Asian Journal of Empirical Research
Volume 7, Issue 8(2017): 202-224
http://aessweb.com/journal-detail.php?id=5004

The effects of sectoral trade composition on inequality: evidence from emerging economies

Mohammad Monirul Islam[a*], Zhaohua Li[b], Farha Fatema[c]
[a*] PhD Scholar; School of Economics, Huazhong University of Science and Technology, P.R China.
Email address: *mmislamhust@yahoo.com* (Corresponding author)
[b] School of Economics, Huazhong University of Science and Technology, P.R China.
[c] PhD Scholar; School of Economics, Huazhong University of Science and Technology, P.R China.


Corresponding author

ARTICLE HISTORY:

Received: 30-Aug-2017
Accepted: 09-Oct-2017
Online available: 23-Oct-2017

Keywords:
Sectoral trade composition, Inequality, emerging economies, revealed comparative advantage

ABSTRACT

This study identifies the effect of sectoral composition of trade on inequality in the emerging economies. We separate export and import into four broad sectors such as agriculture; labor-intensive manufacturing; capital-intensive manufacturing and service, and measure revealed comparative advantage (RCA) of each sector. We then identify the effect of growing export; import; and comparative advantage of these sectors on inequality. The study applies dynamic panel data model to a panel dataset of 31 emerging economies over 1994-2014. We take both relative and absolute measures of inequality to solve the debate regarding measurement issues of inequality. The study results suggest that trade in different sectors have differential effect on inequality measured by Gini and ratio of average income of highest and lowest quintiles, but it significantly increases income differences between the two extreme quintiles of income group. Technology has a mixed effect on relative inequality, but it substantially raises absolute income differences between the highest and lowest quintiles.

Contribution/ Originality
This study contributes to the existing literature by examining the effects of sectoral composition of trade on inequality in the emerging economies focusing on two research questions: firstly whether export and import of different sectors have a differential effect on inequality in the emerging economies; and secondly, how revealed comparative advantage of various sectors affects inequality.

DOI: 10.18488/journal.1007/2017.7.8/1007.8.202.224
ISSN (P): 2306-983X, ISSN (E): 2224-4425

Citation: Mohammad Monirul Islam, Zhaohua Li and Farha Fatema (2017). The effects of sectoral trade composition on inequality: evidence from emerging economies. Asian Journal of Empirical Research, 7(8), 202-224.

1. INTRODUCTION

The most direct linkage between trade and distribution of income is explained by the Heckscher-Ohlin (HO) model also known as general equilibrium model of international trade. In its simple form, HO theory predicts that each factor of production earns the same income irrespective of industries they are employed when each factor can be moved costless across industries. Trade affects distribution of income through shifting the prices of factors of production. According to the two-factor version of HO model, countries that are comparatively endowed with unskilled labor should master in the production of unskilled labor-intensive products.

As cohort theorem of HO model, Stolper-Samuelson (SS) theory relates the HO model with distribution of income. This theory assumes that the return of the factors of production that are used abundantly in producing goods in a country will increase due to trade liberalization whereas the return of other factors of production is expected to fall. Developing countries are endowed with huge unskilled labors that are extensively used in producing exported goods whereas developed countries have abundant skilled labor. So, as per SS theory, it can be postulated that trade liberalization will lessen income inequality in the developing countries but raises inequality in the developed countries due to higher premium for skill. Based on this perception, Krueger (1983); and Bhagwati and Srinivasan (2002) argue that in the developing countries, trade reforms should be pro-poor as these countries enjoy a comparative advantage in producing goods that require unskilled labor abundantly. Thus, the expansion of trade should reduce inequality in the poor countries. In contrast to SS theorem, specific factors model claims that few factors of production cannot alter the whole industries scenario at all. According to this model, trade tends to decrease the real incomes of factors used in import-competing industries whereas it increases the incomes of those used in export-competing industries (Jones, 1971).

The offshoring model proposed by Feenstra and Hanson (1995) explains the trade-inequality linkage from a different view. According to this model, a competitive industry performs basket of tasks to produce a single product, and they hire both skilled and unskilled workers for their works. These tasks are grouped according to their skill intensity. To save cost the industry moves some tasks to the skill-poor country. Although the reallocated tasks are least skill-intensive for the skill-rich developed countries but these tasks are more skill-intensive in the poor countries compared to the tasks previously done. Thus, the demand for skilled labor goes up and thus movement of tasks raises income disparity in both of the country groups. According to Davidson *et al*. (1999), search friction and unemployment are the two important factors in the standard model that can significantly contribute to change the effects of trade on income distribution. Fajgelbaum *et al.* (2011) focused on consumer side effect of trade on income distribution. They argued that trade does not impact income distribution directly through the factors of production rather it affects the real incomes of different groups as consumption of goods differs across consumers according to their income levels.

In their review papers, Goldberg and Pavcnik (2007); and Harrison *et al.* (2011) identified several channels of trade-income distribution linkage within a country such as skill-based technological change (Aghion *et al.*, 2005; Attanasio *et al.*, 2004; Fernandes, 2007); rapid expansion of global production sharing between developed and developing countries (Lorentowicz *et al.*, 2005; Marin, 2006); international capital flows (Behrman *et al.*, 2000; Cragg & Epelbaum, 1996); heterogeneity of the firms in international trade (Brambilla *et al.*, 2012; Egger & Kreickemeier, 2009; Verhoogen, 2008); transitional unemployment in developing countries (Attanasio *et al.*, 2004); changes in industry wages (Kaplan & Verhoogen, 2006; Kumar & Mishra, 2008); and potential effects on labor market standards (Goldberg & Pavcnik, 2003; Harrison & Scorse, 2004).

However, the composition of trade affects several channels of trade-inequality nexus. French (2014) argues that composition of trade flows acts as a quantitatively significant catalyst in determining the welfare gains from trade. Technology intensity of the product exported or imported has a differential effect on the economy. Technology-intensive products lead to faster economic growth while low

technology products tend to grow slow (Lall, 2000). New technology is also embodied in imports of capital goods rather than labor-intensive goods (Acemoglu, 2003). According to Grossman and Helpman (2014) growth creates inequality but not always universally and they argued that long run inequality is affected by technological and policy features of the economy and within-country the inequality is intensified by the globalization process. The subsidy in R&D in one country can lead to higher economic growth which results in within-country inequality around the globe. The impact of technological advancement is visible both in employment dynamics and wage dynamics (Hamermesh, 1996; Petit & Vivarelli, 1997).

The goods-in-process that are considered as unskilled labor-intensive in the skill-rich developed countries are outsourced to developing countries, and this outsourcing affects the distribution of income in both of the country groups (Czech & Woo, 2005; Feenstra & Hanson, 1997). Export composition also induces flows of capital and labor toward better firms. When export markets production are high skill-intensive compared to the domestic market of the developing countries, export will upturn the demand for skilled labors and result in higher skill premium (Bernard & Jensen, 1997; Harrison & Hanson, 1999).

