NEXUS OF TRADE AND INCOME:

A CASE STUDY OF THE DEVELOPING WORLD

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CERTIFICATE

This is to certify that this thesis entitled: **"Nexus of Trade and Income: A Case Study of the Developing World"** submitted by Ms. Tooba Mazhar is accepted in its present form by the Department of Economics & Econometrics, Pakistan Institute of Development Economics (PIDE), Islamabad as satisfying the requirements for partial fulfillment of the degree of **Master of Philosophy in Economics.**

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Author's Declaration

I Tooba Mazhar hereby state that my MPhil thesis titled **Nexus of Trade and Income: A Case Study of Developing World** is my own work and has not been submitted previously by me for taking any degree from this University (Pakistan Institute of Development economics, Islamabad or anywhere else in the country/world.

At any time if my statement is found to be incorrect even after my Graduation the university has the right to withdraw my MPhil degree.

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Tooba Mazhar

Dedication

This thesis is dedicated to my parents, who are the reason of what I am today; I thank them for their support throughout this journey and to my siblings who have been my inspiration.

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Abstract

This study investigates the impact of trade on low, middle and upper income groups within developing countries for the time period of 2000-2015. Panel data techniques fixed and random provided insignificant results, due to the problem of endogeniety I employed generalized method of moment which indicated that trade openness has positive and highly significant impact on income groups. However, the magnitude of impact is lowest for upper income group, and comparatively larger for lower income group. From this it can implied that the lowest income group gets most benefit from openness of trade due to the provision of cheap goods, increased employment opportunities as compared to the upper and middle income group. The GDP growth and employment are positively and significantly associated with income groups. Human capital inflation and investment revealed negative relation with income groups. Policy makers should focus on making effective trade policies in order to yield increased income and growth in the long run for all income groups in developing nations.

Keywords: Trade, Income groups, GMM

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Chapter 1: Introduction

1.1 Background of the study

Over the years, it has been observed that world economy has been created by the integration of countries through liberalization of trade. Especially in second half of the twentieth century, when the governments of the developed nations realized, that no country can achieve maximum economic success without being open to the rest of the world. This realization resulted in integration of international capital markets and international migration which lead world towards trade liberalization. This process is also known as the reverse process of protectionism. Since then, many governments reciprocated each other's liberalization decisions. These decisions were non-discriminatory in applying to all liberalizing partners.

The outcome of these integrating as well as liberalizing processes resulted in globalization. The term globalisation refers to the integration of national markets into global markets. Due to Globalization, multilateral trade liberalization and the regional agreements reduced trade barriers among the richer countries. Restrictions on international capital market transactions were lifted. It was also facilitated by ease of international communications. In addition to it, the patterns of trade changed that had previously been based on the richer countries trading among themselves, importing raw materials and low valued goods from poorer countries.

Consequently both globalization and trade liberalization lead the world towards trade openness. Trade openness is the ratio of trade (imports & exports) to GDP; bring economic benefits, in terms of transfer of technology and skills from developed nations to less developed nations. Openness of trade resulted in increased demand of skilled

labour, total factor productivity, thus overall increasing growth and development all over the globe.

With the emergence of the trade liberalisation, the debate about the effects of openness on economic growth and income also emerged. According to standard factor proportions theory, trade will have an equalizing effect in less developed countries, while it will increase income and income inequality in highly developed and rich economies[1]. However, this theory was criticized and was not proved by the data, as some East Asian countries showed that trade decreased income inequality. Moreover, several Latin American countries experienced worsening of income distribution with trade openness. Due to unavailability of data, evolution in this area was hindered. Deininger & Squire, (1996) also published data set on income inequality. The data made difficulties for the policy makers in reaching the conclusions, showing mixed results. Also, conclusions drawn were not in accordance with theoretical models.

The impact of trade openness on the level of income has always been a topic of debate amongst policymakers and analysts, especially for the developing nations and their future trade policies. Trade has been a regarded as an engine which promotes economic growth by creating an environment through which quality goods are produced. Considering the literature, trade has been regarded as the prime cause of economic growth, although it has never been occurred as the robust predictor of economic growth (Ravallion, 2004). The main objective of trade liberalisation is to provide better living to the whole world through international market. It also fosters economic development and reduces poverty which deals with how much developing nations or more specifically poor class economically grow. Also Pro-globalization is

[1] Taking skilled and unskilled relative wage as a proxy of income inequality.

of the view that trade openness helps growing poor. But the skeptical view is that the benefits from trade openness don't really go to the poor. Likewise, it has been observed that trade openness give rise to welfare in an economy. Nevertheless the pattern of the distribution of the welfare is observed to be uneven and small (Saintos, 2012)

Trade openness and Macroeconomic indicators of the economy:

Since 60's the policy makers and economists started to analyse this welfare and the economic impact of trade openness on different macroeconomic indicators of the economy. Because worldwide all nations wanted to achieve sustainable economic growth. Different macroeconomic indicators are expected to be correlated with economic growth and trade openness. For example, the more trade in an economy, it is expected that there will be more economic growth, which effects all the major indicators of the economy positively i-e investment, employment, human capital etc. As WTO (2003) states that trade openness will have positive and long term impact on economic growth provided that will increase rate of investment and help in rapid transfer of technology and its growth.

Also, Spagnoli (2014) in his study found employment is positively associated with gross domestic product and trade openness; as agriculture sector of a country improves it increase employment, which in turn increase in more exportable agriculture products, hence increasing international trade. Consequently the terms of trade will affect economic growth of an economy positively.

The exchange rate is also regarded as an important component in the growth of an economy, because when the currency of a home economy appreciates, it increases imports which are less expensive. This process leads the importer country towards more

value addition of its products that are to be exported, resulting in increased trade and beneficial impacts on the domestic economy. In case of the depreciation of the domestic currency, the exports of a country become less expensive for other importing countries. Hence the increased exports will result in more trade and more income, economic growth and stability. Both depreciation and appreciation of the exchange rate depends mainly on the level of development in an economy. For instance if an economy is more specialized in manufactured or capital goods, the appreciation and depreciation of the exchange rate will leave a beneficial impact on the economy. If the economy is more specialized in raw materials or semi manufactured goods, the economy will not get the desired benefit and will have low growth (Huang & Malhotra, 2004).

Since trade liberalization occurred it has been observed that openness of trade has a positive relation with overall consumption especially for developing nations. As trade increases in an economy, the consumers demand for imported goods increases. Because the prices of these imported goods are lower than locally produced goods. These lower prices are due to several reasons like better technology, lower labour costs etc. of the exporting country. The lower prices benefit the consumers of the developing nations, especially when the imported goods are in their consumption basket (Ural Marchand, (2017).

Like other indicators of economic growth, investment also plays a crucial role in the policy making of an economy. If investment in an economy increases it results in more income, the more the income of an economy the higher its Gross Domestic Product will be. The researchers also find out the positive and significant impact of gross domestic product on foreign direct investment in an economy (Mody, 2007).Furthermore, it was found that international trade has a direct impact on growth of an economy through foreign direct investment. Te Velde (2001), indicating that foreign direct investment

impact economic growth through transfer of technology, accumulation of capital, the increased and easy access to the global market, also result in more employment creation and better managerial as well as marketing practices.

Karbasi et al. (2005) estimated the role of trade openness and investment in promoting growth of an economy for developing nations and found a positive and significant effect of both of these variables on economic growth of these countries; they further indicated that this positive effect is coupled with the human capital, economic policies and stability of institutions.

Fogel (2006) forecasted that for a developing economy like China in order to achieve its objective of quadrupled gross domestic product by year 2020, the major priorities should be given to the more investment in promoting quality of education, the political stability of a country, the quality of the major institutions. In short, the most of the literature supports the view that as the investment rate increases in an economy, it increases income and economic growth.

Along with other major components, the key aim of the policy makers of the economy is to make such policies which put the economy on the path where it attains sustainable growth but with less inflation. Because with high inflation the economic growth is difficult to achieve. Also it is highly dependent on the economic state of a country, that whether the increase inflation will affect it positively or negatively.

In case of a developing country the more inflation will have disastrous effects on the economy, where as in case of developed economy the high inflation may not cause greater harm. Therefore low rate of inflation is considered favourable and an ultimate objective for economies to attain sustainable and high economic growth.

A favourable trade balance also considered as an important component of an economy's strength. As liberalization of trade occurred, the importance to measure economies relative strength also emerged. The economy was considered strong which had more exports than imports or at least equal imports and exports. To increase economic growth the economic advisors advice trade balance should not be in deficit.

This whole process of trade liberalization and its relation with macroeconomic indicators of economic growth has pushed interest of policy makers and researchers towards measuring effect of openness on the countries that indulge in trade. It further encourages debate on the economic and financial benefits and costs of trade. As the World Bank in 1990's found as trade liberalisation occurred, it increased the income per person to 5% for 3 billon people. This indicates that the economies that open their doors towards trade their growth rates increase. In addition to it, the international monetary fund is of the view that the economies which trade less have more volatility to debt related crises. The economies which have low export revenue are having more debt service which includes mainly least developed economies.

While some researchers have pointed towards the benefits an economy can derive from trade liberalization, others are concerned with the downside of trade; mainly income inequality and income volatility. Matters related to income disparities have still not been addressed properly and conclusively in the literature. Therefore, the main focus of this study is to investigate the relationship of trade openness with income groups within the economy.

The sole aim to investigate such impact is to get the clear image of the effect on each income class within the economy. As previously, the generalized effect of trade on income has been investigated, or the economies based on World Bank classification of

the income groups (country wise) were examined, but within country trade effects on income has never been explored before.

Also this study intends to deviate from the traditional international trade and income literature, and attempts to take a step further to investigate the effect of trade openness on different income groups of the economy. This aspect of the literature is underexplored and it needs comprehensive answers, from policy perspectives. It can be possible that the trade liberalization may be affecting different income levels in an economy differently.

