.481 is high. As a result, the changes in the independent variable of inflation is not related to the changes in the dependent variable. Adjusted R^2 of -0.01253 shows the same conclusion because it is negative. Negative value means the explanation towards change is very low or negligible. To sum up, this independent variable does not have a major impact on changes in Gini Coefficient values. However, there are outlier in the single regression model that can influence the explanatory power of the variable. Outlier can influence the accuracy of the results. According to above-plotted line, there is a value of -4.5%. Figures that differ in a big way from the general pattern of the figures are known as outliers. In order to eliminate this effect, the next the model will calculate the impact of inflation on income inequality without outlier as a single independent variable. The 2009 figure will be removed from our dataset in order to understand the outlier effect on the whole regression model whether it affects the model considerably or the effect is not remarkable.

Model 1 b): Gini Coefficient versus Inflation without outlier



Model 1 b) examines the connection between the dependent variable and inflation without outlier in a single regression equation. The relationship is positive in this single regression model. The higher-level inflation brings to higher level of Gini Coefficient In this single regression, the p-value of 0.640102 is high. As a result, the changes in the independent variable of inflation is not related to the changes in the dependent variable. Adjusted R^2 of -0.03202 shows the same conclusion because it is negative. Negative value still means the explanation towards change is very low or negligible. Although, outlier was removed the result still indicates that this independent variable does not have a major impact on changes in Gini Coefficient values.

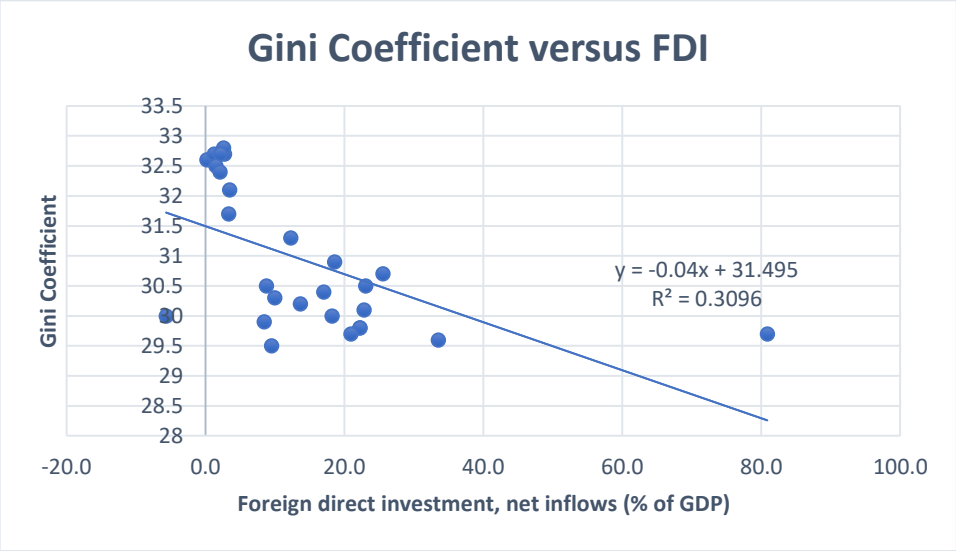
Model 2: Gini Coefficient versus Trade



Model 2 shows the link between Gini Coefficient and trade. There is a downward-sloping link between these variables. The relationship is negative in this single regression model. This indicates that higher level of trade decreases the Gini Coefficient.

The p value of 3.96E-07 is low. As a result, the changes in the independent variable of inflation is related to the changes in the dependent variable. Adjusted R^2 shows the same conclusion because it is around 63%. This outcome is significant and indicates that trade has a significant influence on income allocation in Ireland according to the single regression model. This result is in line with Feenstra and Hanson's (2003) statement that more open a country to worldwide trade, the higher the obvious impact would be on wage disparity.

