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The Global Production Sharing and Economic Development: The Nexus of Preferential Trade Agreements and Unilateral Trade

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THE GLOBAL PRODUCTION SHARING AND ECONOMIC DEVELOPMENT: THE NEXUS OF PREFERENTIAL TRADE AGREEMENTS AND UNILATERAL TRADE

by

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DEDICATION

I would like to dedicate this to all the hardworking economists who believe in freer trade.

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ABSTRACT

This study primarily attempts to investigate the causal relationship between Global Production Sharing and economic growth. Secondarily, the study attempts to identify the impact of Preferential Trade Agreements on Global Production Sharing. The study is based on secondary data for a panel of 12 Asian countries for the time period from 1999 to 2017. The methodology adopted for the study is both quantitative and qualitative. The empirical methodology is based on Cobb-Douglas production function, and panel fixed effects estimator is employed to derive the consistent estimates. The empirical findings of the study suggest that Global Production Sharing has a positive relationship with economic growth. The estimates of fixed effects model suggest that 10 percent increase in Global Production Network trade is associated with 1 percent increase in Gross Domestic Production Per Capita. More importantly, the study found that Global Production Sharing can enhance the economic development with implications of raised revenue, more employment and poverty reduction. Further, based on the review of literature, the study reveals that although the deep Preferential Trade Agreements can increase the countries' participation in production sharing, different tariff structures pertinent to different Preferential Trade Agreement member countries can hamper the utilization of an optimal Global Production Network due to different Rules of Origin. Finally, the study advocates for an innovative global trade paradigm empowered by the unilateral trade liberalization in order to safeguard the free trade economic phenomenon.

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LIST OF ABBREVIATIONS

AMNE…… Activity of Multinational Enterprise

FTA……. Free Trade Agreement

GDP……...……... Gross Domestic Product

GPN…….…… Global Production Network

GPS……...… Global Production Sharing

GVC……. Global Value Chain

HDD……. Hard Disk Drive

MFN……... Most Favored Nation

NAFTA……. North American Free Trade Agreement

OECD……. Organization for Economic Cooperation and Development

PTA……..... Preferential Trade Agreement

RoO……. Rules of Origin

SITC……...…. Standard International Trade Classification

WTO…….…. World Trade Organization

CHAPTER 1: INTRODUCTION

Western and European economies were dominated by mercantilism from 16th century to late 18th century. The term mercantilism was initially coined by Adam Smith in his book 'An Inquiry into the Nature and Causes of the Wealth of Nations', published in 1776. The mercantilist system is an economic system which advocates the establishment of a nationalistic wealthy economy that reinforces the state by discouraging imports and encouraging exports (Smith 1776). The ultimate objective of so-called system is to achieve a favorable trade balance which can convey gold and silver into the country while procuring sovereign economic prosperity. However, mercantilism was flawed owing to the fact that increased exports lead to more money in the country with rising prices and inflation resulting in expensive exports and cheaper imports (Hume 1969).

Thereupon, the Smith's theory of absolute cost advantage also came into light with his book, Wealth of Nations in 1776. The theory of absolute cost advantage as a theory of free trade suggests the capability of one country to produce more of a product with the same amount of inputs than another country. Hence, a country with lesser input costs should produce and export while those goods where it incurs higher costs should be imported. Therefore, such a trade between two countries is a win-win outcome. Howbeit, the theory of absolute cost advantage fails if a country is cheap in the production of almost everything. Then, the country should only export (Ricardo 1817). Subsequently, David Ricardo in his book 'On the Principles of Political Economy and Taxation' in 1817 argued that it should be the comparative cost advantage, not the absolute cost advantage. Hence,

the country should export the product which can be produced at a lower opportunity cost while importing the product with the higher opportunity cost.