Considering H-O model as a base, as it suggested that trade openness affects different income groups differently. The model states that the abundant factor gains from trade and the scarce factor losses from the trade openness. Linking this argument with income-trade nexus, we can imply that the trade openness may be affecting upper income group in an economy more, and maybe adversely affecting the lower income groups or vice versa.

1.2 Problem statement

The scope of trade liberalization has been broadened for the past three decades, especially among developing nations. This is due to the development strategies that leverage trade for increasing growth and pace of development, and the growing role of International Monetary Fund and World Bank.

Since then, the issue of how or to what extent trade openness affects economic performance of a nation has always been a subject of interest and debate among policymakers. Most of the studies carried out are general which only considers the relationship between trade and income and theoretically controversial, revealing mixed results.

While sector (industry, agriculture and service) specific benefit of trade openness has been explored recently (Tahir et.al, 2019), still the effect of trade on different income groups within a country has never been properly explored yet again, especially for developing countries. This study seeks to investigate the same relationship as done previously in different studies. However this study seeks to focus on segregation by income levels within country. The main objectives of this study will be, to find out which income level within country benefits most from trade liberalization, and in general what are impacts of trade openness on different income levels within developing countries.

To explore these relationships, the data from World Bank, Penn world tables and Global Consumption and Income Project, which compares disposable incomes across countries, is used.

1.3 Research objectives

Based on the preceding discussion, the specific research objectives that emerge for this study are as follows:

1. To quantify the impact of trade openness on different income levels.
2. Compare the impact of trade openness across different income groups.

1.4 Research questions

To achieve the objectives of the study, the following research questions will be answered through quantitative analysis:

- Does trade openness have a statistically significant impact on income groups within a country?

- Which income group is most affected by trade openness, and which one is least benefitted by openness of trade?

1.5 Significance of the study

It is an undeniable fact that trade openness and income has positive relation which means income will increase with increase in trade openness, thus the standard of living of the people. Vast literature is available on the topic; however, limited work has been done on the impact of trade openness on levels of income within countries. The proposed study recognizes the importance of this dimension and analyses the impact of openness of trade on income levels and growth. This type of study should provide useful insight for the design of trade liberalization policies.

1.6 Organization of the study

The remainder of the thesis is organized as follows. Section 2 reviews literature linking trade openness, income and growth. Section 3 discusses theoretical and conceptual framework and methodology adopted for analysis. Chapter 4 summarises the empirical results derived from analysis. The last section concludes the study and outlines main policy implications.

Chapter 2: Literature Review

2.1 Introduction

The main focus of this study is to analyze the impact of trade openness on different income levels. It is crucial to revisit the literature to know how the trade controversy emerged, what were the criticism and the issues in the previous literature. Moreover, it is also important to explore the effects of trade openness on income.

This chapter is divided into three parts. The first part briefly describes all the controversy behind the relationship of trade openness and economic growth along with the evolution of theoretical and empirical literature with time. The second section covers issues in measuring trade openness. Third section includes brief survey on the relationship amongst trade openness and income growth.

2.2 Trade openness and economic growth

Trade openness and economic growth is one of the most discussed areas of international economics because to have higher economic growth trade is a necessary element. Trade not only increases growth of the economy but also raise income levels with in the country. For decades, researchers are trying to find a decisive answer to the question whether trade causes growth or it is harmful for the economy's growth. One strand of literature is in favour of trade and economic growth (Ram, 1987; Michael & Ruhwedel, 2005; Mahdavi & Javadi, 2006), while the other strand is in favour of tariffs and protective policies (Prehisch, 1962; Kavoussi, 1985; Taylor, 1991; Musila & Yiheyis, 2015).

Before the issues of measuring trade openness and economic growth controversial relationship arise, there were two parallel ideologies prevailing. One, which was

presented by classical economists, that law of diminishing returns in primary production and law of increasing returns in manufactures, will lead towards increasers in any country's terms of trade. The industrial revolution would trigger the economic integration and it will lead towards higher gains and prosperity for the individual countries.

Second school of thought was of the view that the above mentioned ideology will only benefit the developed countries. In order to protect the developing or under developed countries, the infant industry argument was presented. It doesn't only occur in the literature but most of the countries actually applied that, they were wise enough to know that more trade and economic unions will always be beneficial for the British and other developed economics. Consequently, they will continue producing raw materials, and the developed nations will kick the ladder which they used to reach to the heights. (Chang, 2002)

The earlier studies tried to find the positive relationship amongst trade openness and economic growth. Although all the studies contributed to the literature, still the most prominent and influential studies were by Sachs and Warner (1995); Frankel & Romer (1999); Dollar & Krayy (2003). According to Sachs and Warner (1995) there was fast growth in the per capita GDP and annual growth was also observed to be high especially for low income countries. This indicated that the economic growth has increased incomes of the economies, but they were criticized for the use of the measures which were based on the factors of trade instead of the policy.

Frankel and Romer (1999) used geographical variables to analyse development levels and found out that a rise in trade integration doubles the income levels of a person. Dollar & Kraay (2003) used similar measure to examine the growth of per capita GDP

and concluded that as trade increases the growth rate also increases by 2.5 percentage points. Edwards (1998) presented different ways through which an economy can be protected from competition with other countries. He found out that total factor productivity growth is more in economies who are open to trade and are not restricted. Willard (2000) illustrated considering previous literature, it is obvious that it is trade openness which triggers economic growth not the other way round as believed by some researchers.

Early literature i.e. 1990-2000 gave us a clear image that there exists a positive and significant relationship amongst trade openness and economic growth, and it claimed to have a robust relationship not on to the factors of openness but also to functional form, time span , econometric techniques (see Edwards,1998). These all studies compelled policy makers and researchers to believe there exists positive relationship between trade liberalization and economic growth.

However, Rodriguez & Rodrik (2001) criticized the above studies by pointing out methodological errors and conceptual issues. Before his famous paper "Trade Policy and Economic Growth: A Skeptic's Guide to the Cross-National Evidence'', the trade growth nexus was going towards a smooth conclusion, however after his study, questions were raised whether trade has positive effects on growth. Several studies were conducted in that era, which highly contributed in making trade-growth nexus a controversial topic in international economics literature.

For example, Jones (2000) was in favour of free trade. He concluded in his study that trade barriers are harmful for income growth. On the other hand, Yanikkaya, (2003) estimated the effect of trade barriers on economic growth, and found out that trade barriers are significantly and positively associated with the economic growth especially

for the developing nations, there results were consistent on the theoretical basis. Bhagwati & Srinivasan (2001) revisited the criticism and found out that the criticism has no sound roots. Fiestas (2005) tried to find whether the criticism holds and stated that, keeping methodological issues and errors aside, there is no strong evidence over the negative relation between trade and growth.

Wacziarg & Welch (2003) revealed that the those countries which were liberalized and were practicing free trade policies faced higher growth rates annually as compared to those which practiced protectionist policies. Rodriguez (2007) reviewed all the studies which were criticized and concluded that the measures of trade policy are not associated with economic growth. Moreover, Hallak & Levinsohn, (2004) believed that the econometric regressions employed in earlier studies were too simple, for finding the relationship amongst both variables.

Krueger and Berg (2003) did a comprehensive research on trade growth nexus. The study employed cross-country and panel analyses, included individual firm level studies as well as industry level. In addition to this, they also added case studies. They concluded by running regression through all, that trade has a positive and strong relationship with economic growth. Winters (2004) stated that, although there are some issues related to the relationship amongst these two variables but overall his results were in favour of the relationship.

Lopez (2005) did a research on plant level and his result revealed that in developing nations more trade brings more productivity and more growth to the economies. Babula & Anderson (2008) revealed positive association; however, they wanted developing world to follow the empirical research and the solutions presented in it to address the

issues. For example endogeniety, prevailing in the trade growth way, in order to gain productivity growth using trade openness.

Stone & Strutt (2009) supported the view that trade causes growth and the main ingredient that helps accelerating trade is infrastructure. Mendoza (2010) concluded that the relationship amongst openness of trade and economic growth yields mixed results and it is conditional to the situations prevailing or in which the studies are carried out. Bruckner and Lederman (2012) found increase in openness of a country increases both short and long run growth, having greater effect on the latter.

Chang et al., (2005) discussed that openness will be greater if it is aided by higher investments in human development, integrated markets, and well developed infrastructure. Foreign direct investment policies are crucial in this regard, in order to grasp the fruits from trade liberalization, and trade must be accompanied by financial liberalization. This is the only way to achieve higher growth (Cuadros et al., (2004).

In addition, a recent study showed that the impact of openness of trade has positive and significant impact on growth although this impact has been weakened by poverty and income inequality at national and provincial levels (Arabiyat et.al, 2020)

Researchers who were in support of free trade, for example Warner (2003) rejected Rodriguez and Rodrik (2001), by showing that there exist a non-positive relationship amongst trade barriers and economic growth. The earlier researches (Romer, 1990; Grossman & Helpman, 1990; Rivera-Batiz and Romer, 1991a, b; Matsuyama, 1992) showed mixed results, of increase or decrease of economic growth with trade barriers. However, they believed that the mixed results are because the samples are of different nature, but then again the similar countries also have different endowments, expertise and skills of the manpower so that also yielded different results. Resultantly, if the

economic integration leads the whole world towards improved growth rates, it is possible that it is not better for individual countries (Grossman and Helpman, 1991a, b; Lucas, 1988; Rivera-Batiz & Xie, 1993; Young 1991). It has been observed that trade growth literature, has diverse kind of models which showed increase or decrease in growth due to trade barriers.

Several researchers tried to answer the critique raised, like open economies are generating more economic growth as compared to closed economies. Nonetheless, due to the bias in the answers they never came up with the same conclusions.