Model 3 a): Gini Coefficient versus FDI



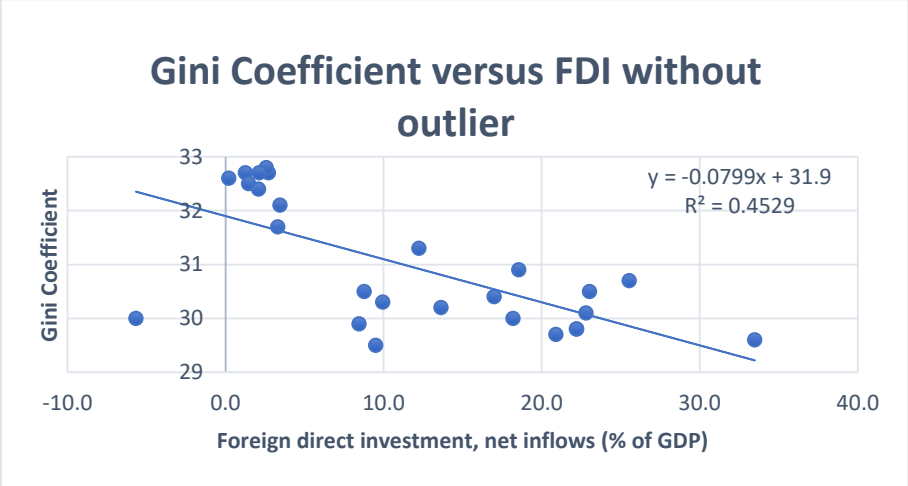
Model 3 a) shows the link between the variables of Gini Coefficient and FDI. There is a downward-sloping link between these variables. FDI might be positive or negative depending on the correlative effects of FDI on disparity (Kratou and Goaied, 2016).

The relationship is negative in this single regression model. This indicates that higher level of FDI decreases the Gini Coefficient. The p value of 0.00257 is a low. This means that FDI is a significant variable in the single regression model. As a result, the alterations in the independent variable of FDI is related to the alterations in the dependent variable. Adjusted R Square value shows the same result because it is around 28%. The explanatory power of FDI impact on Gini Coefficient is less than 30% but FDI still has a major contribution to the change in income disparity. However, there are outlier in the single regression model that can influence the explanatory power of the variable. The main reason was that 2015 was a record year for

FDI because of financial and corporate reorganisation instead of recent investments. (Hamilton, 2017).

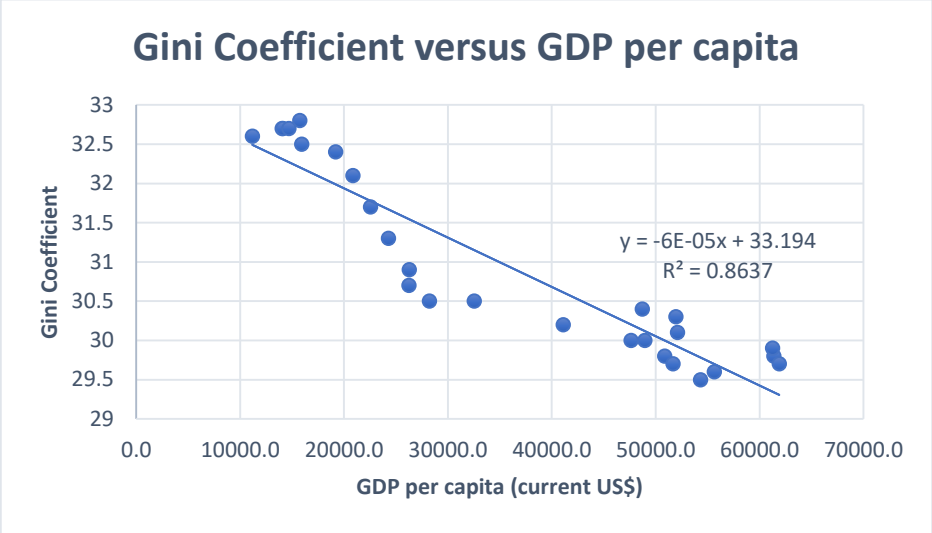
According to above-plotted line, there is a value of around 80 %. In order to eliminate this effect, the next the model will calculate the impact of inflation on income inequality without outlier as a single independent variable. The 2015 figure will be removed from our dataset in order to understand the outlier effect on the whole regression model whether it affects the model considerably or the effect is not remarkable. In order to eliminate this effect, the next the model will calculate the impact of FDI on income inequality without outlier as a single independent variable.

Model 3 b): Gini Coefficient versus FDI without outlier



Model 3 b) shows the link between the variables of Gini Coefficient and FDI. There is a downward-sloping link between these variables. The relationship is negative in this single regression model. This indicates that higher level of FDI decreases the Gini Coefficient. The p-value of 0.000165 is a low. This means that FDI is a significant variable in the single regression model. As a result, the alterations in the independent variable of FDI is related to the alterations in the dependent variable. Adjusted R^2 shows the same result because it is around 43%. However, this result has a higher explanatory power without the outlier in 2015. This indicates that FDI has a major impact on income inequality in Ireland.