Consequently, in the 20th century Eli Heckscher and Bertil Ohlin developed a theory addressing two questions left largely unexplained by Ricardo: What determines comparative advantage and what effect does international trade have on the earnings of various factors of production in trading nations? (Carbaugh 2008). Their theory became known as the Heckscher-Ohlin theory, which suggests that capital abundant country should export capital intensive product while labor abundant country should export labor intensive product. This trend of trade theories came to an end with the emergence of New Trade Theory shaped by Krugman (1979). Krugman

> 'develops a simple, general equilibrium model of noncomparative advantage trade in which trade is driven by economies of scale, which are internal to firms because of the scale economies, markets are imperfectly competitive. Nonetheless, one can show that trade, and gains from trade, will occur, even between countries with identical tastes, technology, and factor endowments' (Krugman 1979, 469).

These prominent trade theories mostly dominated the global trade until the dawn of the newest trade theory identified as Global Production Sharing (GPS) which is the break-up of the production process into geographically separated stages such as initial design, production of components and final assembly (Athukorala 2010). This international trade phenomenon is also known as Offshoring, Global Production Network (GPN) and Global Value Chain (GVC) (Feenstra 2010; Hiratsuka 2011; The World Bank 2017). The Thailand centered hard disk production is an exemplary case of GPS. Hard Disk Drive (HDD) production in Thailand consists of 15 percent total merchandise exports from Thailand and 70 percent of total world HDD exports. But HDDs are not entirely produced in Thailand

where at least ten other countries participate in HDD production (Hiratsuka 2011). The Figure 1.1 depicts the case of Thailand centered HDD production.

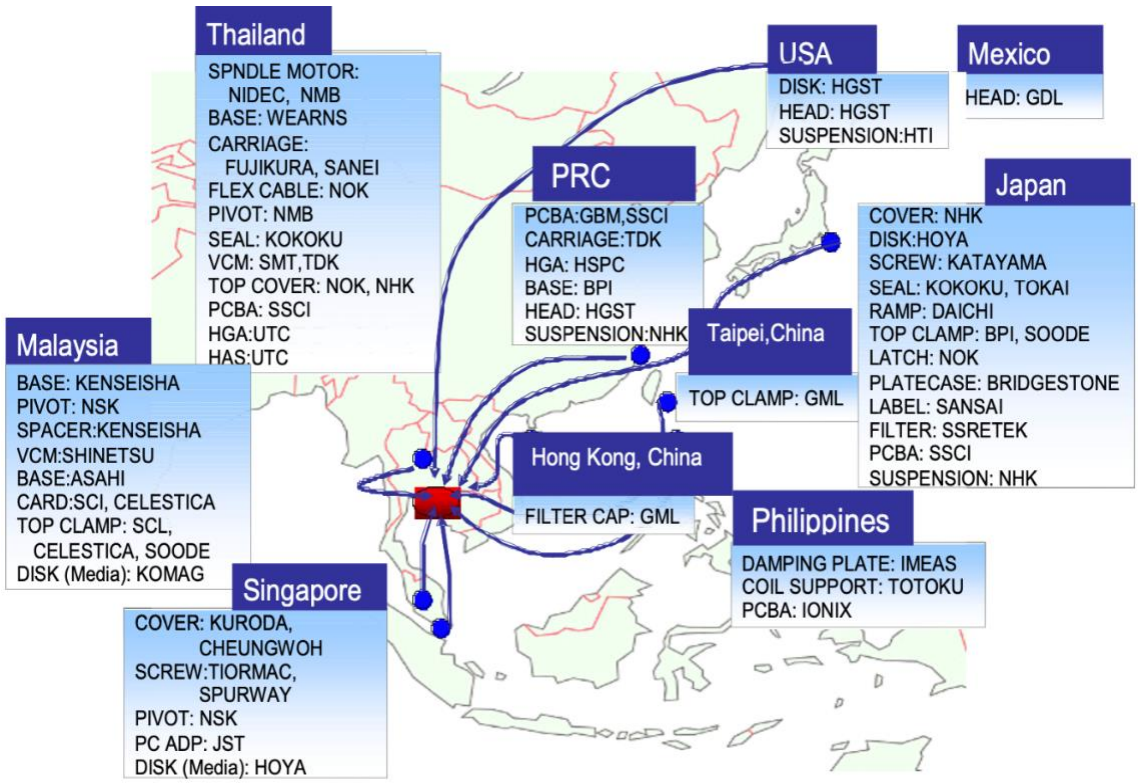

Figure 1.1: Thailand Centered HDD Production
Source: Hiratsuka (2011).