2.2.1 Trade openness in Developing Nations:

The trade growth nexus in terms of developing economies remained always an interesting topic in literature for researchers. It was generally believed that openness trade has proven to be beneficial in case of developing economies. Also the gradual liberalization of trade, the outward orientation and the investment in some East Asian countries i-e China, Singapore, Hong Kong have positively and significantly contributed to their sustained economic growth. This further shifted the focus of the researchers towards developing nations and their trade policies and their effects on income and economic growth.

For example Michaely (1977) estimated trade and growth relationship by employing simple correlation techniques for sample of 41 developing countries; he found a strong positive relationship between trade and growth. He further concluded that the protectionist industrialization policies had adverse effects on economic growth. Jung and Marshall (1985) investigated the relationship between economic growth and trade openness for a sample of Southeast Asian countries and found out mixed results. In case of Thailand the economic growth was the cause of expansion of exports, while in case of Indonesia he found out that increase in exports caused economic growth. Taiwan and

Philippines failed to prove any causality relationship among trade and growth, while Korea experienced low growth rate due to increased exports.

Lin (2000) has investigated the same relationship in case of China and found out the rate of growth of export; import, volume of trade and labour force all are directly and positively related to economic growth. Furthermore the causality between trade and growth in case of China was also proved by (Liu et al, 1997).Wei & Wu (2001) in their study found that trade openness helped in greater decline in Chinese rural-urban income inequality.

Goldberg & Pavcnik (2007) also tried to find the nature of relationship of trade and income growth for the panel of developing countries and found out that the benefits derived from globalisation depends upon specific factors i-e country, time and case specific.

Gries et al. (2009) found insignificant relationships among trade and growth in the longer-run. They showed economic growth propelled trade in Gabon, Senegal, Mauritius, Ethiopia, Togo, Kenya, Sierra Leone while bi-directional causation was observed in Cameroon, Cote d'Ivoire, Rwanda, and Nigeria. Found no causal relationship between trade openness and economic growth in South Africa, Ghana, Gambia, Burundi, and Madagascar. Hussain, Chaudhry & Hassan (2009) explored the effect of openness on income distribution by employing time series approach, for the sample period of 1972-2005 in Pakistan and found out evidence in favour of the conventional wisdom that opening up of the economy into the international market has good effects on the distribution of income.

Akilou (2013) also examined the bidirectional relationship of trade openness on economic growth for the West African Economic & Monetary Union countries and

found out that all countries except Côte d'Ivoire, trade openness doesn't cause growth in those nations, and also growth was also not causing trade openness. Belloumi, M. (2014) examined causal relationship between foreign direct investment, trade openness and growth in Tunisia from 1970 to 2008 and found out that there exists the long-run causal relationship, results also indicate that there is no significant causality from trade to economic growth and from economic growth to trade in the short run.

Moreover, 40 Sub-Saharan African countries were investigated by Safiyanu & Chua, (2020) both for short and long run. They employed Cross-sectional Augmented Autoregressive Distributed Lag model, and found that in short run, trade has increased economic growth , but in long run it has negative as well as significant relationship with growth. Therefore they concluded that to have high effect on national income and economic growth the sub Saharan nations should modify their trade structures the policies by divert their exports from raw materials to high end products.

2.2.2 Trade openness in Developed Nations:

It was observed that those countries which have better liberal trade policies have better growth rates, as well as growing ratios of trade, investments and national incomes, Drabek & Laird (1998).Tyler (1981) confirmed positive relationship between exports expansion and more production, and emphasizes on the countries to have certain level of development to ripe potential benefits of expansion of exports especially in case of capital goods. In the same vein, Bayoumi et al. (1999) identified that through research and development, trade openness play major role in promoting growth in developed as well as developing countries.

Coe and Moghadam (1993) investigated trade openness for France; he suggested that openness and capital have positive impact on growth and income of the country. Rodrik (1995) investigated the causality relationship between openness and growth for Korea,

Taiwan, Chile, and Turkey. That study showed a causality relationship from growth to openness in Korea. In Taiwan, however, there was evidence of bidirectional causality but there was no causality found between growth and openness in Turkey.

Kipici (1996) tested Harberger Laursen Metzler hypothesis for Turkey and concluded that when terms of trade improves, the real income level of a country increases. A part of that increase will increase savings hence improvement in terms of trade improves trade balance, which increase income and economic growth in Turkey. Dutt & Gosh (1996) found a one way relationship in the period 1953–1991 from exports to economic growth in Israel as well as Turkey, while in Morocco he found two-way causality between both variables

Smeeding, (2002) in his study found income inequality due to globalization has not risen markedly in countries like Denmark, Germany, France, and Canada while its rise has slowed during 1990s in many other countries. The reason for rising inequality in developed countries can be many; one ultimate reason cannot justify this relation. Also he hasn't found any evidence that trade openness is bad for rich economies, therefore suggesting the openness is not the reason of inequality among different income groups, the domestic institutions, polices have larger effects on income distribution in richer nations than trade openness or globalization has.

2.3 Issues with measuring trade openness

The definition of trade openness in the literature is not very clear. Firstly, there were ambiguities in the theoretical literature mainly with cross-countries analysis (Winters, 2004). But with the passage to time, the definition of openness has evolved. It was considered that the ideal measure of the trade openness must be an index which counts all the barriers/distortions that comes in the way of trade.

To measure trade openness, different researchers have used different measures (Alcala & Ciccone, 2004). A number of studies calculated trade openness by the data available while other build up their own indices to measure trade openness (Leamer 1988, Dollar 1992, and Sachs et al, 1995) one of the prominent study is of Anderson & Neary (1992), who introduced an index which measures trade restrictiveness of both trade and non-trade barriers. However, their index was limited to small samples and was not available for a large sample of countries.

The most basic and extensively used measure of openness nowadays is trade shares, which is defined as the addition of export and import divided by gross domestic product. This measure is used initially by Harrison, (1996). He concluded that there is strong and positive effect of trade on growth. Later on Frankel & Romer (1999) controlled geographical variables, to measure openness, and concluded that there is same effect of trade on growth. Rodrik et al. (2002) reinvestigated both indices and found out that geographical variables as well as trade shares doesn't hold their significances when regressed with institutional quality variables proxied by rule of law and property rights.

Some researches shifted their focus towards measuring trade openness with average rates of tariffs and found out negative relationship with economic growth (Lee, 1993; Harrison, 1996; Edwards, 1998).These tariff rates includes, average tariff rates, indices on non-tariff barriers, export taxes, total taxes. All these openness measures had issues in measurement, for example, if collected tariff rates were considered as openness index, defined as the ratio of revenues of tariffs to values of imports. They may be misleading as collected tariff rate underestimates the actual tariff rates.

One of the major issues of these indices is that the theoretical literature is still inconclusive about the effect of trade restrictions on economic growth which empirical

literature has ignored largely. Consequently the majority of the studies state that the tariffs are always bad for the economic health of a country, which out taking account of the size or level of a development of a country.

Rodriguez and Rodrik (2001) also used average tariffs in their analysis from the World Bank. Their sample size was of 43 countries, for the time period of 10 years starting from 1980 till 1990.They concluded that average tariff rates are positively and significantly associated with growth of total factor productivity. But their findings have limitations, as the size of sample countries and time period was small. When they ran same regression with increased sample size of 66 nations. The coefficient of import duties turned positive and insignificant. Furthermore Rodrik (2001) showed positive association between import tariffs and economic growth graphically for the 1990's.

Bilateral payments arrangements are also used as a measure of the trade openness of economies. Basically it is an agreement between two countries that are trading with each other. This agreement describes the method of trade balances settlement. These arrangements were used in the post second world war period by the countries to finance trade with non-dollar world, as most nations were facing difficulties in finding hard currency. Different researchers were of the view that these agreements should be considered important steps in the way of more liberal trading and payments regimes, as in initial days of the post-war period international trade was under severe restrictions (Triffin,1976 & Auguste,1997).

Where Trued & Mikesell (1955) showed evidences of these discriminatory practices. Auguste (1997) argued about the effects of these agreements on economic welfare in the context of customs union theory. He concluded that considering assumption of the misalignment of the exchange rate and inconvertibility of the currency, bilateral

payment agreements can be beneficial for improving welfare, although they discriminate against non-member states. This positive relation is a result of the trade creation effect of the bilateral payment agreements. As both nations are likely to face a constraint of foreign exchange on bilateral trade on margin, these agreements permits both nations to trade with each other. But it is also evident from the custom union theory that such agreements cast negative effect on the welfare of the economy by distorting the direction of trade.

To measure trade openness population densities are also used in growth regressions. The densities are formed as the ratio of total population to total area, indicating the higher ratios, the more open economies. This index is used because it is considered that, the countries with higher densities are more likely to be open and have more international contacts (Sachs & Warner 1995, 1997 a, b).

One of the trade openness measures is the exchange rate. The most commonly used measure in the category of exchange rate is the black market premium that shows the success of the rationing function of prices in the foreign exchange market. Edwards (1992), Sala-i-Martin (1997) and Clemens and Williamson (2001) used this measure found out that the relationship between tariff rates and growth is not strong.

However, subsequently, Rodriguez & Rodrik (1999) revisited and they concluded that it is not a correct measure as it is linked with such outcomes which are not good for economies health such as high inflation, external debt problems, high degree of corruption, a less reliable bureaucracy, and ineffective law enforcement. So, it is difficult to use this variable as an indicator of any one policy. Thus it provides misleading results and cannot be used as a measure of the severity of trade barriers.

Also there are indices of trade orientation (such as Leamer's, 1988 openness index, Dollar's, 1992 price distortion and variability index, and Sachs and Warner's, 1995 openness index) that are constructed by some authors to test the effects of trade openness on growth. The basic claim of these studies is that outward-oriented economies have consistently outperformed inward-oriented economies.