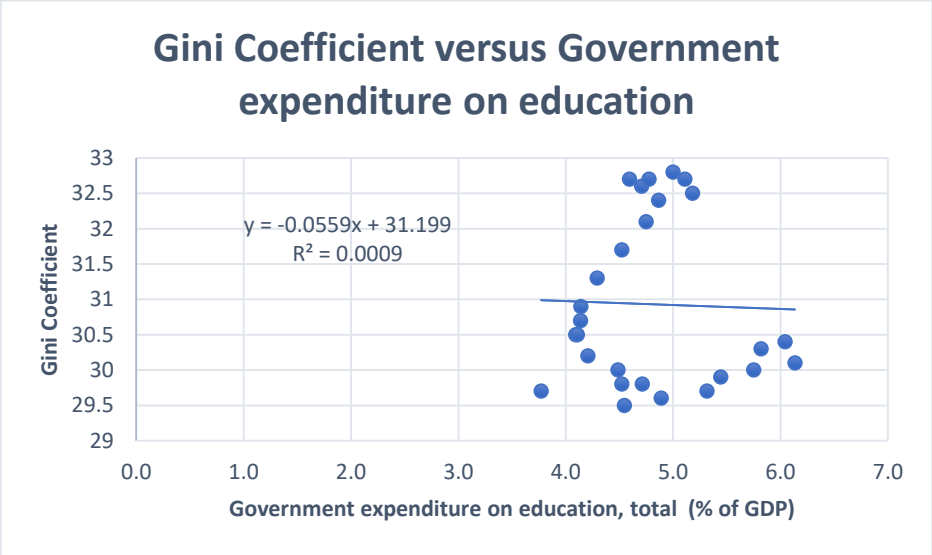
Model 4: Gini Coefficient versus GDP per capita



Model 4 displays the link Gini Coefficient and GDP per capita. There is a downward-sloping link between these variables.

This shows that higher level of GDP per capita decreases the Gini Coefficient. The p value of 2.57E-12 is low. This means that GDP per capita is a significant variable in the single regression model. As a result, the alterations in the independent variable of GDP per capita is related to the alterations in the dependent variable. Adjusted R^2 shows the same result because it is around 85%. This is a high value and it means that GDP per capita has a major effect on wage allocation. This result is in accordance with the Kuznets' theory that after a certain point GDP per capita is negatively linked to the Gini Coefficient

Model 5: Gini Coefficient versus Government expenditure on education



Model 5 indicates the link between Gini Coefficient and Government expenditure on education. There is a downward-sloping relationship between these variables. This result is in accordance with the Kuznets' theory that after a certain point GDP per capita is negatively linked to the Gini Coefficient. This shows that higher level of GDP per capita decreases the Gini Coefficient. The p value of 0.884497 is high. This means that Government spending on education is an insignificant variable in the single regression model. The adjusted R^2 of -0.0391 shows the same conclusion because it is negative. Negative value means the explanation towards change is very low or negligible. To sum up, this independent variable does not have a major impact on changes in Gini Coefficient values.

The below-mentioned table summarize the single regression models data

Summarized table 2

Single Regression Models: GINI Coefficient versus	(Adjusted) R^2	B co-efficient(s)	P-value of coefficients
1. Inflation	-0.01253	30.71655	0.41800
2. Trade*	0.63515	35.8281	3.96E-07*
3. Foreign Direct Investment*	0.28201	31.49456	0.00257*
4. GDP per capita*	0.85821	33.19367	2.57E-12*
5. Government expenditure on education	-0.0391	31.19879	0.884497

8.2 Analysis of Gini Coefficient and the independent variables in multiple regression model

In this part, the Gini Coefficient as dependent variable and the different independent variables will be examined by multiple regression model.

Model 26 a): Gini Coefficient versus Inflation, Trade, FDI, GDP per capita and Government expenditure on education

Independent variables	**B co-efficient(s)**	**P-value(s)**	**(Adjusted) R^2**	**Significance F**
Inflation	0.012584	0.73227	0.94539	1.67E-13
Trade	-0.01644	6.12E-05		
FDI	0.021544	0.002041		
GDP per capita	-5.8E-05	1.18E-10		
Government expenditure on education	0.569762	0.000374		

The F-statistics rejects the zero hypothesis and the corresponding p-values are under our degree of significance ($p<0.05$) except inflation with the value of 0.73227, showing that our model is reasonable. This shows that the independent variables are not just random regarding the dependent variable. The level of the adjusted R^2 is high and demonstrates that 94% of the variation in the Gini coefficient is described in the model. This model has a strong explanatory power regarding the detailed dependent and independent variables. 2015 was a record year for FDI because of financial and corporate reorganisation instead of recent investments (Hamilton, 2017). In order to eliminate this effect, the next the model will calculate the influence of FDI on income disparity without outlier in a multiple regression model.