The emergence of GPS is a remarkable millstone in modern international trade. However, this emergence has been empowered by fast growing advanced production technology which enabled industries to slice the value chain in to components, while technological innovations in communication and transportation effaced the distance from one country to other, and finally, the influence of World Trade Organization (WTO) policy reforms on liberalizing trade barriers and investment (Jones and Kierzkowski 2000). This newest trade theory has unfolded the hidden potential of global integration by linking all

the countries in the world to produce global products. Hence, there will be a day in the near future that consumers will see a product tag which evinces the tagline 'Made in World'. The Apple iPhone and the Boeing Dreamliner are also two classic examples of such trade pattern (Carbaugh 2010).

It has been a proven fact in the international trade literature that GPS has shaped the pattern of trade in the world. Yet, how countries participate in GPS matters for the impact on their development, which is a premise that should be probed. Vast number of studies conducted in this direction have proved that GPS has a significant potential of enhancing economic development in developing countries in the world (The World Bank 2019). Moreover, this new phenomenon in international trade strengthens export orientation with implications of employment generation and poverty reduction (Athukorala 2014).

Simultaneously, rapidly transforming global trade has focused its attention on Preferential Trade Agreements (PTAs) to boost the gains of international trade.

> 'PTAs in the WTO include Generalized System of Preferences schemes (under which developed countries grant preferential tariffs to imports from developing countries), as well as other non-reciprocal preferential schemes granted a waiver by the General Council' (WTO 2019).

If so, what would be the convergence of GPS and PTAs? It has been stated that countries have started to move towards deeper PTAs in the current global context. Certain studies in this juncture claims that deeper PTAs promote GPS (Laget et al. 2018) while others divulge that PTAs can generate negative effects on GPS (Bhagwati 2008). These two opposite premises twirl the global trade's attention towards unilateral trade. Therefore, it is quite clear that why pursue reciprocity when the world has unilateral trade. This is when any state can open its borders to international trade without waiting for others to

reciprocate. Is not this so plain sailing? If so, why cannot nations practice unilateral free trade to enhance GPS and promote economic development? Given this backdrop, the paper attempts to answer these questions by giving potential insights to the phenomena of GPS, economic development and unilateral trade.

1.1 PROBLEM STATEMENT AND RATIONALE

The existing literature that investigates the linkage between GPS and economic growth and the impact of PTA on GPS is limited. However, the review of limited literature on the impact of GPS on economic development of countries, suggests that GPS has a positive impact on enhancing the level of growth in the economy. More importantly, the existing literature in this direction has failed to empirically estimate the impact of GPS on economic growth. Hence, this creates a vacuum of literature in this regard. At this backdrop, this study attempts to empirically estimate the relationship between GPS and economic growth under the purview of Asian countries. The general objective of this study is to identify the economic relationship between the GPS and economic growth. The specific objectives include compiling a variable that measure the amount of GPS in respective Asian countries, empirically estimating the causal relationship between GPS and economic growth and identifying the impact of PTAs on GPS.

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CHAPTER 2: LITERATURE REVIEW

Haddad (2007) conducted a study on trade integration in East Asia giving more emphasis on the role of China and production networks. The paper is based on a descriptive statistical analysis for the time period spanning from 1960 to 2004. He found that there has been a rapid increase in fragmentation in trade, majorly trade in parts and components in the East Asian region against the conventional trade pattern. According to him, so called fragmentation in trade is mainly due to four reasons. Firstly, the relatively more favorable policy setting for international production. Secondly, the agglomeration benefits arising from the early entry into this new form of specialization. Thirdly, considerable intercountry wage differentials in the region, lower trade and transport costs and finally, the specialization in products exhibiting increasing returns to scale. Haddad (2007) further states that the economic integration of China has positively affected the rapid increase in GPNs in the region.).