David (2007) had reservations about these indices and therefore the rest of studies did not regard them as a perfect measure. Because in many cases, the openness indicators that are used by the researchers and policy makers are problematic. The reasons are, the measures associated with the barriers of trade are highly dependent on other sources of weak economic performance. Also in some cases relationship between trade policies and growth have shortcomings. When these shortcomings were removed it resulted in weaker findings.

Resultantly, the conclusion from these studies is that these indices have serious shortcomings in measuring the trade orientation of countries. Therefore, the relationship between openness measures and economic growth/ income is not as robust as previously suggested.

Thus, we will not rely on these indices to measure the effects of trade policies. Rather, this study will use the most common and mostly used index that is trade shares. Although this measure is also criticized but it is easy assessable and reliable, as discussed above, it is much better and direct measure of trade policies and it is used by many researchers over decades.

Secondly, the endogeneity issue has caused serious problems and uncertainties, till date, it is difficult to analyse whether its trade liberalizations which enhances economic growth, or the economic growth through which trade openness is stemmed, or both have

causal relationship (Babula & Anderson, 2008). Frankel and Romer (1999) used the gravity model to solve this issue but this approach was criticized by Rodriquez (2000) as adding non-trade effects into the model. Furthermore, many researchers tried to solve the issue by introducing newer directions and techniques (Tahir & Norulazidah, 2013; Bruckner & Lederman, 2012),

Thirdly, it has been considered that in order to find exact relationship one has to choose different kind of sample. Only then, one can conclude something about the relationship among trade and growth. In this regard efforts have been made by some scholars, (Greenaway et al., 2002; Ackah 2008; Sarkar, 2007 and Shamsadini et al., 2011)

Also, the data selected should be from reliable sources such as International Monetary Fund, World Bank, OECD and Penn World tables in order to minimize biases in the results.

The issues mentioned above were the hurdles faced by researchers in reaching a robust conclusion and relationship of trade openness with major independent variables like economic growth and income. The contributions of different researchers who specified different ways, in literature to examine the impact revealed new insights and made this controversial relationship clearer than before.

2.4 Trade openness and income

Keeping these all issues it has been clearly seen that the impact of openness of trade on economic growth is still inconclusive. This study primarily focuses on finding the relationship between trade openness on income growth, and a brief review of notable studies in this area is presented here, in order to know the traditional effect of trade openness on income as it is the basis of the study.

One aspect of literature is, there exists positive links between trade openness and income, Salinas & Aksoy 2006; Rassekh 2007; Freund & Bolaky 2008; Chang, Kaltani, & Loayza 2009; Dufrenot,, Mignon & Tsangarides,(2010).; Squalli & Wilson 2011; Sakyi et al. 2012), while some researchers have shown contrasting results, (Dowrick & Golley 2004; Kim & Lin 2009; Kim 2011).

Kim, Lin, & Suen (2011) found out that trade benefits richer countries more than the poorer ones, because the less developed countries lack the manpower planning, skills accumulations and technology innovation. Manole, & Spatareanu, (2010) re-examined panel of developed and developing nations and concluded that more trade protection will lower the income of a country, and higher trade will have yield higher incomes within a country. Some studies also found out the bidirectional impact of trade openness on income, both in short and long run.

Trade and income relationship has been investigated in different ways; Noguer & Siscart (2005) extended Frankel and Romer methodology to find out the impact of trade openness on income. They found out that instrumenting trade yields positive impact largely. Frankel and Romer model also reinvestigated the relationship by considering distance not static, and revealed that result of their estimations of Frankel and Romer are robust (Feyrer, 2019), whereas in order to see trade openness and income distribution relationship found out the countries having more skilled labour have better income distribution patterns, while the countries that are more land and capital intensive have unequal patterns of distribution (Spilimbergo, Londoño, & Székely, 1999).

Zakaria, & Fida, (2016) tried to find trade openness and income inequality relationship for the SAARC region and found out that the policies related to trade liberalization are root cause of increasing income inequality due to trade openness. Also Munira et al

(2013), tried to find out whether trade has significant relation with income inequality, rejects the rationale of trade liberalization that it promotes income equality and its distribution. In case of same relationship investigated by using BRICS nations, it was observed that trade openness has worsened income distributions within countries (Mahesh, 2016).

It has been found out that income distribution in those developing countries which were trading with developed countries faced high unequal income distribution within them, in both scenarios i.e. imports and exports (Meschi, & Vivarelli,2009), while some researchers have presented their novel views to tackle the issue of income distributions (Waugh,2010).

A vast literature is also available focusing on the specific regions, for example, the Asian region is investigated by Das and Paul (2011) who employed GMM, and found out that trade openness has positive and significant effect on income. While investigating same effect for Latin American and East Asian region the researchers tried to extend research by giving special attention to trade policy interventions concluded that exports and income growth was better in LA than EA (Duran et al, 2008).

Nelson & Zolnik (2013) regressed trade on income, by employing notable panel data techniques for several regions, for Latin American and Caribbean they found out that trade and income has positive and significant relationship. Another comparative study is conducted by Camarero et al (2016) between Latin American and Asian region, by considering structural breaks and cross-country dependence. Their results suggested positive relationship with both regions but trade was more in magnitude with Asian region.

Based on the above discussion, we can conclude that not all the countries can ripe potential benefits from trade openness it depends on their policymakers decisions, and several other related factors which lets a country to get maximum benefits from trade liberalization. Although, one cannot deny the fact that income level of a country plus its trade structure are the two key determinants of economic growth for any country.

2.5 Gap in the Literature

Based on the discussed literature related to trade openness and income groups in preceding sections, it is evident that the relationship of trade openness with income has always been controversial, and it has not been solved yet. In addition to this, there appears to be no empirical analysis of the impact of increased trade on income groups within countries. This study aims to contribute to this area of research by investigating the relatively unexplored aspect i.e. impact of trade openness on income groups. Furthermore, this study will also contribute to the literature by providing a comparative analysis of degree of impact by income groups.

Chapter 3: Theoretical Foundation and the Model

The relationship of trade openness and growth or income being a controversial issue remained always in the debates amongst researchers and policymakers. This is explained in terms of theory and major concepts in the succeeding sections.

3.1 Theoretical Foundation

The relation of openness of trade and economic growth is mentioned in the models of the international trade. The prominent economists, Adam Smith and Ricardo were of the view that liberalization of trade encourages specialization in the production activities and the efficient as well as optimal distribution of the recourses in an economy. Both, Smith and Ricardian models argue that due to trade openness the countries specialize in those products for which they have relative labour and productivity advantage than other nations, hence will export those good and economically grow. Furthermore, the sectors of the economy which cannot stand foreign competition should be shifted in other sectors where they can be better utilized, resulting in better resource allocation.

According to famous Heckscher-Ohlin model, an economy exports those goods which are made by use of the abundant factors present in the economy. When openness increases it shifts the resources of the country to the sectors that draw abundant factor. Consequently more production in economy will occur, increasing exports, income and economic growth (Lopez, 2005)

From the theoretical literature, it is evident that the rate of growth is associated with the degree of openness of an economy. For instance, Rybczynski theorem states that the increase of capital in an economy will hamper production of capital intensive goods in an economy, while production of the labour intensive goods will decrease. The country where there is abundant labour, the increase in capital will lower trade in that country. On the other hand, the country will do more trade where there is abundance of capital (Akilou, 2013).

In the growth models, the relationship of trade openness and economic growth is presented in different ways. If neoclassical growth models, Solow Growth model is of the view that there is temporary impact of trade openness on economic growth. In addition to it, the other models such as the optimal-saving mode and Ramsey growth model, states the progress of technology and the growth rate of output is exogenous. We can conclude from neoclassical growth models that as technology is exogenous according to them, the trade policy of a country will not have any effect on its technology.

But the theories related to endogenous growth, pioneered by Romer (1986, 1990) stated that the relationship between trade and growth exists. The reasons are that in endogenous growth models the learning by doing concept is followed as in these models the technology is considered endogenous. Due to openness in an economy, the countries specially the developing nations, increase their productivity and efficiency by using new technologies hence increasing income and economic growth of an economy (Jin, 2000).

Also other researchers supported this view like Grossman and Helpman (1992) and Harrison (1996), that as trade in a nation increases, the effect on technology is also

positive. The reason is that the imports will increase with certain degree of openness. These imports contain the goods and services that are having advanced technologies from the trading partners. Through these high end imports, the domestic firms will be able to specialize in research intensive production thus increasing trade, growth and income.

Also since introduction of trade openness, the effect of trade liberalization on economic growth is considered ambiguous. In the empirical literature, the protectionist policies were considered beneficial for developing countries. Levine and Renelt (1992) found that trade openness and foreign direct investments are directly related, if there is reduction in tariff rate it would affect economic growth in long run. It can also be inferred from these findings that those firms which will not be able to compete with foreign firms, will eventually shut down. Thus, we conclude that the effect of openness depends upon which of these effects are larger.

Batra and Slottje (1993) also suggested if trade barriers will be removed it will decrease the overall domestic production of the economy, which will exert pressure on domestic prices of goods and services to decrease. Grossman and Helpman (1991, 1995) found that trade will effect growth, if the reduction of tariffs will increase allocation of resources, research and development of economy. If the reduction in tariffs failed to increase research, development and efficient allocation of resources the trade will decrease economic growth.

Rodrik & Rodríguez (2001) found impact of openness on growth is uncertain. Bernard & Wagner (1997) concluded that exporting firms were more productive than firms that focused on the domestic market. Dowrick & Golley (2004) supported this argument and found evidence that those nations which were in the category of developing

countries in 1960 to 1970s when rapidly grew due to openness, became developed nations. But after a decade it was found that the effect of trade openness on developed nations was more than the less developed ones or the ones which were developed recently.