Model 26 b): Gini Coefficient versus Inflation, Trade, FDI without outlier, GDP per capita and Government expenditure on education

Independent variables	**B co-efficient(s)**	**P-value(s)**	**(Adjusted) R^2**	**Significance F**
Inflation	0.031202	0.272389	0.969027	2.39E-15
Trade	-0.01298	7.34E-05		
FDI	0.002135	0.748358		
GDP per capita	-5.7E-05	1.46E-12		
Government expenditure on education	0.631617	4.94E-06		

The F-statistics rejects the zero hypothesis and the corresponding p-values are under our level of significance ($p<0.05$) except inflation with the value of 0.272389 and FDI with the value of 0.748358 and, showing that our model is reasonable. This shows that the independent variables are not just random regarding the dependent variable. The level of the adjusted R^2 is high and demonstrates that 96% of the variation in the Gini coefficient is described in the model. This model has higher explanatory power regarding the detailed dependent and independent variables. The next model will use variables without inflation because the inflation was not significant in the single regression model.

Model 25: Gini Coefficient versus Trade, FDI, GDP per capita and Government expenditure on education

Independent variables	**B co-efficient(s)**	**P-value(s)**	**(Adjusted) R^2**	**Significance F**
Trade	-0.01646	4.1E-05	0.947574	1.51E-14
FDI	0.02059	0.000885		
GDP per capita	-5.7E-05	3.21E-11		
Government expenditure on education	0.539856	2.38E-05		

Inflation was left out in order to understand the impact on whole model. The F-statistics rejects the zero hypothesis and all the corresponding p-values are under our level of significance ($p<0.05$) showing that our model is a very reasonable. This shows that the independent variables are not just random regarding the dependent variable. The level of the adjusted R^2 is high and demonstrates that 94 % of the variation in the Gini coefficient is described in the model. This model has a strong explanatory power regarding the detailed dependent and independent variables.

Model 24: Gini Coefficient versus Inflation, FDI, GDP per capita and Government expenditure on education

Independent variables	**B co-efficient(s)**	**P-value(s)**	**(Adjusted) R^2**	**Significance F**
Inflation	0.016769	0.752073	0.886032	7.34E-11
FDI	0.006129	0.430898		
GDP per capita	-6.9E-05	1.66E-10		
Government expenditure on education	0.466752	0.023806		

The F-statistics rejects the zero hypothesis and all the corresponding p-values are under our level of significance ($p<0.05$) except FDI of 0.430898 showing that our model is a reasonable. The level of the adjusted R^2 is high and demonstrates that 88% of the variation in the Gini coefficient is described in the model. This model still has a strong explanatory power regarding the detailed dependent and independent variables. The next model will leave out GDP per capita.

Model 23: Gini Coefficient versus Inflation, Trade, FDI, and Government expenditure on education

Independent variables	**B co-efficient(s)**	**P-value(s)**	**(Adjusted) R^2**	**Significance F**
Inflation	-0.07812	0.419274	0.608723	4.38E-05
Trade	-0.03497	0.000167		
FDI	0.003251	0.839341		
Government expenditure on education	0.024432	0.943047		

The F-statistics rejects the zero hypothesis and out of the corresponding p-values just one is below our level of significance ($p<0.05$). The level of the adjusted R^2 is high and demonstrates that 60% of the variation in the Gini coefficient is described in the model. This model has a lower explanatory power regarding the detailed dependent and independent

variables because GDP per capita was left out. This independent variable had the highest R^2 of 85% in the single regression model as well. This indicates that GDP per capita plays a crucial role in our multiple regression model and has a major impact on income inequality. The next model will leave out government expenditure on education because it was not significant in the single regression model in order to comprehend the effect on the model.