However, in the field of trade-inequality nexus, very few studies focused on identifying the differential effect of trade composition on income inequality in a narrow scope. Calderón and Chong (2001) identified that the developing countries that export primary products face higher inequality whereas the developed countries who export manufacturing goods experience decreasing income inequality. According to Demir *et al*. (2012), increasing export in the manufacturing sectors leads to increasing inequality although the majority shares of employment are in the agricultural sector. Bensidoun *et al.* (2011) argued that growing trade in labor-intensive sector upsurges income disparity in the poor countries but shrinks inequality in developed countries. On the other hand, increasing trade in the capital-intensive sector decreases inequality in the developing economies while it increases inequality in rich countries.

Although a vast study focuses on identifying the effect of growing trade on inequality, the important factor overlooked by the previous studies is whether the sectoral composition of trade has a differential effect on inequality. Moreover, some empirical studies identified that composition of trade affects many of the channels of this trade-inequality linkage. This study aims at examining the effects of sectoral composition of trade on inequality in the emerging economies. In this study, we focus on two research questions: firstly, whether export and import of different sectors have a differential effect on inequality in the emerging economies. Secondly, how revealed comparative advantage of various sectors affect inequality.

We divide export and import into four broad sectors such as agriculture; labor-intensive manufacturing; capital-intensive manufacturing and service. We then identify the effect of growing export and import of these four sectors on inequality. We also use trade composition variable named Compo-RCA which measures the revealed comparative advantage of each of the four broad sectors and determine the differential effect of comparative advantage of each sector on inequality. The empirical studies in the field of trade-inequality linkage are sensitive to the choice of economic modeling. To address economic modeling issues and solve the problem of endogeneity and omitted variable bias, we apply system GMM approach of dynamic panel data model to a panel of 31 emerging economies for 1994-2014. Rather than using annual or quarterly data, we average the data over seven three-year periods to avoid missing data and smooth short-run fluctuations. Moreover, fewer time periods and a large number of groups in the data sets are the key requirements to apply GMM technique. We also use both absolute and relative measures income inequality to solve the problems regarding measurement issues of income inequality.

This study emphasis on emerging economies as they play significant role in the world trade in the recent times. They contribute more than 50% of global trade and constitute almost 80% of the world's population. Moreover, they are in a transitional phase of economic development. The remaining part

of the study proceeds as follows. Section 2 discusses the measures of poverty and trade composition including data sample and sources. Section 3 describes the methodology of the study and followed by section 4 that reports and analyzes empirical results. The last section makes conclusions and provides policy recommendations.

2. DATA DESCRIPTION AND SOURCES

We use several measures of inequality, the composition of trade and different methodological information related to the study. This section defines the variables and describes the data sources, principal components as well as provides summary statistics of the analysis.

2.1. Measures of inequality

In the field of empirical research in the trade-inequality nexus, the measurement of inequality is a crucial issue as the effect of trade on inequality is highly sensitive to measurement of inequality. Ravallion (2003) argued that there are several disagreements in the empirical studies regarding whether growing trade reduces inequality and measurement of inequality is one of the key issues of these disagreements among the studies. Measures of inequality are sensitive to 'relative' and 'absolute' concept. Most of the applied work considers 'relative inequality' as measures of inequality to identify the effect of greater trade liberalization on inequality (Ravallion, 2003). As the first measure of relative inequality, we take Gini coefficient as it measures the deviation of income distribution among individuals or households within an economy from an entirely equal distribution.

According to Nissanke and Thorbecke (2006), although globalization affects both vertical and horizontal inequality, class conflicts result from vertical inequality. To measure the vertical inequality, we used the relative income ratio of highest and poorest quintile which is also known as 20:20 ratio and calculated as follows:

$$\text{Income inequality} = \frac{\text{Average per capita income of highest quintile}}{\text{Average per capita income of lowest quintile}}$$

A higher value of income inequality indicates higher income inequality between these two income groups.

However, according to Ravallion (2003), absolute measure of inequality is crucial in identifying the effect of trade on inequality. For example, if an economy has two household incomes such as $1000 and $100000 if both incomes become double in size then relative inequality will remain same as before ten times, but absolute differences in their earnings have doubled, from $90000 to $180000. Here, relative inequality is unchanged but absolute inequality has risen and become double. Considering the above issue, we use an absolute measure of income inequality calculated as follows:

Absolute inequality= Average per capita income of highest quintile - Average per capita income of lowest quintile

A higher value of all inequality measures indicates higher income inequality.

2.2. Measures of trade composition

This study aims at identifying the differential effect of trade composition on inequality in the emerging economies. For this purpose, we divide imports and exports into four broad sectors such as agriculture; labor-intensive manufacturing; capital-0intensive manufacturing and service. We collected productive data from UNComtrade database as per SITC rev. 3. Classification of agriculture and service sectors can be easily made from UNComtrade database, but it is hard to distinguish between labor-intensive manufacturing and capital-intensive manufacturing products. We separated labor-intensive manufacturing and capital-intensive manufacturing products based on employee value addition and use of advanced technology in the production process. Capital-intensive manufacturing products are characterized by the use of advanced and fast-changing technology for production and assembly with high R&D investment, and they have very low labor requirement. On the contrary, labor-intensive

manufacturing products require high value addition by the employee and well-diffused technology. However, we divide labor-intensive manufacturing and capital-intensive manufacturing sector following several previous studies such as (Busse & Spielmann, 2006; Lall, 2000; Lary, 1968; Thorbecke & Zhang, 2009; Tyers *et al.*, 1987).

At first stage, we identify the effect of growing export and import of these four sectors on inequality. We also use one trade composition variable named Compo-RCA that measures revealed comparative advantage (RCA) of each sector (Busse & Spielmann, 2006) and is calculated as follows:

$$\text{Compo-RCA} = \frac{\frac{\text{Export of labor-intensive /capital-intensive /agriculture / service sector}}{\text{Import of labor-intensive / capital-intensive /agriculture / service sector}}}{\frac{\text{Total Export}}{\text{Total Import}}}$$

2.3. Other control variables

We use several control variables in the regression model to strengthen the linkage between trade composition and inequality. Skill-based technological progress and diffusion process is one of the key channels that affect income distribution within and between countries (Attanasio *et al.*, 2004; Fernandes, 2007). We use technology upgrading and deepening index value published by UNIDO as a proxy for technological development. The value of technology variable ranges from 0 to 1 where a higher value indicates higher technological advancement.

We control economic growth in the regression as it is one of the key channels of the effects of trade on the economy (Dollar & Kraay, 2004; Seven & Coskun, 2016). Inflation-CPI is used as a control variable because according to Balat and Porto (2007), trade openness affects inequality by influencing the prices of goods consumed as well as prices of the goods produced and exported. We also use unemployment rate as a control variable in the regression model as it can affect inequality in short run and long run (Attanasio *et al.*, 2004; Goldberg & Pavcnik, 2004). Moreover, higher import composition also increases unemployment which in turn affect urban and rural poor (Kletzer, 2004).

