



Global Conference on Business and Economics Research (GCBER) 2017  
14-15 August 2017, Universiti Putra Malaysia, Malaysia

# Trade Openness and Income Inequality in Selected Developing Countries

Tee Heng Guan\*, Shivee Ranjane Kaliappan, Lee Chin, Rusmawati Said

*Faculty of Economics and Management, Universiti Putra Malaysia, Malaysia*

---

## Abstract

The purpose of this paper is to examine the nexus between trade openness and income inequality in the case of eight selected developing countries from 1985 to 2014 under Kuznet framework. Based on the idea of Kuznet curve, income inequality rise with national income growth initially and drop after reaching certain turning point. Most of the papers merely focus on the changing sign that indicated the existence of Kuznet curve. However, they ignored the threshold value whereby the turning point occurred. This paper not only fills the gap by considering the threshold value but also following the idea of “Openness Kuznet Curve” which is another version of Kuznet curve that hardly received attention in empirical studies. This paper follows measurement proposed by Squalli and Wilson (2011) by considering a multidimensional index which is composite trade shares to measure for trade openness. This index not only accounts for the contribution of international trade in terms of GDP but also on the relative size of the country’s international trade compared to the world economy. By considering two dimensions of international trade, the composite trade shares are therefore able to capture the real contributions of trade openness more precisely compared to the widely used trade shares that only account for the share of international trade in GDP alone. Different from most of the empirical study, this paper has found the non-existence of “Openness Kuznet Curve” since the null hypothesis of no threshold effect failed to be rejected at 95 % confidence level. Hence, the linear model is applied and the results from static panel indicated the relationships between trade openness and income inequality were significantly positive when using both composite trade shares and trade shares under the random effect model. This is against with the prediction of Heckscher-Ohlin and Stolper-Samuelson theorem that trade openness is beneficial in reducing income inequality in the case of developing countries. This paper has also proven that it is important to take into account of the multidimensional nature of trade openness since the magnitude of trade openness is found to be relatively smaller than when using the trade shares for measuring trade openness in static panel estimations. By using a relatively more reliable indicator for trade openness, the composite trade shares has able to avoid the overestimation of trade openness on income inequality as indicated by trade shares which ignored the interaction with world dimension of trade openness. Given the evidence of the significantly positive relationships between trade openness and income inequality, the policy makers should anticipate the potential adverse effect that might occur with greater trade openness to ensure greater trade openness continue to be beneficial for the countries.

**Keywords:** Trade openness, composite trade shares, income inequality, developing countries

---

## 1. INTRODUCTION

According to UNDP (2013), developing countries continue to suffer from high level of income inequality as represented by Gini index. In 1992, developing countries recorded high Gini index at more than 35 and the condition does not change significantly since Gini index still stood high, close to 50 in 2005. Lee (2010) pointed

---

\*Corresponding author. Tel.: 017-3901328  
E-mail: [teehgth@gmail.com](mailto:teehgth@gmail.com)

out that globalization is to be blamed for the outcome of income inequality for certain countries. This is because as the world becoming more integrated, the external exposure has greater influence over the world economies, including the income distribution of the nations. As suggested by standard theory of international trade by Heckscher-Ohlin and Stolper-Samuelson, not every country is expected to experience rising income inequality. For instance, only the developed nations are expected to encounter rising income inequality whereas the developing nations are expected to have lowering income inequality. As trade openness is a product of globalization, therefore it is natural to link it with income inequality as well.

Meschi and Vivarelli (2009) raised the issue whether trade openness improves or worsen the income distribution (as suggested by the standard international trade theory) in the case of developing countries. However, the relationships between trade openness and income inequality are valid only under the Stolper-Samuelson model which is in linear form. Besides linear form, there is possibility that trade openness and income inequality relationships might also exhibit a nonlinear form as shown by Kuznet model. Under Kuznet model, at the early development stage, it is predicted that the relationships between trade openness and income inequality are positive before it changes into negative as the countries developed further. Since few studies have established nonlinear relationship between trade openness and income inequality (e.g. Dobson and Ramlogan, 2009; Jalil, 2012; Lee, 2010), this opens the possibility on re-examining this issue in the context of the developing countries. Additionally, preliminary scatter plot analyses on trade openness-income inequality nexus also did not revealed the consistent trend over time. Thus, the main issue is finding the ideal level of trade openness so that income equity is achieved. By knowing the optimum level of income, it enables for effective redistributive policy making. This can be achieved by finding the threshold point for trade openness via static threshold model.