Model 21: Gini Coefficient versus Inflation, Trade, FDI and GDP per capita

Independent variables	**B co-efficient(s)**	**P-value(s)**	**(Adjusted) R^2**	**Significance F**
Inflation	-0.08581	0.030323	0.903429	1.2E-11
Trade	-0.0143	0.003225		
FDI	0.005397	0.405827		
GDP per capita	-5E-05	3.95E-08		

The F-statistics rejects the zero hypothesis, and the corresponding p-values are below our level of significance ($p<0.05$) except FDI with the value of 0.405827. The level of the adjusted R^2 is high and demonstrates that 90% of the variation in the Gini coefficient is described in the model. This shows that government expenditure on education does not have a major impact. This model still has a strong explanatory power regarding the detailed dependent and independent variables.

Model 18 a): Gini Coefficient versus Trade, FDI and GDP per capita

Independent variables	**B co-efficient(s)**	**P-value(s)**	**(Adjusted) R^2**	**Significance F**
Trade	-0.0127	0.012051	0.885124	1.43E-11
FDI	0.006631	0.347904		
GDP per capita	-5E-05	1.3E-07		

The F-statistics rejects the zero hypothesis, and the corresponding p-values are below our level of significance ($p<0.05$) except FDI with the value of 0.347904. The level of the adjusted R^2 is high and demonstrates that 88% of the variation in the Gini coefficient is described in the model. This model still has a strong explanatory power regarding the detailed dependent and independent variables. This model has a strong explanatory power regarding the

detailed dependent and independent variables. 2015 was a record year for FDI because of financial and corporate reorganisation instead of recent investments (Hamilton, 2017). In order to eliminate this effect, the next the model will calculate the impact of FDI on income inequality without outlier in a multiple regression model.

Model 18 b): Gini Coefficient versus Trade, FDI without outlier and GDP per capita

Independent variables	**B co-efficient(s)**	**P-value(s)**	**(Adjusted) R^2**	**Significance F**
Trade	-0.00964	0.049551	0.897996	1.13E-11
FDI	-0.01175	0.307542		
GDP per capita	-4.9E-05	9.71E-08		

The F-statistics rejects the zero hypothesis, and the corresponding p-values are below our level of significance ($p<0.05$) except FDI with the value of 0.307542. The level of the adjusted R^2 is high and demonstrates that 89% of the variation in the Gini coefficient is described in the model. This model still has a strong explanatory power regarding the detailed dependent and independent variables. These values indicate high multicollinearity because correlation of FDI and trade with the value of 0.72 and GDP per capita and Trade with the value of 0.74 according to the correlation matrix table. The table show how the independent variable correlate to each other.

Table 3: Correlation matrix

	Inflation	FDI	GDP per capita	Trade	Gov. ex. on education
Inflation	1.00				
FDI	-0.32	1.00			
GDP per capita	-0.28	0.56	1.00		
Trade	-0.36	0.72	0.74	1.00	
Gov .ex. on education	-0.51	-0.24	0.23	0.11	1.00

9 Discussion

This section shows the empirical results gained for Ireland between the period 1989-2017. During the previous decades, the probable link between income disparity and globalization has been the main topic of economic discussion. Amongst the different channels of globalization, the significance of FDI is comparatively less examined. Furthermore, the academic literature between FDI-inequality relationship is quite uncertain and cross-country evidence is unconvincing, however, current examinations recommend that the impacts of FDI on inequality differ based on the degree of economic improvement of an economy.

This current study attempts to clarify these doubts in the case of Ireland. The findings indicate that on average FDI seems to raise income inequality in the models with a higher R^2 but the FDI results are not significant in those models except model 25 and 26 with high explanatory power. However, FDI as a single independent variable has a negative influence on income inequality in Ireland. The intuition behind this impact is that FDI increases the comparative need for qualified labour force, which than again results in a rise in earnings and rate of employment of qualified people in relation to those people who are not qualified.

The statistical findings show ambiguous results regarding FDI because there are significant and not significant outcomes and has negative and positive impact according to the models. Model 26 a) shows the main outcomes for the approximation of the link of FDI-income inequality in the multiple regression model. TThese findings show that FDI level raises by 1% income inequality increases by 0.0215%. Even though this outcome is statistically significant, it is still weak because the coefficient value is low. As discussed above, similar findings are also found in previous papers, for instance Reuveny and Li (2003), Alderson and Nielsen (1999), Choi (2006) also discovered that inequality grows with FDI.