Athukorala (2009) examined the implications of GPS for regional and global trade patterns in East Asia. The study is majorly based on United Nations-Comtrade data base for the time period from 1992 to 2007. He has incorporated a gravity model to examine the determinants of inter-country differences in network trade intensity, with an emphasis on East Asia's unique role in this new form of international exchange. As per his analysis, the GPS in East Asia has grown swiftly than the total world trade in manufacturing. Further, he advocates a more global integration rather than regional approach to trade.

Hiratsuka (2011) investigated the case of production networks in Asia. The study is based on a micro level case study on procurement system of HDD assembler, operating in Thailand. The study found HDD components and parts were obtained from more overseas suppliers than from domestic suppliers through a production network. Further, he found that GPNs have developed more in the HDD industry than in the automobile industry due to lower transport costs affiliated to production of HDDs.

Athukorala (2014) conducted a case study in Penang, Malaysia in order to understand how GPS has enabled Penang to be an export production hub in the world and to explore the policy options for developing countries to engage effectively in production networks. He identifies Penang as a unique example for a country which utilized its national development strategy to attract emerging opportunities of GPS. Further, the study found that through GPS, Penang was able to attract the major multinational enterprises in global electronics industry, which boosted the export growth in Penang by promoting its economic growth.

Athukorala and Nasir (2012) researched the case of GPS and South-South trade with emphasis on the role of production sharing in global economic integration of the Southern economies in the world. This paper has initially utilized a descriptive statistical analysis on the emerging trends and patterns of South-South trade using a classification system in order to identify the trade based on GPS against the total recorded trade. Then, a standard gravity model has been employed to delineate the determinants of South-South and South-North trade. They found that global South-South trade has remarkably increased over the past two decades due to the growing engagement in the GPS by East Asian countries.

Sen (2014) studied how GPNs can be drivers of South Asia's growth and regional integration by examining the role of economic corridors in facilitating the access of South Asian countries to GPNs. Sen (2014) found that South Asia has lagged behind the context of GPS compared to East Asian countries. Moreover, the study found that regional economic corridors in South Asia can increase the region's linkages to the GPNs of East Asia and can boost regional cooperation between South Asia, South East Asia and East Asia.

Degain et al. (2017) researched the recent trends in global trade and GVCs in the world. This study attempts to answer how GVCs can explain the new developments in international trading mechanism and how this trend of parts and components crossing national boundaries matters for developing countries. They discerned that globalization and growth of global Gross Domestic Product (GDP) during 1995 to 2008 was empowered by the driving force of complex GVCs related cross border production activities. In contrast, the complex GVCs declined during 2012 to 2015 due to industrial upgrading occurred in emerging economies such as China with a declining processing trade. More importantly, Degain et al. (2017) argue that GVC related production activities have declined due to increased trade protectionism after the global financial crisis during 2008-09.

Orefice and Rocha (2011) investigated the relationship between deep integration and GPNs. In this study, deep integration is captured by a set of indices constructed in terms of policy areas covered in PTAs. The methodology adopted for this study is estimation of an augmented gravity equation to investigate the impact of deep integration on GPNs. The finding of this study supports the premise that PTAs have a positive impact

on GPNs. Hence, on average signing deeper agreements increases production network trade among member countries by 35 percentage points.

Hayakawa and Yamashita (2011) examined the effect of PTAs in facilitating GPNs. Based on more than 250 PTAs with trade flows distinguished into parts and components and final goods for the period of 1979 to 2008, they estimated the augmented gravity equation to determine the effects of PTA formation on trade in parts and components. They conclude that concurrent effects of PTA formation on trade in parts and components are not identified through the model incorporated. In contrast, PTAs have positive and pervasive effects on trade in parts and components 6 years post-signing the PTA.