2.4. Data Description and sources

We focus on the sample of 45 emerging countries and cover the period from 1994 to 2014. However, due to unavailability of inequality data of different emerging countries for long time series, we use the sample of 31 emerging economies out of 45 emerging economies. We also averaged the data over seven three-year periods. That means we have seven periods; the first period denotes the data averaged between 1994 and 1996; the second period indicates averaged data between 1997 and 1999; and so on. We use averaged data in the regression analysis following some previous studies (Khadraoui & Smida, 2012; Seven & Coskun, 2016) which argue that averaging data solves the problem of missing data and smooths out short-run fluctuations in growth rate and it is also suitable for growth models. Although empirical literature uses three, four or five-year averages, the study uses three-year average to maximize the number of periods as well as solve missing data problems. Moreover, in this study, we apply system GMM approach which requires fewer periods and larger groups. We collect the data on inequality from World Bank. Product wise classified trade data is collected from UNComtrade database based on SITS-rev 3. We use technological upgrading and deepening index value as a proxy for technological progress and the data are collected from UNIDO INDSTATS database.

2.5. Summary statistics

Table 1 provides summary statistics for three inequality measures, twelve trade composition variables, and four control variables. There are significant variations in inequality measures across countries. The average value of Gini is 39.292 and ranges from 20.776 in Romania to 59.73 in Brazil (in 2012-2014 and 1994-1996 respectively) whereas the ratio of average income of highest and lowest quintile ranges from 3.385 in Ukraine (in 2012-2014) to 30.583 in Colombia (in 1997-1999) with a mean value of 9.001. However, the income difference between highest and lowest quintile has drastic variations. The average income difference is $10070.08 with the lowest value of $539.169 in Bangladesh in 1994-1996, and the highest difference is $41035.66 in Chile in 2012-2014.

The summary statistics of trade variables show that although emerging countries have the highest comparative advantage in labor-intensive manufacturing (LIM) sector and almost equal advantage in the agriculture sector, on an average, they have maximum share of export and import in capital-intensive manufacturing sector followed by service sector with substantial variations. Technology index has an average value of 0.487 that indicates the medium level of technological progress in the emerging economies, and it shows significant variations with a minimum value of 0.229 in Nigeria (in 2009-2011) and the maximum value of 0.784 in China (in 2009-2011). Other control variables also have substantial variations over the period.

Table 1: Summary statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
GINI	195	39.292	8.981	20.776	59.73
Income Inequality (20: 20 ratio)	190	9.001	5.629	3.385	30.583
Absolute Income Inequality	191	10070.08	8316.544	539.169	41035.66
Agricultural Import	215	7.34e+09	1.51e+10	2.35e+08	1.64e+11
Labor-intensive manufacturing Import	215	1.04e+10	1.57e+10	5.58e+07	1.32e+11
Capital-intensive manufacturing Import	215	6.42e+10	1.56e+11	1.17e+09	1.61e+12
Service Import	216	3.23e+10	6.62e+10	8.08e+08	7.08e+11
Agricultural Export	215	9.36e+09	1.31e+10	7907242	8.84e+10
Labor-intensive manufacturing (LIM) Export	214	2.09e+10	7.32e+10	1.36e+07	8.00e+11
Capital-intensive manufacturing(CIM) Export	215	5.82e+10	1.36e+11	1.81e+08	1.33e+12
Service Export	216	2.69e+10	5.15e+10	6.05e+08	4.51e+11
Revealed Comparative Advantage (RCA) – Agriculture	215	1.831	2.362	0.002	17.580
RCA-LIM	214	1.895	2.423	0.006	15.416
RCA-CIM	215	0.905	0.582	0.051	3.561
RCA-Service	215	0.994	0.516	0.070	2.559
Technology	217	0.486	0.144	0.229	0.784
GDP Growth	217	4.241	3.455	-15.044	15.844
Unemployment	217	8.396	4.189	0.73	19.055
Inflation CPI	217	18.472	62.799	0.07	697.57

Note: All variables are three-year period average. Definitions of variables are provided in the Appendix C.

3. ECONOMETRIC METHODOLOGY

Santos-Paulino (2012) suggested that the empirical studies which explain the effect of trade openness on inequality are highly sensitive to the choice of econometric modeling and assumptions. Moreover, omitted variable bias and endogeneity problems are the two key challenges in determining trade-inequality linkage (Hertel & Reimer, 2005). According to Winters and Martuscelli (2014), although the instrumental variable (IV) approach is a common tool to deal with endogeneity problems, different studies criticize the use of IV approach for solving endogeneity problem to explain the effects of trade on inequality (Bazzi & Clemens, 2013; Deaton, 2009). In this study, we apply dynamic panel data technique to solve endogeneity problems and unobserved country-specific effects in the data. The following basic regression was run to identify the effect of trade composition on inequality:

$$y_{i,t} - y_{i,t-1} = \alpha\, y_{i,t-1} + \beta_1\, TC_{i,t} + \gamma\, X_{i,t} + \eta_i + \varepsilon_{i,t} \quad \text{..... (1)}$$

Where, y represents the log of inequality measures such as Gini/ ratio of the average income of highest and lowest 20% population/ difference between the average income of highest and lowest quintiles of

income groups. $y_{i,t}$-$y_{i,t-1}$ indicates the growth of the above three dependent variables. $y_{i,t-1}$ is the lagged value of dependent variables to test the persistence of inequality measures. $TC_{i,t}$ represents the trade composition measures at period t and $X_{i,t}$ indicates different control variables used in this study, i.e., technology; inflation rate; GDP growth; and unemployment rate. Finally, η_i specifies unobserved country-specific effects and $\varepsilon_{i,t}$ denotes the error term.

In the regression analysis, we apply system GMM approach developed by Blundell and Bond (1998) as it solves the problem of endogeneity of the variables as well as eliminates heteroscedasticity. Moreover, in the presence of endogeneity this approach provides consistent and efficient estimates. Different tests have been applied to examine the validity of the model. The reliability of GMM estimates highly depends on the validity of the instruments in the regression analysis. To test instruments's overall validity we use Hansen test of overidentifying restrictions. We also test serial correlation of the model using Arellano-Bond test for autocorrelation where the null hypothesis is that the error term is not serially correlated either at the first order (AR1) or second order (AR2). AR (2) is more important since it detects autocorrelation in levels.

4. REGRESSION REPORT AND ANALYSIS

The regression results summarized in Table 2 shows that both export and import of four broad sectors have an insignificant negative association with income inequality measured by Gini with few exceptions. Export as an aggregate significantly reduces inequality, and among all four sectors capital-intensive manufacturing export has significant effect in falling inequality. Although export and import of all sectors diminishes income inequality, labor-intensive manufacturing sector export shows a positive association with Gini which indicates that export of labor-intensive sectors increases inequality. This result is consistent with several theoretical and empirical justifications. As unskilled labor constitute a major portion of total labor in the developing countries the export of labor-intensive manufacturing sector does not raise the real incomes of unskilled labor and thus raises inequality in income distribution in the emerging economies. On the other hand, export in capital-intensive manufacturing sector is accompanied with raising skill as well as higher real income of the labor. Thus export in capital-intensive manufacturing sector significantly lowers disparity in income distribution.