In regarding to trade, this independent variable has a negative impact on the income inequality and this outcome is robust. This is in accordance with the academic literature on the influence of trade on inequality, explaining that the higher the degree of trade in the economy, the lower the income disparity (Francois and Nelson (2003) and Heckscher and Ohlin (1991) and Jaumotte et. al. (2013)). Similarly, as regards GDP per capita, this independent variable has a negative impact on the income inequality and the result is significant. This is in line with Kuznets (1955) theory, disparity increases in the start of economic development, but will then begin to lower once again when the economy achieves a certain degree of GDP per capita.

The government expenditure on education has a positive impact on inequality and this finding is significant. This indicates that the more money spent by government on education in society, the higher the income inequality in a country.

Overall, the findings show that FDI has a positive impact on income disparity in Ireland, however, in these models FDI seems to be not significant. The disparity-increasing impact of FDI earlier forecasted by Feenstra and Hanson (1997) seemingly holds for many economies. This outcome is worrying because over the previous decades, emerging economies have given a criticizing position to FDI to increase economic development. It is worth to reason that FDI operations may take advantage a chosen part of the society. The results from this study recommend that economic development forced by FDI is not equal, particularly in nations that have included globalization in a one-sided way by only opening the investment gate and giving advantageous for MNC which be in favour of an already selected part of labour forces. As shown by Lambregts et al. (2015) it tends clear that depending just on investments of MNCs cannot take advantage everybody.

Outcomes in this study provide many issues for additional study. FDI might have been good solution for growth, more actions can be taken to improve its influence in income allocation in Ireland, for example via state policies in the field of teaching, training courses and improvement of infrastructure. Decision makers must bear in mind that an economy system of income relies on many elements such as organisations, strategies in public sector, school system, local and foreign priorities and, maybe most significant, the character of its technique. Economies should still take account of putting more money in educational structure; however, states should not anticipate overcoming these difficulties in the income allocation by just encouraging high-level FDI (high technique and high-end divisions). This might not be advantageous if the high-level of FDI does not correspond with the educational level of their active population. The ambiguous result

10 Conclusion

FDI is regarded as a channel of economic growth and improvement for the economy, many economies such as Ireland have undergone through reformation in the economy choosing liberalisation strategies towards FDI for obtaining bigger economic growth. There are many contradicting evidences in the academic literature describing the link between FDI and income disparity. This analysis examines the influence of FDI on income disparity applying multiple regression model between 1989 and 2017, including five independent variables such as Inflation, Trade, FDI, GDP per capita and Government expenditure on education and Gini coefficient as a dependent variable. As a single independent variable, FDI was discovered to be statistically negative in a single regression model between FDI and Gini coefficient. This indicates that FDI as one independent variable in the regression model reduces income inequality in Ireland between 1989 and 2017. However, there are not just FDI that can influence income inequality in a country. It was assumed that inflation, trade, FDI, GDP per capita and government expenditure on education are the main variables in the model.

The study of FDI and income inequality in Ireland supports that the relationship between FDI and income inequality is not direct rather it is determined by other elements such as trade, GDP per capita and government expenditure on education. These models deliver some interesting and ambiguous outcomes but opens the door for additional researches.

Most of the models show that FDI is not a significant variable. Due to the better understanding of the allocational impact of FDI in the case of Ireland, further studies should concentrate on other independent variables that will be included in the model and multicollinearity amongst them in order to have a more accurate result.

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Single regression models

Model 1 a): Gini Coefficient versus Inflation

Data Analysis Output	
Metric	**Value**
R Square	0.026411
Adjusted R Square	-0.01253
Coefficient	0.091815
P-Value of above coefficient	0.418002

Model 1 b): Gini Coefficient versus Inflation without outlier

Data Analysis Output	
Metric	**Value**
R Square	0.009257
Adjusted R Square	-0.03202
Coefficient	0.07038
P-Value of above coefficient	0.640102

Model 2 Gini Coefficient versus Trade

Data Analysis Output	
Metric	**Value**
R Square	0.64918
Adjusted R Square	0.63515
Coefficient	-0.03167
P-Value of above coefficient	3.96E-07

Model 3 a) Gini Coefficient versus FDI

Data Analysis Output	
Metric	**Value**
R Square	0.30963
Adjusted R Square	0.28201
Coefficient	-0.04004
P-Value of above coefficient	0.00257

Model 3 b) Gini Coefficient versus FDI without outlier

Data Analysis Output	
Metric	**Value**
R Square	0.45294
Adjusted R Square	0.430146
Coefficient	-0.07994
P-Value of above coefficient	0.000165