Miroudot and Rigo (2019) investigated the impact of deep integration in PTAs on multinational production through production networks. The study has employed a time series panel data gravity equation based on Organization for Economic Cooperation and Development (OECD) analytical Activity of Multinational Enterprise (AMNE) database and the Design of Trade Agreements database for the time period spanning from 2000 to 2014. The results of the paper show that, on average, tariff reductions through PTAs have a positive impact on multinational production with a stronger effect for trading intermediate inputs or serving the final demand. Finally, the study suggests that rapid increase in PTAs has facilitated the engagement in GVCs, thereby proliferating the multinational production.

Bhagwati (2008) by studying the empirical cases of the contemporary international trade, reviewed how the proliferation of PTAs has become a menace to the world trading system. He argues that signing PTAs initiate preferences among countries in the trade that violates the principle of non-discrimination in trade. Thus, the existence of trade

discriminations through PTAs can cause a great divide between large-scale firms and small-scale firms, resulting in losses for small-scale firms. Bhagwati (2008) further argues that PTAs comprise draconian requirements of capital flows and labor standards that endanger poor nations in the process of negotiating.

Baldwin and Freund (2011) investigated the relationship between PTAs and multilateral liberalization. The study has incorporated existing literature in this direction and microeconomics theoretical framework designed by authors to investigate the aforementioned linkage. They attempted to analyze how regionalism through PTAs result in diverting trade away from the most productive global producers in favor of regional partners while generating welfare losses. Further, the study focuses on multilateralists' argument of identifying regional PTAs as external forces that hinder multilateralism resulting in erroneous equilibrium in the context where regional trade blocks maintain extraneous trade barriers.

Bruhn (2014) examined the role of PTAs in the context of GVCs. In this study, he emphasizes the concern that whether developing countries promote trade at the cost of domestic policy autonomy. The methodology of the study is based on analyzing the effects of deep PTAs by reviewing literature on regional integration with rapid drive of GVC. The study reveals that PTAs can contribute to the participation in GVCs by eliminating traditional trade barriers at the cost of restricting policy autonomy.

Eckhardt and Lee (2018) investigated the linkage between GVCs and firm preferences on PTA design by conducting a case study on the preferences and political strategies of tobacco firms during North American Free Trade Agreement (NAFTA) negotiations. The authors found supportive evidence towards the premise of highly

productive firms generally being supportive of PTAs. However, such preferences of the firms on PTA design vary depending on firms' organization of their own GVCs. Finally, Eckhardt and Lee (2018) conclude that firms source their inputs from PTA partner countries or non-partner countries depending on their preferences on Rules of Origin (RoO).

CHAPTER 3: METHODOLOGY

The methodology adopted for this study includes both quantitative and qualitative approaches. The econometric methodology attempts to estimate the causal relationship between GPS and economic growth and the qualitative approach attempts to identify the impact of PTAs on GPS. This study is based on secondary data for a panel of 12 Asian countries (China, Hongkong, India, Indonesia, Japan, Korea, Malaysia, Philippines, Singapore, Sri Lanka, Thailand, Vietnam) for the time period from 1999 to 2017. The data are obtained for variables namely, Gross Domestic Product Per Capita – PPP, Gross Domestic Fixed Capital Formulation, Labor Force, Exports, Imports and Total Parts and Component Exports. The amount of GPN trade can be measured using exports of parts and components production (Yeats 2001). The data sources include both World Development Indicators and UN Comtrade databases. Moreover, total parts and component exports include data for more than 300 product categories at the five-digit level of Standard International Trade Classification (SITC) Revision 3.[1]

[1] Please find the relevant product categories at the five-digit level of SITC Revision 3 in the Appendix.

Table 3.1: Variable Definitions, Means and Standard Deviations of the Data
(N = 228)

Variable	Description*	Mean
Y	Gross Domestic Product Per Capita – PPP in USD	12984.88 (15795.46)
K	Gross Domestic Fixed Capital Formulation in USD	3.93e+11 (8.44e+11)
L	Labor Force	2.26e+08 (2069707)
Open	Trade Openness (((Exports + Imports)/GDP) *100)	130.40 (114.15)
GPN	Global Production Network Trade measured using total parts and component exports in USD	5.05e+07 (5.66e+07)

Note: Numbers in the parenthesis are standard deviations.