The remaining structure of this study is as follows. In Section 2, this study introduces the commonly used trade openness measurements after providing the background study of trade openness and income inequality in Section 1, followed by the newly introduced composite trade shares measurement for testing the relationships with income inequality in selected developing countries Section 3 describes the data and variables used in the study. Section 4 reports and discusses the results of study. Finally, the last section in this study concludes the findings and suggests possible future advancements.

## 2. TRADE OPENNESS MEASUREMENTS

In a very recent work, Squalli and Wilson (2011) pointed that trade openness is commonly measured in terms of its share of the income for a given nation, that is, in the form of export plus import over GDP or in terms of export or import alone over the GDP. This is supported by Sakyi et al. (2015), Dehesa (2007) and Liu et al. (1997), to name a few. Sakyi et al. (2015) regarded trade openness itself is an issue since it has various measurements but agreed that the share of total trade in GDP, also known as nominal trade shares, as the standard measurement for trade openness. Three types of trade openness measurements developed by Squalli and Wilson (2011) are considered in this study, including trade shares, world trade shares, and composite trade shares as in Table 1. Having three measurements for trade openness is informative since it is expected to alter the strength of the relationships between trade openness with income inequality in different dimensions. Accordingly, TS captures only the domestic dimension while WTS only concerns the global dimensions. By combining these two into a single measurement, CTS has the advantage of able to capture the multi-dimensional of trade openness and hence able to provide a better understanding of trade openness condition of the selected developing countries as listed in Table 2.

**Table 1. Trade Openness Measurements Used in Squalli and Wilson (2011)**

Measurement	Definition
$(X + M)_i / GDP_i$	Standard Trade Shares (TS)
$(X + M)_i^2 / N(X + M)_j$	World Trade Shares (WTS)
$N(TS \times WTS)$	Composite Trade Shares (CTS)

**Table 2. Lists of selected developing countries in the study**

Trade Openness and Income Inequality	Bangladesh, China, Costa Rica, Dominican Republic, Indonesia, Thailand, Tunisia, Uganda.
--------------------------------------	--

Figure 1 and Figure 2 shows different relationships between different trade openness indicators as measured by trade shares and composite trade shares with income inequality as measured by Gini coefficient. Figure 1 shows trade shares have nonlinear relationships with income inequality from 1985 to 2014. Nonlinear means the existence of turning point rather than constant trends over time. From 1985 to 2014, it is continuously observed that trade shares increased the income inequality initially. However, beyond certain point, greater trade openness started to improve the income inequality condition. This is in line with “Openness Kuznet Curve” which shows an inverted U shape between trade openness and income inequality. However, when using composite trade