Model 4 Gini Coefficient versus GDP per capita

Data Analysis Output	
Metric	**Value**
R Square	0.86366
Adjusted R Square	0.85821
Coefficient	-6.3E-05
P-Value of above coefficient	2.57E-12

Model 5 Gini Coefficient versus Government expenditure on education

Data Analysis Output	
Metric	**Value**
R Square	0.00086
Adjusted R Square	-0.0391
Coefficient	-0.05594
P-Value of above coefficient	0.884497

Multiple regression models with two independent variables

Model 6: Gini Coefficient versus Inflation and Trade

Independent variables	**B co-efficient(s)**	**P-value(s)**	**(Adjusted) R^2**	**Significance F**
Inflation	-0.083632079	0.251944	0.640583936	1.78E-06
Trade	-0.033768939	4.78E-07		

Model 7: Gini Coefficient versus Inflation and FDI

Independent variables	**B co-efficient(s)**	**P-value(s)**	**(Adjusted) R^2**	**Significance F**
Inflation	-0.00815	0.936345	0.252297	0.011684
FDI	-0.04036	0.004448		

Model 8: Gini Coefficient versus Inflation and GDP per capita

Independent variables	**B co-efficient(s)**	**P-value(s)**	**(Adjusted) R^2**	**Significance F**
Inflation	-0.05842	0.183839	0.862993	1.67E-11
GDP per capita	-6.5E-05	3.97E-12		

Model 9: Gini Coefficient versus Inflation and Government expenditure on education

Independent variables	**B co-efficient(s)**	**P-value(s)**	**(Adjusted) R^2**	**Significance F**
Inflation	0.112762	0.401721	0.640583936	0.691219
Government expenditure on education	0.138411	0.758858		

Model 10: Gini Coefficient versus Trade and FDI

Independent variables	**B co-efficient(s)**	**P-value(s)**	**(Adjusted) R^2**	**Significance F**
Trade	-0.03315	6.27E-05	0.621371	3.32E-06
FDI	0.00377	0.766382		

Model 11: Gini Coefficient versus Trade and GDP per capita

Independent variables	**B co-efficient(s)**	**P-value(s)**	**(Adjusted) R^2**	**Significance F**
Trade	-0.01024	0.014387	0.885515	1.94E-12
GDP per capita	-5E-05	1.06E-07		

Model 12: Gini Coefficient versus Trade and Government expenditure on education

Independent variables	**B co-efficient(s)**	**P-value(s)**	**(Adjusted) R^2**	**Significance F**
Trade	-0.03195	-0.03195	0.624321	3.02E-06
Government expenditure on education	0.121966	0.121966		

Model 13: Gini Coefficient versus FDI and GDP per capita

Independent variables	**B co-efficient(s)**	**P-value(s)**	**(Adjusted) R^2**	**Significance F**
FDI	-0.00377	0.567113	0.854346	3.49E-11
GDP per capita	-6.1E-05	5.3E-10		

Model 14: Gini Coefficient versus FDI and Government expenditure on education

Independent variables	**B co-efficient(s)**	**P-value(s)**	**(Adjusted) R^2**	**Significance F**
FDI	-0.04292	0.001898	0.281704	0.007219
Government expenditure on education	-0.32437	0.329826		

Multiple regression models with three independent variables

Model 15: Gini Coefficient versus Inflation, Trade and FDI

Independent variables	**B co-efficient(s)**	**P-value(s)**	**(Adjusted) R^2**	**Significance F**
Inflation	-0.08236	0.270635	0.625646	9.95E-06
Trade	-0.03475	4.74E-05		
FDI	0.002576	0.838801		

Model 16: Gini Coefficient versus Inflation, Trade and GDP per capita

Independent variables	**B co-efficient(s)**	**P-value(s)**	**(Adjusted) R^2**	**Significance F**
Inflation	-0.08844	0.024386	0.904612	1.7E-12
Trade	-0.01236	0.002537		
GDP per capita	-5E-05	2.73E-08		

Model 17: Gini Coefficient versus Inflation, Trade and Government expenditure on education

Independent variables	**B co-efficient(s)**	**P-value(s)**	**(Adjusted) R^2**	**Significance F**
Inflation	-0.08627	0.317366	0.625019	1.01E-05
Trade	-0.0338	8.73E-07		
Government expenditure on education	-0.01646	0.951427		

Model 18: Gini Coefficient versus Trade, FDI and GDP per capita

Independent variables	**B co-efficient(s)**	**P-value(s)**	**(Adjusted) R^2**	**Significance F**
Trade	-0.0127	0.012051	0.885124	1.43E-11
FDI	0.006631	0.347904		
GDP per capita	-5E-05	1.3E-07		