From all the discussion above we can sum up basic theories related to income are three, endogenous growth theory according to which trade enhances growth and income through different factors presented below. The second approach is related to neoclassical theory which states through trade liberalisation the level of income in a country increases, it does not have long run effect on growth. The approach related to institutions is not incorporated in trade theory yet, however it has been considered that without updated and basic institutions trade openness cannot provide desired results.

The theory of endogenous and exogenous growth forms the basis of the research area for this study. According to the literature on trade and growth, it is considered that growth and development arise from the degree of openness of trade of a country. This is witnessed through technological processes and increased domestic and foreign competition. Both models are concerned with several factors but focus primarily on knowledge accumulation which is derived from trade liberalization policies and trade openness.

If we look at developing countries individually, the openness of trade not only provides room for better international relations with highly developed economies. However, it also provides opportunities to increase foreign exchange through exports, while the connection of low income economics with high income economics allows the former access to high quality goods of the latter through imports. Theoretically speaking this would lead towards the movement of new technology, techniques of manufacturing

goods and knowledge from advanced to less advanced countries. (Grossman & Helpman 1990, 1991; Rodrik 1999; Almeida & Fernandes, 2008).

Some studies also pointed out the negative impacts of trade on economic growth and income for developing countries especially in the industries and sectors where research and development policies are not of central importance. On the other hand, it has been considered beneficial for the countries where transfer of new technologies is considered crucial.

These growth models are diverse in nature that it provides studies which have mixed effects (Romer 1990; Yanikkaya 2003). Young (1991) and Perera-Tallo (2003), say there are positive links, some are of the point that there is a negative link amongst trade, income and growth.

For instance, there are evidences that trade may affect the income positively however it does not contribute to the economic growth, or might have positive impacts however most of the time this positive impact is not robust. The reason for this low, positive and negative growth effect is because there exist income threshold, which as trade increases it pumps economic growth towards lower sides. The low income economies are also fighting domestic issues which include the inability of low income economies taking full advantages of advance technologies provided by the foreign advance economies and human capital constraints, (Kim and Lin 2009; Kim 2011).

Kali, Mendez, and Reyes (2007) analysed international trade and growth nexus and concluded that for the developing countries growth does not only depend upon the volume of the trade. It also depends upon the trading partners they are connected with in order to reap benefits and most importantly the type of goods it trades either capital intensive or labour intensive or manufactured.

More concretely, the aim of this study is to find out the effect of trade openness on income groups within a country. The effect of trade on different income groups in a country will be different. Trickledown theory is the closest to the nature of the idea presented above, which is built on two assumptions: All members of society benefit from growth, and growth is most likely to come from those with the resources and skills to increase productive output.

In the above case, the argument on which this study is based is that it is traditionally assumed that the trade spurs growth because it brings the innovation and more quality, quantity, fewer prices of the goods as compared to the prices of the goods in home economy. This aspect of trade liberalization is more prominent in developed economics but in case of developing economics the situation is other way round. In order to increase growth the growing countries practice protectionist policies because they want their domestic industries to grow and have or less or no competition from foreign industries. It is evident if there are no barriers to trade so with in a developing country the poor or the section of households which has low income will be benefitted more because they will be getting goods at cheaper price. Same goes for the middle class.

On the other hand the upper class who owns these industries are indifferent to the prices especially to the necessity goods, so they supports tariffs and barriers, hence get most benefits. Governments of these developing nations also believe that home industries and industrialists should be protected from foreign competition and they allow restrictions on trade. This sometimes provides subsidies to the industries which it thinks that industry is a crucial for growth of an economy.

Based on the above discussion and literature review it is evident that review and theoretical framework discussed above, still the empirical evidence on the impact of trade openness on economic growth and income remain mixed and inconclusive.

3.2 Factors Affecting Trade and Income

The macroeconomic policies greatly influence performance of growth of an economy, which directly or indirectly affects inflation, investment rates in any form either in human or in physical capital, trade and employment. In economic literature inflation is defined in terms of changes in level of prices; however, the effect of inflation on economic growth and income is controversial in the literature. Some studies suggested that it is positively linked with economic growth (Mallik & Chowdhury, A, 2001).

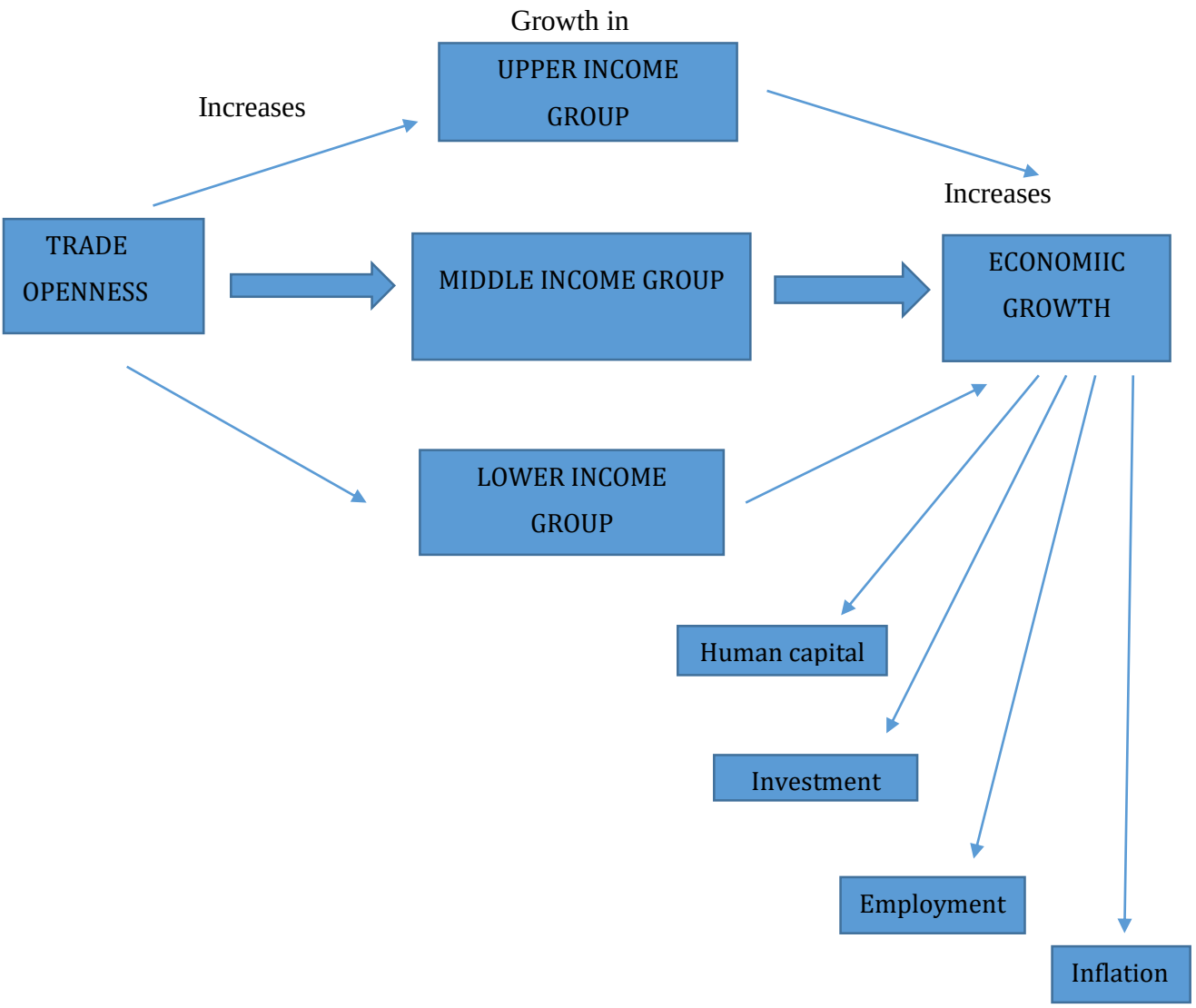
While others believe that the relationship between both variables is not linear (Kremer et al., 2009). However overall it has been considered that for stable growth and equal income distribution in an economy inflation rates must be moderate because with more income (money supply) there will be more money in economy which will trigger inflation. In addition to it, in empirical literature investment is proxied as contribution in capital accumulation, it is also considered to be a main element in developing economic infrastructure. Therefore, with more investment there is more economic growth and hence more income in an economy or vice versa.

Human capital as described in the literature is one of the main determinant of adoption of advance technologies as allowed by openness of trade (Cohen & Levinthal, 1989). Its effect is calculated by two components, rate of growth in population and rate of secondary enrollment. The employment is also directly linked with the economic situation of an economy, because lack of job opportunities may affect overall economic

growth thus affecting economy on the whole and would deprive from potential benefits of trade openness.

All the above mentioned variables are presented below, showing bidirectional impact (the channels) of effect income of individuals and growth in an economy.

3.3 Conceptual Framework



3.4 Study Area

This study focuses on the panel of 81 developing countries. The countries are selected as World Bank classification of countries into developing and developed categories. From all those selected countries, population is divided in to three categories, according to the level of income, lower income, middle income and upper income groups within countries. List of the countries is given in appendix section A.

3.5 Econometric technique

To determine the impact of trade openness on different income groups, this study used panel data for developing countries using both static and dynamic models for analysis. In the case of static panel models, the traditional models are fixed effects and random effects. It is mentioned in the empirical literature that panel data can be analysed using the fixed and random effects estimators (Dewan & Hussein, 2001). The fixed effects method is preferred under the conditions when there exist certain degree of correlation among the explanatory variables and residual term. However in case of the random effects model, the independent variables and the error term in the model under investigation have no correlation. However, the decision to use fixed effect or random effect is based on the Hausman test (1980).