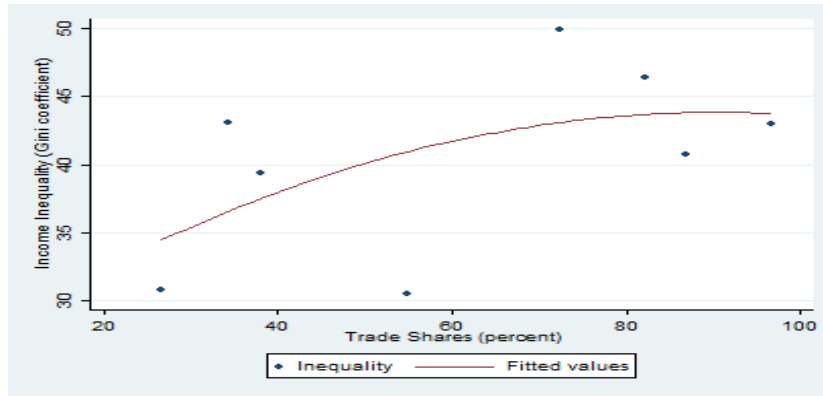


Figure 1. Scatter Plot of Trade Shares-Income Inequality, 1985-2014

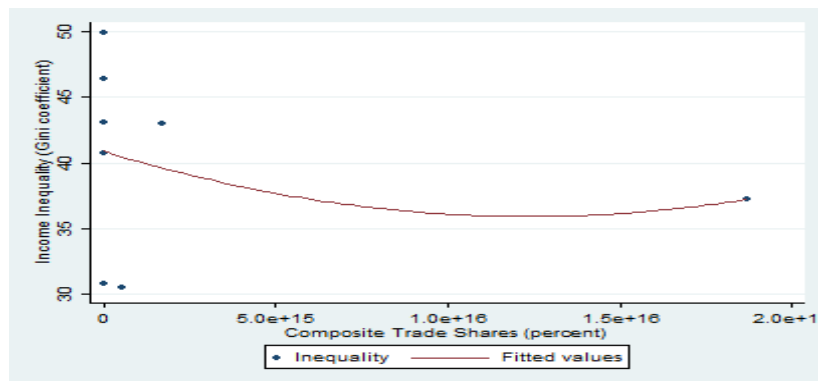


Figure 2. Scatter Plot of Composite Trade Shares-Income Inequality, 1985-2014

shares as trade openness in Figure 2, composite trade shares reduced the income inequality initially. However, beyond certain point, greater trade openness started to worsen the income inequality condition. This is against with “Openness Kuznet Curve” which proposed that trade openness replacing the national income growth and income inequality rise with trade openness initially and drops after reaching certain turning point. Since the scatter plots shows that there might be an existence of nonlinear relationship between trade openness and income inequality among the selected developing countries, it is important to conduct further empirical analysis on this matter under Kuznet framework.

### 3. EMPIRICAL MODEL OF TRADE OPENNESS AND ECONOMIC GROWTH

Given the evidence of Kuznet curve, the model is estimated in the following form:

$$\log II_{it} = \alpha + \beta_1 \log TO_{it} + \beta_2 \log TO_{it}^2 + \beta_3 \log GDP_{it} + \beta_4 \log INF_{it} + \beta_5 \log EDU_{it} + \varepsilon_{it} \quad (1)$$

From Equation (1),  $\log II_{it}$  as a dependent variable and  $\log TO_{it}$  together with its squared term,  $\log TO_{it}^2$  as independent variables for trade openness. Other independent variables such as national income ( $\log GDP_{it}$ ), inflation ( $\log INF_{it}$ ) and education ( $\log EDU_{it}$ ) are included as control variable in this study. In accordance with Jalil (2012), this study also focused on the role played by trade openness in explaining for the nonlinear relationships with income inequality. Jalil (2012) included average tariff rates, effective tariff rates, economic globalization and overall globalization apart from trade ratios as the proxy for trade openness. However, Jalil (2012) did not include GDP per capita which is a standard variable for explaining income inequality under Kuznet framework and it is replaced by openness variable. Based on the evidence from the scatter plot analysis, Jalil (2012) showed the possibility of openness variable in replacing the GDP per capita variable as the determinant of income inequality. Hence, it allows for the possibility following the Kuznet idea that openness has turning point after reaching certain level that income inequality changed as supported by Lee (2010). However, in the case of non-existence of nonlinear relationships between trade openness and income inequality, equation (2) as follows applies:

$$\log II_{it} = \alpha + \beta_1 \log TO_{it} + \beta_2 \log GDP_{it} + \beta_3 \log INF_{it} + \beta_4 \log EDU_{it} + \varepsilon_{it} \quad (2)$$