Table 2: GMM estimation of sectoral trade composition and GINI

	Dependent Variable: GINI Coefficient									
Lag of GINI	-0.097 (0.034)***	-0.107 (0.041)**	-0.106 (0.025)***	-0.088 (0.034)**	-0.108 (0.031)***	-0.102 (0.033)***	-0.115 (0.032)***	-0.112 (0.031)***	-0.101 (0.033)***	-0.098 (0.035)***
Total Export	-0.023 (0.011)*									
Agri Export		-0.007 (0.014)								
LIM Export			0.016 (0.012)							
CIM Export				-0.016 (0.007)**						
Service Export					-0.018 (0.013)					
Total Import						-0.012 (0.013)				
Agri Import							-0.012 (0.012)			
LIM Import								-0.005 (0.012)		
CIM Import									-0.014 (0.012)	
Service Import										-0.016 (0.012)
Technology	0.017 (0.027)	-0.005 (0.023)	-0.053 (0.040)	0.016 (0.024)	0.014 (0.030)	0.005 (0.026)	-0.005 (0.025)	-0.006 (0.0250)	0.014 (0.026)	0.003 (0.026)
GDP Growth	-0.0005 (0.0008)	-0.0005 (0.001)	0.0003 (0.0006)	-0.0004 (0.0007)	-0.0003 (0.0008)	0.00009 (0.0008)	-0.0003 (0.0007)	0.0002 (0.0008)	0.00009 (.00008)	-0.0002 (0.0008)
Inflation CPI	-0.0005 (0.0006)	-0.0004 (0.0006)	0.00005 (0.0005)	-0.0004 (0.0006)	-0.0004 (0.0006)	-0.0003 (0.0006)	-0.0004 (0.0006)	-0.0003 (0.0006)	-0.0003 (0.0007)	-0.0003 (0.0006)
Unemployment	-0.0003 (0.0008)	0.0002 (0.0009)	0.0013 (0.0008)	0.0000 (0.0007)**	-0.0001 (0.0009)	0.00002 (0.0009)	-0.0001 (0.0009)	0.0002 (0.0008)	-0.0001 (0.0009)	-0.0002 (0.0009)
Constant	0.404 (0.111)***	0.251 (0.107)**	0.021 (0.122)	0.305 (0.071)***	0.357 (0.127)***	0.293 (0.122)***	0.309 (0.111)***	0.230 (0.1150**	0.310 (0.115)**	0.328 (0.105)***

Observations	167	167	166	167	167	167	167	167	167	167
No. of Groups	31	31	31	31	31	31	31	31	31	31
No. of Instrument	33	33	33	33	33	33	33	33	33	33
Hansen p-value	0.569	0.468	0.457	0.538	0.605	0.412	0.450	0.438	0.530	0.494
AR (2)	0.068	0.115	0.866	0.083	0.127	0.237	0.105	0.241	0.165	0.170

Note: The table summarises the system GMM regression results with their standard errors in parenthesis. It also reports Number of observations, No. of Groups, No. of instruments, Hansen test p-value and AR (2). *, **, and *** indicates that the coefficients are statistically significant at the 10%, 5%, and 1% level respectively. Agri, LIM, and CIM denote Agriculture, labor-intensive manufacturing and capital-intensive manufacturing sector respectively

It is also inferred from the regression results that Gini coefficient in the current period decreases at a faster rate for the countries that experience high level of income inequality (Gini) in the previous period as the one-period lag value of Gini shows significant negative association with Gini growth in the regression results. Technological progress has a mixed effect on the growth of Gini. It shows a negative association with Gini growth for agriculture and labor-intensive manufacturing export and import, but its impact is positive in all other cases. The regression results suggest that technological progress increases income inequality as it is associated with raising skill. Due to a huge portion of unskilled labor in the emerging economies, technology change raises the income inequality through higher premium for skill. However, when we consider export and import of agriculture and labor-intensive manufacturing as trade variable, technology shows a negative association with the growth of Gini. It suggests that technology reduces inequality in the case of agriculture and labor-intensive manufacturing trade. Inflation is negatively linked with Gini growth whereas GDP growth and unemployment have mixed effect on Gini growth.

Table 3: GMM estimation of sectoral trade composition and income inequality (20:20 ratio)

	Dependent Variable: Income Inequality (20:20 ratio)									
Lag of Inequality	-0.197 (0.044)***	-0.225 (0.051)***	-0.208 (0.042)***	-0.190 (0.042)***	-0.211 (0.048)***	-0.198 (0.044)***	-0.204 (0.045)***	-0.200 (0.043)***	-0.198 (0.043)***	-0.195 (0.045)***
Total Export	-1.07 (0.587)*									
Agri Export		0.415 (0.738)								
LIM Export			0.677 (1.27)							
CIM Export				-0.763 (0.409)*						
Service Export					-0.645 (0.582)					
Total Import						-0.933 (0.586)				
Agri Import							-1.363 (0.778)*			
LIM Import								-1.13 (0.745)		
CIM Import									-0.861 (0.545)	
Service Import										-1.037 (0.601)*
Technology	0.939 (1.42)	-1.29 (1.70)	-2.52 (3.40)	0.858 (1.388)	0.357 (1.41)	0.717 (1.329)	0.728 (1.54)	0.821 (1.475)	0.959 (1.29)	0.407 (1.363)
GDP Growth	-0.053 (0.053)	-0.025 (0.077)	-0.057 (0.054)	-0.048 (0.052)	-0.062 (0.051)	-0.054 (0.052)	-0.060 (0.052)	-0.053 (0.054)	-0.047 (0.0510)	-0.063 (0.054)
Inflation CPI	-0.008 (0.001)***	-0.005 (0.003)	-0.004 (0.003)	-0.008 (0.001)***	-0.007 (0.001)***	-0.008 (0.001)***	-0.008 (0.001)***	-0.009 (0.002)	-0.008 (0.002)	-0.008 (0.001)***
Unemployment	0.065 (0.066)	0.125 (0.093)	0.134 (0.102)	0.079 (0.068)	0.087 (0.076)	0.065 (0.069)	0.052 (0.057)	0.056 (0.063)	0.069 (0.070)	0.058 (.072)
Constant	12.44 (6.43)*	-2.35 (7.32)	-4.439 (11.74)	8.65 (4.30)*	7.74 (6.21)	11.102 (6.585)	14.34 (7.55)*	12.23 (7.43) ***	9.88 (5.96)***	11.87 (6.48)*