3.1 THEORETICAL FOUNDATION AND ECONOMETRIC MODEL

The hypothesis tested in this study is that GPS stimulates economic growth, based on 12 Asian countries. The testing of this hypothesis includes estimating Cobb-Douglas production function derived from Solow Growth Model, combining capital and labor as follows.

$$Y_{it} = A_{it} K_{it}^{\alpha} L_{it}^{\beta} \qquad (1)$$

Where Y is the real economic output, K is the capital stock, L is the labor force, and A is the technological progress. This production function can be extended by assuming that technological progress is influenced by trade openness and GPS. Hence, A can be specified as follows.

$$A_{it} = \phi O_{it}^{\delta} G_{it}^{\rho} \qquad (2)$$

Where (O) stands for trade openness and (G) stands for GPN trade. By substituting equation (2)into equation (1), following equation can be derived.

$$Y_{it} = \phi O_{it}^{\delta} G_{it}^{\rho} K_{it}^{\alpha} L_{it}^{\beta} \qquad (3)$$

Moreover, taking the natural logs of such Per Capita terms, the following equation is derived.

$$Y_{it} = \theta_0 + \theta_1 K_{it} + \theta_2 L_{it} + \theta_3 O_{it} + \theta_4 G_{it} \quad (4)$$

Based on the equation (4), following equation is constructed plugging in non-generic variables.

$$lnY_{it} = \beta_0 + \beta_1 lnK_{it} + \beta_2 lnL_{it} + \beta_3 lnOpen_{it} + \beta_4 lnGPN_{it} + \varepsilon_{it} \quad (5)$$

Based on the equation (5), panel fixed effect model is estimated. In this model there can be omitted variables that are correlated with the explanatory variables. Hence, fixed effect model is the most appropriate, given there might be neglected heterogeneity[2] (Wooldridge 2016). Under the fixed effect model, equation (5) can be rewritten by splitting the idiosyncratic error term ε_{it}) into time variant u_{it}) and time invariant, if not neglected heterogeneity v_{it}) error terms, as follows.

$$lnY_{it} = \beta_0 + \beta_1 lnK_{it} + \beta_2 lnL_{it} + \beta_3 lnOpen_{it} + \beta_4 lnGPN_{it} + v_{it} + u_{it} \quad (6)$$

By averaging each i in the equation (6) over time, the time dimension can be removed from the equation. Hence, the following equations can be derived.

$$\overline{lnY_i} = \beta_0 + \beta_1 \overline{lnK_i} + \beta_2 \overline{lnL_i} + \beta_3 \overline{lnOpen_i} + \beta_4 \overline{lnGPN_i} + \overline{v_i} + \overline{u_i} \quad (7)$$

[2] This is similar to unobserved heterogeneity which is a situation where a possible correlation is expected between observable variables and unobservable variables.

$$lnY_{it} - \overline{lnY_i} = (\beta_0 - \beta_0) + \beta_1\left(lnK_{it} - \overline{lnK_i}\right) + \beta_2(lnL_{it} - \overline{lnL_i}) + \beta_3(lnOpen_{it} - lnOpen_i) + \beta_4(lnGPN_{it} - \overline{lnGPN_i}) + (v_{it} - \overline{v_i}) + (u_{it} - \overline{u_i}) \quad (8)$$

As shown in the equation (8), by subtracting equation (7)from equation (6), the time invariant effect, if not the neglected heterogeneity of the error term (ε) can be eliminated $(v_{it} - \overline{v_i}) = 0$. Thus, the following equation can be derived

$$\ddot{lnY}_{it} = \beta_1 \ddot{lnK}_{it} + \beta_2 \ddot{lnL}_{it} + \beta_3 \ddot{lnOpen}_{it} + \beta_4 \ddot{lnGPN}_{it} + \ddot{u_{it}} \quad (9)$$

Equation (9) indicates time-demeaned data on both outcome and control variables. Though, the time invariant effect, if not the neglected heterogeneity of the error term, is eliminated from the model. The time varying error term $\ddot{u_{it}}$ is still present in the equation causing weak exogeneity. However, the presence of weak exogeneity assumption along with no perfect collinearity amongst variables ensures that the fixed effects estimator, if not pooled OLS estimator, is consistent (Wooldridge 2016). Subsequently, this study employs the Hausman specification test to determine the most suitable estimator amongst fixed effects and random effects estimators.