#### 4. EMPIRICAL RESULTS OF STATIC PANEL ESTIMATIONS

**Table 3. Static Threshold Results (Composite Trade Shares)**

	Composite trade shares as trade openness
<b>Threshold estimates <math>\hat{\gamma}</math></b>	27.76
<b>p-value</b>	0.55
<b>95 % confidence interval</b>	(27.62, 28.15)
<b>Impact of Composite trade shares</b>	
$\hat{\beta}_1$	0.04 (0.01)**
$\hat{\beta}_2$	0.04 (0.01)***
<b>Impact of covariates</b>	
<b>National income growth</b>	0.00 (0.02)
<b>Inflation (CPI percentage)</b>	0.01 (0.02)
<b>Secondary Education Enrollment</b>	-0.06 (0.06)
<b>Constant</b>	2.62 (0.33)***
<b>Observations</b>	40

Note: Standard errors in parentheses. \*\*\*, \*\* and \* indicates statistical significance at the 1%, 5% and 10 % levels respectively.

**Table 4. Static Panel Results (Composite Trade Shares)**

Variables	Pooled Least Squares	Random effects	Fixed effects
<b>Constant</b>	3.61 (0.33)***	2.60 (0.32)***	2.35 (0.33)***
<b>Composite trade shares</b>	-0.02 (0.01)*	0.03 (0.01)**	0.04 (0.01)***
<b>National income growth</b>	0.06 (0.04)	0.01 (0.02)	0.01 (0.02)
<b>Inflation (CPI percentage)</b>	0.05 (0.04)	0.02 (0.02)	0.02 (0.02)
<b>Secondary Education Enrollment</b>	0.17 (0.07)**	0.02 (0.06)	-0.01 (0.06)
<b>Breusch-Pagan LM test</b>	43.82 (0.00)***	43.82 (0.00)***	-
<b>Hausman test</b>	-	4.29 (0.37)	4.29 (0.37)
<b>Observations</b>	40	40	40

Note: Standard errors in parentheses. \*\*\*, \*\* and \* indicates statistical significance at the 1%, 5% and 10 % levels respectively.

Table 3 showed the static threshold model which indicates the absence of threshold since p-value is greater than 0.05. To the best of author's knowledge, none of the studies examine on threshold point following the Openness Kuznet Curve framework. The existing empirical studies that adopted Openness Kuznet Curve framework are from the study of Dobson and Ramlogan (2009), Lee (2010), and Jalil (2012). All of them have confirmed the existence of the Openness Kuznet Curve in nonlinear specification. On the other hand, this study has rejected on the existence of Openness Kuznet Curve.

Table 4 showed the results of static panel estimations after the rejection of the existence of threshold. Out of the three static panel estimations including pooled OLS, fixed effects and random effects models, random effects model was the most appropriate static panel estimation since its calculated value greater than the value of tabulated chi-squared when selecting between pooled versus random effect model using Breusch and Pagan Lagrangian

multiplier test. After that, Hausman test is a test to further select between random and fixed effect when random effect is preferred over pooled model. The result from Hausman test indicated that random effect model is preferred compared to fixed effect model. Hence, the appropriate model for estimating the static relationships between trade openness and income inequality is the random effects model.

Based on the results of the random effects estimation, trade openness as represented by composite trade shares showed positive and statistically significant relationships with income inequality even though its coefficient was small (0.03). This is against with Stolper-Samuelson and Heckscher-Ohlin theorem which predicted negative relationships between trade openness and income inequality in the case of developing countries (Zakaria and Fida, 2016; Meschi and Vivarelli, 2009). To the best of author's knowledge, none of the existing empirical studies have used composite trade shares as measurement for trade openness in studying the relationships between trade openness and income inequality since it is still considered as a relatively new measurement for trade openness (Alragas et al., 2015) and most of the empirical studies tend to use trade shares as indicator for trade openness. Among the empirical studies which used trade shares as proxy for trade openness, some of them have generally found contradicting results with theoretical predictions, namely in the study of Daumal (2013) in the case of India; Spilimbergo et al. (1999) for a total of 34 developing and developed countries as well as Zakaria and Fida (2016) in the case of China and South Asian Association for Regional Cooperation countries (SAARC). According to Spilimbergo et al. (1999), following with the advancement of trade openness policy, the aspect of income redistribution is often been neglected and that is the reason why trade openness is positively and significantly related to income inequality. Zakaria and Fida (2016) provide another explanation for the positive effects of trade openness on income inequality in term of the trade structure. Accordingly, it is due to the export orientation in primary goods rather than manufactured goods which have resulting into higher income inequality from greater trade openness. Focusing particularly on developing countries, Meschi and Vivarelli (2009) have attributed the rise of income inequality with technological advancements following international trade with advanced countries. Accordingly, the technological advancements created demand on skilled labor and hence widen the wage differentials which eventually also widen the income inequality. The results implies for the role played by trade openness in explaining for the income inequality condition among the selected developing countries which requires for further attention by policy makers. Other than that, all of the other control variables were unable to explain for the income inequality among the selected developing countries since they are all not significant even at 90 % significance level.