Observations	164	164	164	164	165	164	164	164	164	165
No. of Groups	31	31	31	31	31	31	31	31	31	31
No. of Instrument	24	24	24	24	24	24	24	24	24	24
Hansen p-value	0.551	0.360	0.259	0.401	0.360	0.368	0.498	0.394	0.290	0.629
AR (2)	0.280	0.311	0.323	0.272	0.309	0.291	0.295	0.295	0.295	0.288

Note: The table summarises the system GMM regression results with their standard errors in parenthesis. It also reports Number of observations, No. of Groups, No. of instruments, Hansen test p-value and AR (2). *, **, and *** indicates that the coefficients are statistically significant at the 10%, 5%, and 1% level respectively. Agri, LIM, and CIM denote Agriculture, labor-intensive manufacturing and capital-intensive manufacturing sector respectively

The study uses the ratio of average income of highest and lowest quintile as a measure of vertical inequality between the two extreme income groups. The regression results show that export of agricultural and labor-intensive manufacturing sectors increases inequality between the two extreme quintiles of income groups whereas capital-intensive manufacturing and service export reduces the inequality. However, according to the results, import in any of the four sectors reduces income inequality, but agriculture and service imports have significant effect. Technology has a positive linkage with the growth of inequality whereas agriculture and labor-intensive manufacturing export is negatively associated with income inequality. This result is also consistent when we consider Gini as a measure of income inequality. High inflation reduces inequality insignificantly, and inequality falls with higher economic growth whereas unemployment has a positive association with the growth of income inequality.

Table 4: GMM estimation of sectoral trade composition and absolute income inequality (income difference between highest and lowest quintile)

	Dependent Variable: absolute income inequality (income difference between highest and lowest quintile)									
Lag of Absolute Inequality	-0.142 (0.093)	-0.124 (0.074)*	-0.085 (0.076)	-0.152 (0.104)	-0.151 (0.093)	-0.142 (0.088)	-0.122 (0.079)	-0.195 (0.111)	-0.157 (0.096)	-0.119 (0.078)
Total Export	0.120 (0.080)									
Agri Export		0.070 (0.031)**								
LIM Export			0.1821 (0.073)**							
CIM Export				0.079 (0.060)						
Service Export					0.147 (0.089)					
Total Import						0.145 (0.073)*				
Agri Import							0.131 (0.069)*			
LIM Import								0.223 (0.109)**		
CIM Import									0.148 (0.076)**	
Service Import										0.095 (0.0550)*
Technology	-0.204 (0.117)*	-0.124 (0.074)*	-0.535 (0.229)**	-0.176 (0.123)	-0.272 (0.127)*	-0.232 (0.109)**	-0.177 (0.102)*	-0.284 (0.136)**	-0.285 (0.126)**	-0.139 (0.082)*
GDP Growth	0.007 (0.007)	0.010 (0.006)*	0.012 (0.006)*	0.006 (0.007)	0.007 (0.007)	0.009 (0.006)	0.009 (0.006)	0.007 (0.006)	0.007 (0.007)	0.009 (0.006)
Inflation CPI	-0.002 (0.002)	-0.002 (0.002)	-0.0008 (0.002)	-0.002 (0.002)	-0.002 (0.002)	-0.002 (0.002)	-0.002 (0.002)	-0.002 (0.002)	-0.002 (0.002)	-0.002 (0.002)
Unemployment	0.0008 (0.004)	-0.0007 (0.003)	0.002 (0.003)	-0.001 (0.003)	0.001 (0.004)	0.003 (0.004)	0.001 (0.004)	0.006 (0.006)	0.003 (0.004)	0.0002 (0.003)
Constant	-0.577 (0.578)	-0.069 (0.343)	-1.16 (0.473)**	-0.053 (0.315)	-0.707 (0.646)	-0.865 (0.544)	-0.658 (0.480)	-1.27 (0.689)*	-0.761 (0.518)	-0.379 (0.447)

Observations	165	165	164	165	166	165	165	165	165	165
No. of Groups	31	31	31	31	31	31	31	31	31	31
No. of Instrum	33	33	33	33	33	33	33	33	33	33
Hansen test p-value	0.459	0.320	0.371	.369	0.297	0.478	0.417	0.437	0.450	0.438
AR (2)	0.405	0.398	0.380	.415	0.411	0.393	0.391	0.398	0.403	0.407

Note: The table summarises the system GMM regression results with their standard errors in parenthesis. It also reports Number of observations, No. of Groups, No. of instruments, Hansen test p-value and AR (2). *, **, and *** indicates that the coefficients are statistically significant at the 10%, 5%, and 1% level respectively. Agri, LIM, and CIM denote Agriculture, labor-intensive manufacturing and capital-intensive manufacturing sector respectively

To identify the effect of trade composition on absolute income inequality we also use the income differences between highest and lowest quintile of income groups. Although export and import of different sectors reduce absolute income inequality as measured by Gini coefficient and the ratio of average income of highest and lowest quintile, the income difference between these two groups significantly goes up with growing export and import of the four broad sectors. It indicates that trade reduces relative income inequality but increases absolute income inequality significantly. However, the significance and magnitude of different sectors' effects on absolute income inequality vary substantially.

This result supports the theoretical argument by Ravallion (2003) that growing trade may reduce the relative income inequality between and within groups but the absolute income inequality measured by the income difference between the two groups raises significantly with the increasing trade. Another significant issue is the effects of technology on income inequality. Technology does not have significant effect on income inequality measured in relative terms, but the results show technology has statistically significant effect in reducing absolute income inequality measured by the income differences between two extreme quintiles of income group. Both GDP growth and unemployment are positively associated with absolute income inequality whereas inflation has a negative linkage with income inequality.

Table 5: GMM estimation of revealed comparative advantage (RCA) and income inequality