Further, equation (10) is derived with the inclusion of 1999 GDP Per Capita (Y99) as the initial GDP Per Capita that will be measuring economic growth rather than just the level of economic development, and this inclusion will evince the status of the convergence (Mankiw et al. 1992). However, as the initial GDP Per Capita is included, random effects estimator should be employed. Thus, each country's initial GDP Per Capita is time invariant. Therefore, initial GDP Per Capita is perfectly colinear with any other time invariant variable such as country fixed effects. This prevents fixed effects estimation and may cause other econometric issues (Baltagi 2005).

$$lnY_{it} = \beta_0 + \beta_1 lnK_{it} + \beta_2 lnL_{it} + \beta_3 lnOpen_{it} + \beta_4 lnGPN_{it} + \beta_5 lnY99_{it} + \varepsilon_{it} \quad (10)$$

Moreover, the equation (10) can be further altered by including a dummy variable (D_{it}) and an interaction term ($D2_{it}$) of the GPN_{it}*D_{it} to detect a structural break in 2008 in order to identify the effect of global financial crisis on the linkage between global production sharing and economic growth (Dufour 1980). The dummy variable (D) takes a value of 1 if the year is greater than or equal to 2008.

$$lnY_{it} = \beta_0 + \beta_1 lnK_{it} + \beta_2 lnL_{it} + \beta_3 lnOpen_{it} + \beta_4 lnGPN_{it} + \beta_4 lnY99_{it} + \beta_5 lnD_{it} + \beta_6 lnD2_{it} + \varepsilon_{it} \quad (11)$$

CHAPTER 4: RESULTS AND DISCUSSION

Table 4.1: Estimates of Fixed Effects Models
(Dependent Variable = $lnY(GDP\ Per\ Capita)$

	Model (1)	Model (2)	Model (3)
lnK	0.5085***	0.5089***	0.4245***
	(0.0200)	(0.0180)	(0.0258)
lnL	0.2882**	0.3542***	0.3559***
	(0.1255)	(0.1130)	(0.1084)
lnOpen	----------	0.2651***	0.0932*
		(0.0365)	(0.0525)
lnGPN	----------	----------	0.1040***
			(0.0236)
Constant	-8.4665***	-10.8276***	-9.6919***
	(1.8255)	(1.6706)	(1.6237)
R_2 (within)	0.8911	0.9126	0.9199
N	228	228	228

Note: "standard errors are in parentheses"; *p<0.1, **p<0.05, ***p<0.01

Table 4.2: Results of Hausman Specification Test

Variables	Coefficients		(b-B)	sqrt(diag(V_b-V_B))
	Fixed (b)	Random (B)	Difference	Standard Error
lnK	0.4245	0.5434	-0.1188	0.0031
lnL	0.3559	-0.5748	0.9308	0.1004
lnOpen	0.0932	0.1198	-0.0266	-------
lnGPN	0.1040	0.0875	0.0165	-------
chi2(4)	83.68 ((b-B)'[(V_b-V_B) ^ (-1)] (b-B))			
Prob>chi2	0.0000 (Ho: difference in coefficients not systematic)			

Source: Author generated.

At 5 percent level of significance, the Hausman test rejects the null hypothesis. Hence, the fixed effects model is appropriate in this context. As per the Table 4.1, three

fixed effects models were estimated and the 3rd model delivers the estimates for the equation (9). The value of R-squared is 0.89 which says that 89 percent of the variation in log GDP Per Capita is jointly explained by the control variables. The generated R-squared value is the within value as it is generally of main interest, as it tells the variation of log GDP Per Capita within countries. Further, fixed effects estimator is also known as within estimator (Wooldridge 2016).