Overall, composite trade shares as a representative variable for trade openness showed that it appeared to be the significant variable for explaining the income inequality condition among the eight of the selected developing countries. However, composite trade shares were relatively small the in term of its magnitude of coefficient since a one percent increase of composite trade shares resulting into 0.03 percent decrease in income inequality in random effects model.

## 5. CONCLUSION AND POLICY IMPLICATIONS

Based on eight selected developing countries from 1985 to 2014, this study failed to find the existence of threshold or nonlinear relationships between trade openness and income inequality. Hence, the study continues by using linear and static specification for testing the relationships between trade openness and income inequality. The preferred models of random effect model for examine the relationships between trade openness and income inequality showed positive effect and significant using composite trade shares measurement. Given the overall positive effect of trade openness and income inequality, the policy makers should aware of the side effect that might occur following greater trade openness to ensure more trade openness that will continue to benefit the countries rather than making the countries to suffer from the problem of income inequality.

## REFERENCES

- Alragas, R., Murphy, P., Parhi, M., Mishra, T. K., and Ouattara, B. (2015). Empirical evidence on the relationship between trade openness and economic growth. *Global Journal of Business Research*, 9(3): 91-96.
- Dehesa, G. (2007). *What do We Know about Globalization: Issues of Poverty and Income Distribution*. Malden: Blackwell Publishing.
- Dobson, S., & Ramlogan, C. (2009). Is there an openness Kuznets curve? *Kyklos*, 62(2), 226-238.
- Jalil, A. (2012). Modeling income inequality and openness in the framework of Kuznets curve: New evidence from China. *Economic Modelling*, 29(2), 309-315.
- Kuznets, S. (1955). Economic growth and income inequality. *The American Economic Review*, 45(1), 1-28.
- Lee, J. E. (2010). Inequality in the globalizing Asia. *Applied Economics*, 42(23), 2975-2984.
- Liu, X., Song, H., & Romilly, P. (1997). An empirical investigation of the causal relationship between openness and economic growth in China. *Applied Economics*, 29(12), 1679-1686.
- Meschi, E., & Virarelli, M. (2009). Trade and income inequality in developing countries. *World Development*, 37(2), 287-302.
- Sakya, D., Villaverde, J., & Maza, A. (2015). An International and Comp Trade openness, income levels, and economic growth: The case of developing countries, 1970–2009. *The Journal of International Trade & Economic Development*, 24(6), 860-882.

- Spilimbergo, A., Londono, J. L., Szekely, M. (1999). Income distribution, factor endowments, and trade openness. *Journal of Development Economics*. 59, 77-101.
- Squalli, J., & Wilson, K. (2011). A new measure of trade openness, *The World Economy*, 34(10), 1745-1770.
- United Nations Development Programme. (2013). Humanity divided: Confronting inequality in developing countries. Retrived from [http://www.undp.org/content/dam/undp/library/PovertyReduction/Inclusivedevelopment/HumanityDivided/HumanityDivided\\_Full-Report.pdf](http://www.undp.org/content/dam/undp/library/PovertyReduction/Inclusivedevelopment/HumanityDivided/HumanityDivided_Full-Report.pdf).
- Zakaria, M., and Fida, B. A. (2016). Trade openness and income inequality in China and the SAARC region. *Asian-Pacific Economic Literature*. 33-44.