Dependent Variables	GINI				Income Inequality (20:20 ratio)				Absolute Income Inequality			
Lag of Dependent Variable	-0.136 (0.034)***	-.0121 (0.034)***	-0.142 (0.040)***	-0.145 (0.039)***	-0.217 (0.055)***	-0.2181 (0.051)***	-0.209 (0.042) ***	-0.263 (0.066)***	-0.081 (0.06)	-0.061 (0.065)	-0.078 (0.065)	-0.109 (0.071)
RCA Agri	-0.0005 (0.001)				0.065 (0.163)				-0.004 (0.007)			
RCA LIM		0.002 (0.003)				-0.035 (0.083)				0.003 (0.016)		
RCA CIM			-0.0009 (0.012)				-0.321 (0.4002)				-0.034 (0.035)	
RCA Service				-0.005 (0.010)				-1.98 (1.43)				0.0603 (0.047)
Technology	-0.017 (0.024)	-0.015 (0.023)	-0.019 (0.026)	-0.013 (0.022)	-0.701 (1.42)	-0.839 (1.44)	-1.10 (1.47)	0.529 (1.85)	-0.078 (0.075)	-0.051 (0.073)	-0.093 (0.078)	-0.114 (0.088)
GDP Growth	0.00002 (0.0011)	-0.0001 (0.001)	0.0001 (0.001)	0.0004 (0.0009)	-0.045 (0.064)	-0.051 (0.051)	-0.044 (0.0548)	-0.023 (0.05)	0.009 (0.006)	0.013 (0.005)**	0.009 (0.006)	0.005 (0.007)
Inflation CPI	-0.0002 (0.000)***	-0.0001 (0.000)***	-0.0002 (0.000)***	-0.0002 (0.000)***	-0.006 (0.001)***	-0.006 (0.001)***	-0.006 (0.001)***	-0.006 (0.002)**	-0.002 (0.003)	-0.001 (0.0008)	-0.002 (0.002)	-0.003 (0.003)
Unemployment	0.0005 (0.0005)	0.0006 (0.0005)	0.0004 (0.0005)	0.0004 (0.0006)	0.110 (0.078)	0.097 (0.068)	0.094 (0.065)	0.155 (0.097)	-0.005 (0.002)*	-0.003 (0.002)	-0.005 (0.002)*	-0.006 (0.003)*
Constant	0.222 (0.064)***	0.190 (0.066)***	0.232 (0.065)***	0.237 (0.074)***	1.39 (1.15)	1.79 (1.18)	2.072 (1.13)**	2.82 (1.40)**	0.480 (0.290)*	0.329 (0.273)	0.495 (0.300)*	0.570 (0.327)*
Observations	167	167	167	168	164	164	164	165	165	165	165	166
No. of Groups	31	31	31	31	31	31	31	31	31	31	31	31
No. of Instrument	24	24	24	24	24	24	24	24	33	33	33	33
Hansen p-value	0.150	0.179	0.123	0.165	0.254	0.098	0.427	0.415	.435	.457	.349	.398
AR (2)	0.295	0.441	0.304	0.332	0.319	0.297	0.285	0.283	0.406	0.364	0.391	0.427

Note: The table summarises the system GMM regression results with their standard errors in parenthesis. It also reports Number of observations, No. of Groups, No. of instruments, Hansen test p-value and AR (2). *, **, and *** indicates that the coefficients are statistically significant at the 10%, 5%, and 1% level respectively. Agri, LIM, and CIM denote Agriculture, labor-intensive manufacturing and capital-intensive manufacturing sector respectively. RCA indicates Revealed Comparative advantage

The study result also shows that revealed comparative advantage of each sector does not have statistically significant association with any of the measures of income inequality and comparative advantage of the four sectors has a mixed association with inequality. Revealed comparative advantage (RCA) of labor-intensive manufacturing sector positively associated with growth of Gini whereas RCA of other three sectors has a negative link with Gini. RCA agriculture has positive linkage with income inequality measured by 20:20 ratio but RCA of other sectors is negatively linked with income distribution. RCA of Agriculture and capital-intensive manufacturing have negative association with absolute income inequality whereas other two sectors have a positive association.

5. CONCLUDING REMARKS AND POLICY IMPLICATIONS

In this globalized era, the world economy is being integrated and international trade is playing a significant role in the economic development of both developed and developing economies. The magnitude and value of international trade are drastically increasing, and growing trade is bringing substantial qualitative changes especially in the developing economies. However, the serious debate among the policy makers and researchers is that whether the growing economic integration in the world economy increases inequality in income distribution. This issue is still a key research focus for the academicians and policymakers since the last two decades. This study aims at identifying whether export and import of different sectors have differential effect on inequality in the emerging economies. We split export and import into four broad sectors namely agriculture; labor-intensive manufacturing; capital-intensive manufacturing and service, as well as measure the RCA of each of these four sectors. We then identify the effect of growing export, import and CA of these sectors on inequality in the emerging economies.

In a word, the results of the study suggest that trade in different sectors has a differential effect on inequality either in terms of direction or magnitude. Labor-intensive manufacturing export increases inequality measured by Gini, whereas import and export of all other sectors reduces Gini and only capital intensive-manufacturing export has statistically significant effect on reducing inequality. Technological progress reduces inequality for agriculture and labor-intensive manufacturing trade, and it has a positive association with Gini for trade of other two sectors.

In the case of vertical income inequality measured by the ratio of average income highest and lowest quintile, agriculture and labor-intensive manufacturing export increase inequality, but export and import of other sectors lower the relative income inequality between the two extreme quintiles of income groups. However, the study results suggest that trade in all four sectors rises the inequality measured in absolute terms by the income differences between highest and lowest quintiles and in most cases, this association is statistically significant. Technology significantly reduces absolute income inequality in the emerging economies. RCA of each sector has mixed as well as insignificant effect on different measures of inequality.

The study has several significant policy implications. The study suggests that trade in various sectors has differential effect on inequality either in magnitude or significance. Another critical policy issue is regarding absolute and relative measures of inequality. Although several studies suggest that trade decreases income inequality in the developing countries this study identifies that although trade reduces inequality measures in relative terms, absolute income inequality substantially goes up with growing trade. Technology has mixed effect on relative inequality, but absolute income difference between the two extreme quintiles of income groups significantly raises with growing trade. However, as per the empirical study, RCA of different sectors does not have strong positive or negative association with either of the inequality measures.

This study has some drawbacks. Due to the lack of well-classified data, it 's hard to separate the export and import into four broad sectors exactly. Moreover, data on income inequality is not available for a substantial number of emerging economies over a long time series that can make the result of empirical study little weak. However, availability of classified trade and inequality data will make the research

in this field more robust and reliable as well as highly conducive to policymaking. We can leave these issues to the future research to be done in this area.

Funding: This study received no specific financial support.
Competing Interests: The authors declared that they have no conflict of interests.
Contributors/Acknowledgement: All authors participated equally in designing and estimation of current research.

References

Acemoglu, D. (2003). Patterns of skill premia. *The Review of Economic Studies, 70*(2), 199-230. *view at Google scholar / view at publisher*

Aghion, P., Burgess, R., Redding, S., & Zilibotti, F. (2005). Entry liberalization and inequality in industrial performance. *Journal of the European Economic Association, 3*(2-3), 291-302. *view at Google scholar / view at publisher*

Attanasio, O., Goldberg, P. K., & Pavcnik, N. (2004). Trade reforms and wage inequality in Colombia. *Journal of development Economics, 74*(2), 331-366. *view at Google scholar / view at publisher*

Balat, J. F., & Porto, G. G. (2007). *Globalization and complementary policies: Poverty impacts on rural Zambia Globalization and Poverty* (pp. 373-416): University of Chicago Press. *view at Google scholar / view at publisher*

Bazzi, S., & Clemens, M. A. (2013). Blunt instruments: avoiding common pitfalls in identifying the causes of economic growth. *American Economic Journal: Macroeconomics, 5*(2), 152-186. *view at Google scholar / view at publisher*

Behrman, J., Birdsall, N., & Szekely, M. (2000). Economic reform and wage differentials in Latin America. *view at Google scholar / view at publisher*

Bensidoun, I., Jean, S., & Sztulman, A. (2011). International trade and income distribution: reconsidering the evidence. *Review of World Economics, 147*(4), 593-619. *view at Google scholar / view at publisher*