Besides, the mentioned fixed and random effects methods, this study employed some advance techniques/ dynamic panel data model i.e. generalized method of moment[2], to overcome the possible econometric issues (endogeniety), as trade is highly endogenous

[2] Developed by Arellano and Bond (1991), Arellano & Bover (1995) and Blundell & Bond (1998, 2000)

variable[3]. Also it resolves autocorrelation and heterogeneity issues because the static models suffer these issues. In addition to it, estimation with generalized method of moment also solves measurement errors, weak instruments and country-specific effects as specified by (Caselli et al, 1996) who prefers dynamic models over simple regressions or other panel data techniques. Estimation with dynamic model will not generate biased results and would be free from any omitted variables which are considered to be constant with time. In addition to it, these models allows parameters to be estimated consistently in models thus improving goodness of fit.

3.5.1. Endogeniety

Endogeniety refers to the condition where the independent variable(s) is (are) correlated with the error/residual term. Endogeniety issue can also be defined as the correlation between two error terms when dealing with structural equation modelling. Endogeniety issues cause estimates to be inconsistent i.e. they will not tend to have true value as the size of sample increases. The inconsistent estimates yield incorrect interpretations and conclusions. The literature suggests that most of the studies suffers an endogeniety bias and the vast majority of studies have not properly addressed this issue (e.g. Antonakis, Bendahan, Jacquart, & Lalive, 2010).

Despite advancement in methodologies to address various issues associated with estimations in econometrics literature, the social sciences disciplines for example operations management and supply chain management etc are still producing inconsistent estimates by not addressing endogeniety issues. However, some disciplines

[3] As mentioned in various studies i-e Nannicini, & Billmeier, (2011); Gao, T. (2004); Lin, Li, & Sim, (2014): Frankel and Romer (1999); Tahir et al (2014); Ramzan et al (2019); Kandiero, & Chitiga, (2006); Lee, Ricci, & Rigobon, (2004); Yang, & Martinez-Zarzoso, (2014).

i.e. marketing and operations management have started to address endogeniety in their studies.

Many researchers are not fully aware of endogeniety issues, the sources of its origin, and its remedies (Zaefarian et al., 2017). This bias can have various origins, and there are various methods to address them i.e. for panel data the generalized method of moment is mostly used, whereas for survey data mostly two stage least square method is used or three stage least square method is used.

The residual in endogeniety bias is generally unobservable, which means there is no direct way to test whether an endogenous variable is correlated with the residual term. According to the literature the variables in the models which are considered to be exogenous are never truly exogenous. Therefore, it is statistically impossible to eliminate endogeniety problem or to resolve it completely (Roberts & Whited, 2012). To deal with endogeniety effectively the sources of this problem can be identified and to take such actions which helps in reducing the negative impact (Ketokivi & McIntosh, 2017).

Endogeniety consists of measurement errors and omitted variables. It is important to address these issues theoretically by reviewing literature and providing research designs that help to apply appropriate statistical tools as well as empirically that is using statistical techniques to make sure that data is rigorously investigated (Ketokivi & McIntosh, 2017).The generalized method of moment (GMM) are used generally for panel data models to deal with endogeniety. In panel data this method can solve issues raised in the recent literature related to econometric techniques.

The GMM approach was developed by researchers Arellano & Bond (1991) and Blundell & Bond (1998) for dynamic panel data. In dynamic panel data models, the

relationship between cause and its effect is dynamic over time. To capture such dynamic relationship the estimation techniques (related to panel data) uses the independent variables lags as explanatory variables. These lagged values are considered as instruments to tackle the endogeniety issue. The instruments are known as internal instruments because these instruments are used from the existing econometric model (Roodman, 2009).

The GMM model provides consistent results in presence of heterogeneity and dynamic endogeniety (Wintoki, Linck, & Netter, 2012). The traditional way of researchers is to capture the persistence of the dependent variables was to take two lags of the dependent variable (Schultz et al., 2010). The GMM model handles endogeniety by transforming the data internally that is where the past value of the variable is subtracted from its present value (Roodman, 2009). By doing this the observations are reduced and efficiency of the GMM model is enhanced (Wooldridge, 2012).

There are two kinds of transformation methods of the GMM model, known as first difference transformation/one-step GMM and second-order transformation/two-step GMM, which can be used as GMM estimators.

One-step GMM has limitations, because if past value is subtracted from the current value this will create issues. When the recent value of the variable is missing it will result in loss of a lot of observations. To avoid this issue, Arellano and Bover (1995) recommended to use two-step GMM. In second-order transformation subtracts average of all future available observations of a variable (Roodman, 2009) thus by using two step GMM model the unnecessary data loss can be prevented. The two step GMM model provides efficient and consistent results in case of balanced panel data (Arellano and Bover 1995).

In difference GMM basically to remove country specific effect firstly we take difference, after that we take lag, but in system GMM we take lag only. The difference GMM as its name indicates takes difference to remove time effect. However, the condition of instrument is same for both difference and system GMM. In system GMM the biasness and precision is captured and potential bias is reduced. Following Arellano and Bond (1991) and Blundell and Bond (1998), we use the system dynamic generalized method of moments model (GMM).

The main reason behind using system GMM is when there is endogeniety issue as well as N >T as in this study, it is considered that system GMM provides better and consistent results. If there are T>N so the two stage least square method is preferable

The model in the study is based on Romer (1956) model of Endogenous Growth theory. In which Romer focused on the technical spill overs which are attached with industrialization. In addition with endogenous growth, the model is closely linked with developing nations. Furthermore, this model postulates that economic growth is caused by the endogenous factors like education, human capital, innovation, investment, knowledge. This model also assumes that the long run economic growth depends upon policy measures.

The basic model for the analysis in this study adopts the following specification, as suggested by the review of literature.

$$\boldsymbol{income_{it}} = \boldsymbol{b_0} + \boldsymbol{b_1 trade_{it}} + \boldsymbol{b_2}\, \boldsymbol{gdp_{it}} + \boldsymbol{b_3 inf_{it}} + \boldsymbol{b_4 emp_{it}} + \boldsymbol{b_5 hc_{it}} + \boldsymbol{b_6 inv_{it}} + \boldsymbol{U_{it}} \qquad (4.1)$$

Where

Income of country: Dependent variable

Trade openness: Independent variable

The dependent variable in this study is income of the countries**,** proxied by three main categories.

- Upper income
- Middle income
- Lower income

The data on income variable is collected from global consumption and income data base, where data is available in deciles. The criteria to divide data in to further categories is that in lower income group the average of lowest 40 percent income (or lowest 4 deciles) are included because the data set is of developing countries so the poor class is high in developing nations, whereas for upper income group the upper 30 percent (or 3 deciles) are averaged. For middle income group the middle 30 percent (3 deciles) are averaged. In this way the income groups are constructed from the data available.

Independent variables:

The independent variable in our study is Trade

Control variables:

A control variable is an element that is not changed throughout an experiment. Its unchanging state allows the relationship between the other variables being tested to be better understood.

The control variables in our study are:

- Human capital
- Employment

- Economic growth (GDP)
- Investment
- Inflation

Final regression model:

$$\boldsymbol{Y_{it}} = \boldsymbol{b_0} + \boldsymbol{b_1}(\boldsymbol{X})_{\boldsymbol{it}} + \boldsymbol{U_{it}} \quad (4.2)$$

Equation shows final regression model which is specified for our empirical analysis. Where, $\boldsymbol{Y_{it}}$ shows the dependent variable which is income groups in this case classified above as upper income, middle income lower income groups**.**

$\boldsymbol{b_1}(\boldsymbol{X})_{\boldsymbol{it}}$ Shows all our independent variables which are defined as previously.

$\boldsymbol{U_{it}}$ is the error term.

The individual models for specific income groups are presented below.

Model 1:

$$\boldsymbol{uinc_{it}} = \boldsymbol{b_0} + \boldsymbol{b_1 trade_{it}} + \boldsymbol{b_2\, gdp_{it}} + \boldsymbol{b_3 inf_{it}} + \boldsymbol{b_4 emp_{it}} + \boldsymbol{b_5 hc_{it}} + \boldsymbol{b_6 inv_{it}} + \boldsymbol{U_{it}} \quad (4.3)$$

The first model of the analysis is of upper income group in which the impact of certain variables on upper income is calculated.

In above model, dependent variable is upper income group, and independent variables are trade, gdp growth, employment, human capital, inflation, investment, and error term.

Model 2:

$$\boldsymbol{minc_{it}} = \boldsymbol{b_0} + \boldsymbol{b_1 trade_{it}} + \boldsymbol{b_2\, gdp_{it}} + \boldsymbol{b_3 inf_{it}} + \boldsymbol{b_4 emp_{it}} + \boldsymbol{b_5 hc_{it}} + \boldsymbol{b_6 inv_{it}} + \boldsymbol{U_{it}} \quad (4.4)$$

Model 2 consists is of middle income group, in which the impact of different variables on middle income is estimated

In above model, dependent variable is middle income group and independent variables are human capital, Gdp growth, trade and employment, inflation, investment and error term.

Model 3:

$$linc_{it} = b_0 + b_1 trade_{it} + b_2\, gdp_{it} + b_3 inf_{it} + b_4 emp_{it} + b_5 hc_{it} + b_6 inv_{it} + U_{it} \quad (4.5)$$

Model 3 comprises of lower income group as dependent variable and independent variables are Trade, human capital, Gdp growth, investment, inflation, and employment.

According to the relationship mentioned in standard economic theory, the signs of the independent variables indicate the nature and direction of the association between the independent variables and dependent variables. Therefore, on basis of theoretical literature the following relationships are expected between variables.