Model 19: Gini Coefficient versus Trade, FDI and Government expenditure on education

Independent variables	**B co-efficient(s)**	**P-value(s)**	**(Adjusted) R^2**	**Significance F**
Trade	-0.03556	0.00011	0.614209	1.4E-05
FDI	0.008704	0.548464		
Government expenditure on education	0.196489	0.464039		

Model 20: Gini Coefficient versus FDI, GDP per capita and Government expenditure on education

Independent variables	**B co-efficient(s)**	**P-value(s)**	**(Adjusted) R^2**	**Significance F**
FDI	0.004823	0.453749	0.89048	0.89048
GDP per capita	-6.9E-05	4.38E-11		
Government expenditure on education	0.426659	0.006599		

Multiple regression models with four independent variables

Model 21: Gini Coefficient versus Inflation, Trade, FDI and GDP per capita

Independent variables	**B co-efficient(s)**	**P-value(s)**	**(Adjusted) R^2**	**Significance F**
Inflation	-0.08581	0.030323	0.903429	1.2E-11
Trade	-0.0143	0.003225		
FDI	0.005397	0.405827		
GDP per capita	-5E-05	3.95E-08		

Model 22: Gini Coefficient Inflation, Trade, GDP per capita and Government expenditure on education

Independent variables	**B co-efficient(s)**	**P-value(s)**	**(Adjusted) R^2**	**Significance F**
Inflation	-0.04483	0.273714	0.917141	2.26E-12
Trade	-0.01059	0.006236		
GDP per capita	-5.3E-05	7.05E-09		
Government expenditure on education	0.274467	0.045891		

Model 23: Gini Coefficient versus Inflation, Trade, FDI and Government expenditure on education

Independent variables	**B co-efficient(s)**	**P-value(s)**	**(Adjusted) R^2**	**Significance F**
Inflation	-0.07812	0.419274	0.608723	4.38E-05
Trade	-0.03497	0.000167		
FDI	0.003251	0.839341		
Government expenditure on education	0.024432	0.943047		

Model 24: Gini Coefficient versus Inflation, FDI, GDP per capita and Government expenditure on education

Independent variables	**B co-efficient(s)**	**P-value(s)**	**(Adjusted) R^2**	**Significance F**
Inflation	0.016769	0.752073	0.886032	7.34E-11
FDI	0.006129	0.430898		
GDP per capita	-6.9E-05	1.66E-10		
Government expenditure on education	0.466752	0.023806		

Model 25: Gini Coefficient versus Trade, FDI, GDP per capita, Government expenditure on education

Independent variables	**B co-efficient(s)**	**P-value(s)**	**(Adjusted) R^2**	**Significance F**
Trade	-0.01646	4.1E-05	0.947574	1.51E-14
FDI	0.02059	0.000885		
GDP per capita	-5.7E-05	3.21E-11		
Government expenditure on education	0.539856	2.38E-05		

Multiple regression models with five independent variables

Model 26: Gini Coefficient versus Inflation, Trade, FDI, GDP per capita and Government expenditure on education

Independent variables	**B co-efficient(s)**	**P-value(s)**	**(Adjusted) R^2**	**Significance F**
Inflation	0.012584	0.73227	0.94539	1.67E-13
Trade	-0.01644	6.12E-05		
FDI	0.021544	0.002041		
GDP per capita	-5.8E-05	1.18E-10		
Government expenditure on education	0.569762	0.000374		

Model 26 b) indicates the link between Gini Coefficient and Inflation, Trade, FDI without outlier, GDP per capita and Government expenditure

Independent variables	**B co-efficient(s)**	**P-value(s)**	**(Adjusted) R^2**	**Significance F**
Inflation	0.031202	0.272389	0.969027	2.39E-15
Trade	-0.01298	7.34E-05		
FDI	0.002135	0.748358		
GDP per capita	-5.7E-05	1.46E-12		
Government expenditure on education	0.631617	4.94E-06		

Table 3: Correlation Matrix

	Inflation	FDI	GDP per capita	Trade	Gov. ex. on education
Inflation	1.00				
FDI	-0.32	1.00			
GDP per capita	-0.28	0.56	1.00		
Trade	-0.36	0.72	0.74	1.00	
Gov .ex. on education	-0.51	-0.24	0.23	0.11	1.00