Bernard, A. B., & Jensen, J. B. (1997). Exporters, skill upgrading, and the wage gap. *Journal of international Economics, 42*(1), 3-31. *view at Google scholar / view at publisher*

Bhagwati, J., & Srinivasan, T. N. (2002). Trade and poverty in the poor countries. *The American Economic Review, 92*(2), 180-183. *view at Google scholar / view at publisher*

Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of econometrics, 87*(1), 115-143. *view at Google scholar / view at publisher*

Brambilla, I., Lederman, D., & Porto, G. (2012). Exports, export destinations, and skills. *The American Economic Review, 102*(7), 3406-3438. *view at Google scholar / view at publisher*

Busse, M., & Spielmann, C. (2006). Gender inequality and trade. *Review of International Economics, 14*(3), 362-379. *view at Google scholar / view at publisher*

Calderón, C., & Chong, A. (2001). External sector and income inequality in interdependent economies using a dynamic panel data approach. *Economics Letters, 71*(2), 225-231. *view at Google scholar / view at publisher*

Cragg, M. I., & Epelbaum, M. (1996). Why has wage dispersion grown in Mexico? Is it the incidence of reforms or the growing demand for skills? *Journal of development Economics, 51*(1), 99-116. *view at Google scholar / view at publisher*

Czech, B., & Woo, K. T. (2005). The impact of outsourcing to China on Hong Kong's labor market. *The American Economic Review, 95*(5), 1673-1687. *view at Google scholar / view at publisher*

Davidson, C., Martin, L., & Matusz, S. (1999). Trade and search generated unemployment. *Journal of international Economics, 48*(2), 271-299. *view at Google scholar / view at publisher*

Deaton, A. S. (2009). *Instruments of development: Randomization in the tropics, and the search for the elusive keys to economic development.* National Bureau of Economic Research. *view at Google scholar* / *view at publisher*

Demir, F., Ju, J., & Zhou, Y. (2012). Income inequality and structures of international trade. *Asia-Pacific Journal of Accounting & Economics, 19*(2), 167-180. *view at Google scholar*

Dollar, D., & Kraay, A. (2004). Trade, growth, and poverty. *The Economic Journal, 114*(493). *view at Google scholar* / *view at publisher*

Egger, H., & Kreickemeier, U. (2009). Firm heterogeneity and the labor market effects of trade liberalization. *International Economic Review, 50*(1), 187-216. *view at Google scholar* / *view at publisher*

Fajgelbaum, P., Grossman, G. M., & Helpman, E. (2011). Income distribution, product quality, and international trade. *Journal of Political Economy, 119*(4), 721-765. *view at Google scholar* / *view at publisher*

Feenstra, R. C., & Hanson, G. H. (1995). Foreign investment, outsourcing and relative wages: National bureau of economic research. *view at Google scholar* / *view at publisher*

Feenstra, R. C., & Hanson, G. H. (1997). Foreign direct investment and relative wages: Evidence from Mexico's maquiladoras. *Journal of international Economics, 42*(3), 371-393. *view at Google scholar* / *view at publisher*

Fernandes, A. M. (2007). Trade policy, trade volumes and plant-level productivity in Colombian manufacturing industries. *Journal of international Economics, 71*(1), 52-71. *view at Google scholar* / *view at publisher*

French, S. (2014). The composition of trade flows and the aggregate effects of trade barriers. *Journal of international Economics, 98*, 114-137. *view at Google scholar* / *view at publisher*

Goldberg, P. K., & Pavcnik, N. (2003). The response of the informal sector to trade liberalization. *Journal of development Economics, 72*(2), 463-496. *view at Google scholar* / *view at publisher*

Goldberg, P. K., & Pavcnik, N. (2004). *Trade, inequality, and poverty: What do we know? Evidence from recent trade liberalization episodes in developing countries*. National Bureau of Economic Research. *view at Google scholar* / *view at publisher*

Goldberg, P. K., & Pavcnik, N. (2007). Distributional effects of globalization in developing countries. *Journal of economic literature, 45*(1), 39-82. *view at Google scholar* / *view at publisher*

Grossman, G. M., & Helpman, E. (2014). *Growth, trade, and inequality.* In N. w20502 (Ed.): National Bureau of Economic Research. *view at Google scholar* / *view at publisher*

Hamermesh, D. S. (1996). *Labor demand*. princeton University press. *view at Google scholar* / *view at publisher*

Harrison, A., & Hanson, G. (1999). Who gains from trade reform? Some remaining puzzles. *Journal of development Economics, 59*(1), 125-154. *view at Google scholar* / *view at publisher*

Harrison, A., McLaren, J., & McMillan, M. (2011). Recent perspectives on trade and inequality. *Annu. Rev. Econ., 3*(1), 261-289. *view at Google scholar* / *view at publisher*

Harrison, A., & Scorse, J. (2004). *Moving up or moving out? Anti-sweatshop activists and labor market outcomes*. National Bureau of Economic Research. *view at Google scholar* / *view at publisher*

Hertel, T. W., & Reimer, J. J. (2005). Predicting the poverty impacts of trade reform. *Journal of International Trade & Economic Development, 14*(4), 377-405. *view at Google scholar* / *view at publisher*

Jones, R. W. (1971). A three-factor model in theory, trade, and history. *Trade, balance of payments, and growth, 1*, 3-21. *view at Google scholar*

Kaplan, D., & Verhoogen, E. (2006). *Exporting and individual wage premia: Evidence from Mexican employer-employee data*. Columbia University, mimeograph. *view at Google scholar*

Khadraoui, N., & Smida, M. (2012). Financial development and economic growth: static and dynamic panel data analysis. *International Journal of Economics and Finance, 4*(5), 94. *view at Google scholar* / *view at publisher*

Kletzer, L. G. (2004). Trade-related Job Loss and Wage Insurance: a Synthetic Review. *Review of International Economics, 12*(5), 724-748. *view at Google scholar* / *view at publisher*

Krueger, A. O. (1983). *Trade and employment in developing countries: Synthesis and conclusions*. University of chicago Press. *view at Google scholar* / *view at publisher*

Kumar, U., & Mishra, P. (2008). Trade liberalization and wage inequality: Evidence from India. *Review of Development Economics, 12*(2), 291-311. *view at Google scholar* / *view at publisher*

Lall, S. (2000). The Technological structure and performance of developing country manufactured exports, 1985-98. *Oxford development studies, 28*(3), 337-369. *view at Google scholar* / *view at publisher*

Lary, H. B. (1968). *Imports of manufacturers from less developed countries*. National Bureau of Economic Research. *view at Google scholar* / *view at publisher*

Lorentowicz, A., Marin, D., & Raubold, A. (2005). *Is human capital losing from outsourcing?* Evidence for Austria and Poland. *view at Google scholar*