Variable	Expected sign
Trade openness	+
Inflation	+
Employment	+
Human Capital	+
Investment	+

Since the 1900s, heavily cited literature (Sachs and Warner (1995), Frankel and Romer (1999), Dollar (1992), Edwards (1998) and theories of international trade i-e endogenous growth theory, new trade theory confirms the positive and significant effect of trade openness on income of the countries. Although as the relationship of openness and economic growth is controversial till date, but in general it is considered that the more open an economy is, the more is its income.

The relation of human capital and income is also expected to be positive. Since the concept of human capital refers, as human beings invest in education and their health, in short the investment on the assets that produces more income in future. This investment raises their future income and lifetime earnings. This relation is advocated by both old and new school of thought in development economics literature, suggesting that better education, trainings, migration, health care altogether helps in more productivity and increase in earning capacity of the individuals. (Psacharopoulos, 1981; Edward Denison, 1985; Becker, 1994).

The conventional inflation theories, states that as demand of good increases, it increases the prices of goods. The rise in general price level, increases income, referring positive relation between both income and inflation. But the effect of inflation on all three income groups is expected to be different in the case of this study. In general the theoretical and empirical literature suggests mixed results about the effect of inflation on income (Laidler & Parkin, 1975; Fischer & Modigliani, 1978; Bach & Stephenson, 1974; Blinder & Esaki, 1978; Cardoso, et al, 1995).

The positive relation among income variable and investment variable is expected. According to standard economic theory, as John Maynard Keynes suggested, as investment increases in an economy, it increases business activity, therefore increasing overall income of the economy.

The relationship between income and employment is expected to be positive, as advocated by Keynesian school of thought. Which refers as demand of goods and services increase in an economy, the employment increases which increases income of individuals as well as national income.

Chapter 4: Analysis and Discussion

4.1 Data and its Description:

Data on income is taken from Global Consumption and Income Project. The data is present on the source website in quartiles, as the basic aim of the study is to investigate relationship according to different income levels within country. The first lowest 40 percent population was considered as low income group. While the topmost 30 percent were considered as upper income group and the rest 30 percent were considered as middle income group.

Data on trade flows, income, trade openness and other relevant variables was collected from secondary sources, including the World Development Indicators database of the World Bank, and Penn World Tables and Global consumption and income Project. Data source and variables definitions are given in appendix section B.

4.2 Descriptive statistics

Table 1 reports some basic descriptive statistics for the variables of the study. The income groups namely low, middle and upper have mean of $70.8884, $167.799, $549.97 respectively, which is less as compared to standard deviation 189.663, 406.032, 1377.159. In low income group the minimum value is 2.878 and the maximum value is 1832.727. While the middle income group has minimum value of $7.949 and highest value is 4152.144. The upper income group depicts the highest values, ranging from 31.795 to 14210.53. The minimum values of all income groups are of Liberia and the maximum values of all income groups are of Jordan.

The number of observations is highest for Employment, Human capital and Inflation, whereas the lowest number of observations in our selected sample is for investment.

The mean of our independent variable trade is 75.638 with 53% less standard deviation (35.093). The maximum of trade is reported to be 311.354 and minimum is at 0.167. The maximum value of trade openness is of Liberia and the minimum value of trade is of Myanmar.

Out of the control variables of the study, employment and human capital has mean (28.323, 2.160) less than standard deviation (99.164, 0.593). The minimum value of employment is of Belize and the maximum employment is seen in China. Whereas investment, inflation, and GDP growth has more mean than their standard deviations. Gdp growth has minimum value for Liberia that is -30.145 with highest value for Sierra Leone of 26.417. The least rate of investment is observed in Sierra Leone while the highest investment is witnessed Mauritania as per sample size. The highest inflation is for Venezuela and the lowest is in Kyrgyz republic

Table 1 : Descriptive Statistics

Variable	Observations	Mean	Std. Dev	Minimum	Maximum
LIG	1272	70.884	180.663	2.878	1832.727
MIG	1272	167.799	406.032	7.949	4152.144
UIG	1272	549.97	1377.159	31.795	14210.53
Trade	1277	75.638	36.093	0.167	311.354
Employment	1296	28.323	99.164	0.080	791.770
Human capital	1296	2.160	0.593	1.069	3.449
Inflation	1296	0.405	0.144	1.138	1.617
Investment	1243	23.046	6.390	1.096	61.496
GDP growth	1294	4.702	3.850	-30.145	26.417

4.3 Correlation matrix

The correlation matrix is presented in table 2 in order to see the correlation coefficients of independent variables and dependent variables. The matrix suggests that all variables are correlated with each other. Employment is negatively correlated with trade, whereas GDP growth is negatively correlated to human capital and inflation. Inflation is negatively correlated to employment. Investment and human capital is positively correlated with each other, remaining all variables have mixed correlation amongst them.

The trade has negative correlation with employment as the sample size consists all developing nations, so it can inferred that , most developing nations doesn't have enough resources to compete with foreign markets. So when openness occurs, the countries can imports goods at lower prices as compared to the domestic goods. Consequently the domestic industries suffer which result in shutting down of the domestic firm's thus increasing unemployment.

The negative/inverse correlation of employment and income levels is in accordance with Keynes, "with a given organization, equipment and technique, real wages and the volume of output (and hence of employment) are uniquely correlated, so that, in general, an increase in employment can only occur to the accompaniment of a decline in the rate of real wages. Thus, I am not disputing this vital fact which the classical economists have (rightly) asserted, the real wage earned by a unit of labour has a unique inverse correlation with the volume of employment (Pedersen & Keynes, 1936)"

The correlation amongst human capital and GDP growth is negative, but this negative correlation is extremely weak. However, the reason can be as in developing nations, as people started investing in their education and health, there may be the case of surplus

labor, which results in unemployment, so as human capital increases so as unemployment which may affect GDP negatively. Similarly GDP growth is also negatively associated with all income groups, but the negative relationship is extremely weak.

If the independent variables are strongly correlated with each other, then it is considered to be violation of the assumption of the ordinary least square, according to which the explanatory variables shouldn't be correlated with each other.

However, it has been observed in the regression analysis there exists correlation amongst variables as they are dependent on each other or due to some trend. Although according to the correlation matrix in table 2 the correlation is present between variables still, it will not create a major issue in estimations as the degree of correlation is not high

Table 2: Correlation Matrix

	LIG	MIG	UIG	Trade	Employment	Human capital	Inflation	Investment	GDP growth
LIG	1.000								
MIG	0.998	1.000							
UIG	0.988	0.994	1.000						
Trade	0.176	0.179	0.172	1.0000					
Employment	-0.024	-0.020	-0.023	-0.1730	1.000				
Human capital	0.272	0.263	0.216	0.3442	0.013	1.000			
Inflation	0.161	0.166	0.149	0.0618	-0.035	0.252	1.000		
Investment	0.033	0.038	0.041	0.1676	0.327	0.080	0.181	1.000	
GDP growth	-0.160	-0.161	-0.157	0.0250	0.156	-0.083	-0.143	0.144	1.000
Source: Author's calculations									

4.4 Estimation results

This study analysed using panel data, to find out the impact of trade openness on three income groups within developing countries, divided as low income, middle income, and upper income for the time period starting from 2000 till 2015. If time period is less than the entities, there is no need to conduct unit root testing (Baltagi, 2008). The basic panel data models are Pooled OLS, Fixed effects and Random effects model. Pooled OLS is not estimated due to probability of biased results. As Pooled OLS doesn't differentiate between time period and cross-sections, that's why it is mostly considered not appropriate to use Pooled OLS.

Fixed and random effects models are considered to be the basic panel data models, employed on the basis of Hausman test, which is used to select amongst fixed effects and random effects .The results of Hausman test for all the income groups are reported in Table 3 - Appendix C. Due to the presence of endogeniety, traditional panel data models do not yield better estimates and therefore GMM is employed in order to obtain unbiased results.

The model estimated for the full sample from 2000 to 2015, using GMM are reported in Table 3 below. Model 1 estimates the income equation with a base specification. Income is assumed to be a function of trade, human capital, investment, GDP growth, employment, inflation.

We verify the instruments validity using Sargan (p-level) test, and the result obtained suggest the instruments are valid. We use the Arellano-Bond test to check for the presence of autocorrelation using a null hypothesis that the residuals are not second-order correlated. With AR2 (p-levels) >= 0.100, we conclude the autocorrelation is not an issue for any of the models presented here. The issue of endogeniety has been

addressed by including lagged values of independent variables as well as the lagged value of trade openness as instruments.

The result of the base specification shows that trade positively impacts income, irrespective of the group, though the magnitude of the effect is greatest for the low income group. The result is consistent with the H-O theory which postulates that as trade increases it will shift income towards country's abundant factor and in case of the developing nations the unskilled labour is the abundant factor. The channel of impact is likely to be due to increased economic activity resulting from greater trade flows. It may also be inferred from this result that pursuing inward-looking, protectionist policies will affect the lowest income group the most.

On the other hand, increases in investment levels lead to a decline in low and middle income levels. Stokey (1991) has shown that if a nation is backward (low income/ economic growth) as compared to rest of the world, its rate of investments would be low, especially in human capital. This result is in line with the empirical evidence from the literature which has shown that in developing countries, this negative effect is due to credit-market imperfections, political economy, social unrest, and low saving rates (Barro, 1999; Buckley, et al. 2002).

The relationship between human capital and economic growth is negative in the models reported in Table 3. A number of studies (such as Benhabib & Spiegel, 1992; Tahir & Azid, 2015) have demonstrated a negative impact of human capital on economic growth since investment in human capital today will yield a payoff not in the current period, but in the future. Thus, the evidence suggests a non-linear relationship between these two variables in the model.

GDP growth and employment are positively related, and the impact is statistically significant for all income groups[4]. This result indicates that as income increases it increase employment in the country.