Marin, D. (2006). A new international division of labor in Europe: Outsourcing and offshoring to Eastern Europe. *Journal of the European Economic Association, 4*(2-3), 612-622. *view at Google scholar* / *view at publisher*

Nissanke, M., & Thorbecke, E. (2006). Channels and policy debate in the globalization–inequality–poverty nexus. *World Development, 34*(8), 1338-1360. *view at Google scholar* / *view at publisher*

Petit, P., & Vivarelli, M. (1997). *The economics of technology and employment: theory and empirical evidence*. JSTOR. *view at Google scholar*

Ravallion, M. (2003). The debate on globalization, poverty and inequality: why measurement matters. *International Affairs, 79*(4), 739-753. *view at Google scholar* / *view at publisher*

Santos-Paulino, A. U. (2012). *Trade, income distribution and poverty in developing countries: a survey*. United Nations Conference on Trade and Development. *view at Google scholar*

Seven, U., & Coskun, Y. (2016). Does financial development reduce income inequality and poverty? Evidence from emerging countries. *Emerging Markets Review, 26*, 34-63. *view at Google scholar* / *view at publisher*

Thorbecke, W., & Zhang, H. (2009). The effect of exchange rate changes on china's labour-intensive manufacturing exports. *Pacific Economic Review, 14*(3), 398-409. *view at Google scholar* / *view at publisher*

Tyers, R., Phillips, P., & Findlay, C. (1987). ASEAN and China exports of labour-intensive manufactures: performance and prospects. *ASEAN Economic Bulletin, 3*(3), 339-367. *view at Google scholar* / *view at publisher*

Verhoogen, E. A. (2008). Trade, quality upgrading, and wage inequality in the Mexican manufacturing sector. *The quarterly journal of economics, 123*(2), 489-530. *view at Google scholar* / *view at publisher*

Winters, L. A., & Martuscelli, A. (2014). Trade Liberalization and Poverty: What have we learned in a decade? *Annu. Rev. Resour. Econ., 6*(1), 493-512. *view at Google scholar* / *view at publisher*

Appendices

Appendix A: Sectoral composition of trade as per SITC rev. 3

Labour-Intensive Manufacturing products with their SITC number as per SITC rev. 3

61. Leather, leather manufactures, n.e.s., and dressed furskins	62. Rubber manufactures, n.e.s.
63. Cork and wood manufactures (excluding furniture)	64. Paper, paperboard and articles of paper pulp, of paper or of paperboard
65. Textile yarn, fabrics, made-up articles, n.e.s., and related products	66. Non-metallic mineral manufactures, n.e.s.
69. Manufactures of metals, n.e.s.	81. Prefabricated buildings; sanitary, plumbing, heating and lighting fixtures and fittings, n.e.s.
82. Furniture and parts thereof; bedding, mattresses, mattress supports, cushions and similar stuffed furnishings	83. Travel goods, handbags and similar containers
84. Articles of apparel and clothing accessories	85. Footwear
88. Photographic apparatus, equipment and supplies and optical goods, n.e.s.; watches and clocks	89. Miscellaneous manufactured articles, n.e.s. (excluding 891 Arms and ammunition)

Capital-intensive Manufacturing products with their SITC number as per SITC rev. 3

3. Mineral fuels, lubricants and related materials	32. Coal, coke and briquettes
33. Petroleum, petroleum products and related materials	34. Gas, natural and manufactured
35. Electric current	51. Organic chemicals
52. Inorganic chemicals	53. Dyeing, tanning and colouring materials
54. Medicinal and pharmaceutical products	55. Essential oils and resinoids and perfume materials; toilet, polishing and cleansing preparations
56. Fertilizers (other than those of group 272)	57. Plastics in primary forms
58. Plastics in non-primary forms	59. Chemical materials and products, n.e.s.
71. Power-generating machinery and equipment	72. Machinery specialized for particular industries
73. Metalworking machinery	74. General industrial machinery and equipment, n.e.s., and machine parts, n.e.s.
75. Office machines and automatic data-processing machines	76. Telecommunications and sound-recording and reproducing apparatus and equipment
77. Electrical machinery, apparatus and appliances, n.e.s., and electrical parts thereof (including non-electrical counterparts, n.e.s., of electrical household-type equipment)	78. Road vehicles (including air-cushion vehicles)
79. Other transport equipment	67. Non-ferrous metals
68. Iron and steel	87. Professional, scientific and controlling instruments and apparatus, n.e.s.
891. Arms and ammunition	27. Crude fertilizers, other than those of Division 56, and crude minerals (excluding coal, petroleum and precious stones)
28. Metalliferous ores and metal scrap	

Agriculture: products with their SITC number as per SITC rev. 3

0. Food and live animals
1. Beverages and tobacco

2. Crude materials, inedible, except fuels (excluding 27 and 28)
4. Animal and vegetable oils, fats and waxes
Note: the classification of agricultural products was based on technical notes of WTO trade database. And the labor-intensive and capital-intensive products were classified with reference to WTO trade database , Lary (1968), Tyers *et al*. (1987), (Lall, 2000).

Appendix B: List of country samples

EAGLEs:
Brazil, China, India, Indonesia, Mexico, Russia, Turkey
NEST:
Argentina,Bangladesh, Chile, Colombia, **Egypt, Iran, Iraq,** Kazakhstan, Malaysia,Nigeria, Pakistan, Peru, Philippines, Poland, **Qatar, Saudi Arabia, South Africa**, Thailand, Vietnam
Other emerging markets:
Bahrain, Bulgaria, **CzechRepublic,**Estonia, Hungary, **Jordan, Kuwait**, Latvia, Lithuania, **Mauritius, Oman,** Romania, Slovakia, Sri Lanka, **Sudan**, Tunisia, **United Arab Emirates,** Ukraine, Venezuela
Note: The countries underlined are excluded from regression analysis due to unavailability of poverty data. The list of emerging economies and their classification was given as per BBVA Research list as of March 2014. Source: Wikipedia access date November 22, 2016

Appendix C: The definition of the variables with their data sources

Variables	Definition	Data Source
Poverty headcount ratio (HCR) at $1.90 a day	The percentage of the population living on less than $1.90 a day at 2011 international prices.	World Bank (2017)
Average income of the lowest quintile	The average per capita income of the lowest 20% quintile. We use logarithmic growth of the average per capita income of the poorest quintile as a measure of absolute poverty. To calculate the average income, we multiply the income share of the lowest 20% quintile, which is provided by the World Bank's Database, by the average per capita GDP and divide all by 0.2	World Bank (2017)
Compo- RCA	Comparative advantage in labor-intensive manufacturing /capital-intensive manufacturing/ agriculture/ service sector	UNComtrade database (2017)
Technology	Technological deepening and upgrading index value developed by UNIDO	UNIDO (2017)
GDP growth	Annual percentage growth rate of GDP at market prices	World Bank (2017)
Unemployment Rate	Unemployment refers to the share of the labor force that is without work but available for and seeking employment.	World Bank (2017)
Inflation CPI	Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly.	World Bank (2017)