The estimates of the model indicate a negative, significant relationship between inflation and all income groups. It is to be expected that since income has a positive relationship with GDP growth and employment these factors would accelerate institutional quality, which consequently helps in reducing inflation levels, as suggested by Campillo & Miron (1997).

The variables of government consumption, foreign direct investment, and exchange rate have also been included in the model to avoid the possibility of omitted variables in the estimated model. As evident from the results reported in Table 4, there is no appreciable variation in the results reported from inclusion of these variables. This suggests that the model does not suffer from an omitted variable bias and key variables have not been excluded from the model. Furthermore, the results of the estimations suggest that none of these additional variables exert a statistically significant impact on any of the income groups.

[4] According to Okun's Law (1965)

Table 3 : Estimation results of generalized method of moment

Variables	**LIG**	**MIG**	**UIG**
Log LIG | L1.	1.024*** (0.053)		
Log MIG | L1		1.026*** (0.040)	
Log UIG | L1			1.029*** (0.038)
Trade	**0.002*** **(0.000)**	**0.001*** **(0.000)**	**0.001*** **0.000**
Human capital	-0.049 (0.056)	-0.042 (0.037)	-0.032 (0.026)
Investment	-0.002*** (0.001)	-0.001** (0.001)	-0.001 (0.001)
GDP growth	0.005*** (0.002)	0.005*** (0.002)	0.006*** (0.002)
Log employment	0.018** (0.008)	0.016** (0.007)	0.015** (0.006)
Log inflation	-0.004 (0.031)	-0.017 (0.027)	-0.035 (0.029)
Cons	-0.100 (0.080)	-0.153 (0.109)	-0.238 (0.177)
Sargan (p level)	0.729	0.838	0.729
Hansen test (p level)	0.661	0.800	0.759
Ar1(p level)	0.000	0.000	0.000
Ar2 (p level)	0.100	0.441	0.705
Observations	1,144	1,144	1,144

Note: ***, **, * is significance level at 1, 5, and 10 %

The coefficients and robust standard errors of the variables are reported.

Chapter 5: Conclusion

5.1. Main Findings

The main aim of this research study was to find out the relationship between trade openness and three income groups (low income, middle income and upper income) with in developing countries for the time period of 2000-2015. 81 developing countries were studied in our empirical analysis. Due to the problem of endogeniety, dynamic panel data models are considered better as compared to static model. Generalized Method of Moment is used, and considered more reliable in case of our study. The results indicated that trade openness and all income groups have positive and significant relationship, in general; however, low income group has been benefitted most from the openness of trade as compared to other groups, whereas the upper income group benefits least from trade openness, inferring that protectionist policies will harm poor segment of the society most.

It is found that GDP growth is directly associated with all income groups, favouring our main result which is due to more trade there will be more GDP growth and hence more income for all segments. A positive and statistically significant relationship has been found between income groups and employment for our sample developing nations, implying that with more employment there will be more income.

The human capital is having negative relationship with all income levels which is against standard theory which states as income increases inflation also increases. But it has been observed that inflation rate also adversely affected income groups; this is due to the growth in financial institutions efficiency, as income and economic growth increases.

The results supports the theory, that trade openness is crucial for income and growth. The protectionist policies if applied, will have the greatest effect on low income group. It contradicts the literature which suggests for developing and under developed countries trade barriers have positive effect on income.

5.2. Policy recommendations

The results from the model estimated in this study suggest that trade openness does not negatively impact income. In other words, the more an economy trades the more income levels across the economy (low, middle and high) should rise. Thus, this research supports the adoption of policies to open up economies and encourage them to boost trade integration across the globe.

A holistic approach to policy formulation will be required irrespective of the state of development of individual economies. For example, simply lowering tariffs in isolation, without supporting policies to encourage investment, employment and productivity enhancements in the economy will not yield maximum benefits.

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Appendices

Appendix A: List of countries

No	Country name	No	Country name
1	Albania	42	Madagascar
2	Algeria	43	Malawi
3	Angola	44	Malaysia
4	Armenia	45	Mali
5	Bangladesh	46	Mauritania
6	Belize	47	Mauritius
7	Benin	48	Mexico
8	Bolivia	49	Moldova
9	Botswana	50	Mongolia
10	Brazil	51	Morocco
11	Bulgaria	52	Mozambique
12	Burkina Faso	53	Myanmar
13	Burundi	54	Namibia
14	Cambodia	55	Nepal
15	Cameroon	56	Nicaragua
16	China	57	Niger
17	Colombia	58	Nigeria
18	Costa Rica	59	Pakistan
19	Croatia	60	Panama
20	Dominican Republic	61	Paraguay
21	Ecuador	62	Peru
22	Egypt	63	Philippines
23	El Salvador	64	Romania
24	Ethiopia	66	Russian Federation
25	Gabon	66	Rwanda
26	Gambia	67	Senegal
27	Ghana	68	Sierra Leone
28	Guatemala	69	South Africa
29	Haiti	70	Sudan
30	Honduras	71	Tajikistan
31	India	72	Tanzania
32	Indonesia	73	Thailand
33	Iran, Islamic Rep.	74	Togo

34	Jamaica	75	Tunisia
35	Jordan	76	Turkey
36	Kazakhstan	77	Uganda
37	Kenya	78	Ukraine
38	Kyrgyz Republic	79	Venezuela
39	Lao PDR	80	Vietnam
40	Lesotho	81	Zambia
41	Liberia		

Appendix B: List of variables' definition and source

Variables	Definition	Source
Trade (% of GDP)	'Trade is the sum of exports and imports of goods and services measured as a share of gross domestic product.'	World Bank national accounts data, and OECD National Accounts data files.
GDP growth (annual %)	'Annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2010 U.S. dollars. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources.'	World Bank national accounts data, and OECD National Accounts data files.
Employment	'Number of persons engaged (in millions)'	Penn world tables, version 9.1
Human capital	'Human capital index based on years of schooling and returns to education; see Human capital in PWT9.'	Penn world tables, version 9.1
Income	'Income of persons over time'	Global consumption and income project
Gross fixed capital formation(% of GDP)	'Gross fixed capital formation (formerly gross domestic fixed investment) includes land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. According to the 1993 SNA, net acquisitions of valuables are also considered capital formation.'	World Bank national accounts data, and OECD National Accounts data files.
Inflation	'Price level of household consumption, price level of USA GDPo in 2011=1'	Pen world tables version 9.1

Appendix C: Results of Fixed and Random Effects Estimation

Table 4: Results of Fixed and Random Effects Estimation

Regression results, 2000-2015, dependent variable income groups

Variables	Fixed effects			Random effects		
	Lower	Middle	Upper	Lower	Middle	Upper
Trade	0.000	0.002	0.000	0.00002	0.0001	0.0003
	(0.000)	(0.0002)	(0.0002)	(0.0003)	(0.0002)	(0.000)
Human capital	0.766***	0.731***	0.621***	0.831***	0.746***	0.594***
	(0.067)	(0.060)	(0.061)	(0.558)	(0.050)	(0.050)
Investment	0.008***	0.008***	0.008***	0.008***	0.007***	0.007***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
GDP growth	-0.001	-0.001	-0.001	-0.173	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
log employment	0.028	-0.099**	-0.184***	0.026	-0.041	-0.090***
	(0.054)	(0.048)	(0.049)	(0.034)	(0.031)	(0.031)
log inflation	0.310***	0.309***	0.298***	0.293***	0.288***	0.279***
	(0.029)	(0.260)	(0.026)	(0.027)	(0.025)	(0.025)
Constant	2.012***	3.247***	4.855***	1.828***	3.068***	4.709***
	(0.151)	(1.135)	0.137	(0.157)	(0.143)	(0.143)
F stat/Wald	191***	192***	141***	1218.79***	1212.05***	882.66***
R-sq Within	50	50	42	50	50	32
Between	54	43	28	53	49	37
Overall	55	45	30	55	50	38
Hausman	4.53		6.09		7.91	
Chi (Prob)	(0.605)		(0.412)		(0.245)	

*10% significance level, **5% significance level, ***1% significance level

Appendix D: The units of variables:

Variables	Units
Income	US dollars
Investment	Percentage of GDP
GDP growth	Annual Percentage
Trade	Percentage of GDP
Employment	Millions
Inflation	Index
Human Capital	Index

Appendix E: Additional Variables included to the model

Table 5: Results of Additional Variables included to the model

Variables	**LIG**	**MIG**	**UIG**
Log LIG | L1.	1.074*** (0.172)		
Log MIG | L1		1.049*** (0.114)	
Log UIG | L1			1.071*** (0.111)
Trade	**0.0020*** **(0.000)**	**0.0015*** **(0.000)**	**0.0013*** **0.008**
Human capital	-0.096 (0.056)	-0.059 (0.090)	-0.055 (0.057)
Investment	-0.002** (0.001)	-0.001 (0.006)	-0.013 (0.001)
GDP growth	0.005 (0.004)	0.005* (0.003)	0.006** (0.003)
Log employment	0.015* (0.008)	0.015*** (0.005)	0.016*** (0.005)
Log inflation	-0.022 (0.005)	-0.025 (0.065)	-0.054 (0.069)
Log exchange rate	0.005 (0.007)	0.004 (0.004)	0.005 (0.004)
Log consumption	0.021 (0.226)	0.001 (0.177)	0.030 (0.184)
Foreign direct investment	-0.0001 (0.001)	-0.0001 (0.009)	0.0004 (0.001)
Cons	-0.297 (0.1.33)	-0.243 (0.151)	-0.606 (1.384)
Sargan (p level)	0.792	0.871	0.787
Hansen test (p level)	0.756	0.918	0.801
Ar1(p level)	0.000	0.000	0.000
Ar2 (p level)	0.037	0.370	0.624
Observations	1,144	1,144	1,144

*10% significance level, **5% significance level, ***1% significance level