As per the estimates of model (3), the amount of capital has a positive relationship with GDP Per Capita and it is statistically significant at 1 percent level. Thus, 10 percent increase in capital stock is associated with 4.2 percent increase in GDP Per Capita. The amount of labor has a positive relationship with GDP Per Capita and it is statistically significant at 1 percent level. Hence, 10 percent increase in labor supply is associated with 3.5 percent increase in GDP Per Capita. Further, trade openness has a positive relationship with GDP Per Capita and it is statistically significant at 10 percent level. Consequently, 10 percent increase in trade openness is associated with 0.9 percent increase in GDP Per Capita. However, as shown by the estimates of model (2) and model (3), the impact of trade openness on GDP Per Capita and the significance level have reduced as lnGPN variable is included into the model. Hence, this suggests that given the context of Asian countries, trade openness is less significant to GPN trade. Additionally, the inclusion of GPN trade as a control variable could rectify the omitted variable biasness in many empirical studies in this direction. More importantly, GPN trade has a positive relationship with GDP Per Capita and it is statistically significant at 1 percent level. Thusly, 10 percent increase in GPN trade is associated with 1 percent increase in GDP Per Capita.

Table 4.3: Estimates of Random Effects Models
(Dependent Variable = lnY(GDP Per Capita)

	Model (1)	Model (2)
lnK	0.5378***	0.4301***
	(0.0255)	(0.0298)
lnL	-0.4982***	-0.4857***
	(0.0536)	(0.0527)
lnOpen	0.1432**	0.0118
	(0.0569)	(0.0539)
lnGPN	0.0759***	0.0931***
	(0.0259)	(0.0235)
lnY99	0.1848**	0.2276***
	(0.0817)	(0.0796)
D	----------	-0.4128*
		(0.1612)
D2	----------	0.0325***
		(0.0091)
Constant	0.8029	3.1445**
	(1.4983)	(1.4644)
R_2 (Overall)	0.9342	0.9508
N	228	228

Note: "standard errors are in parentheses"; *p<0.1, **p<0.05, ***p<0.01

Table 4.3 shows the random effects estimations for equation 10 and 11. The coefficient on the initial GDP Per Capita (lnY99) is positive for these 12 Asian countries resulting no tendency towards convergence in the panel. Hence, there is no tendency for these Asian countries to grow faster on average than other rich countries in the world. Moreover, the inclusion of Y99 and the random effects estimator have resulted in a negative coefficient for amount of labor which is significantly different from the sign of the labor coefficient under the fixed effect model. This difference can be attributed to the effect of time dimension in the random effects model. However, all the other coefficients remain positive in both model 1 and 2.

The model 2 shows the random effects estimation with the inclusions of both initial GDP Per Capita and the dummy variable for the structural break caused by the global financial crisis in 2008. The coefficient for the structural dummy variable (D) is negative. This indicates the negative impact of global financial crisis in 2008 on the effect of global production sharing in boosting economic growth after 2008. However, as shown by the model 2, GPN trade has a positive relationship with GDP Per Capita and it is statistically significant at 1 percent level. Further, the inclusion of 1999 GDP Per Capita (Y99) as the initial GDP Per Capita can measure the economic growth rather than economic development. Thus, it can be interpreted that 10 percent increase in GPN trade is associated with 0.9 percent increase in economic growth in these countries.

This provides evidence that increase in GPS can stimulate economic growth in respective countries. Further, the causal impact of GPS on economic growth is higher than the impact of trade openness. Consequently, Asian countries should focus more on parts and components assembly exports in a GPN rather than depending solely on total trade volume. Moreover, further specializing in parts and components assembly can explicitly enhance the economic growth while implicitly generating more employment and poverty reduction as employment in respective industries increases. Consequently, the economic policies should be crafted and directed in such a way that they should enhance the level of GPN trade thereby stimulating the economic development.

Fervent changes in the formation of contemporary globalized economy have reshaped the international trade and production activities while altering the organization of world industries and sovereign states into GPNs. As GPNs become a global trading phenomenon, instead of final goods, great amount of intermediate goods started trading

across borders while exports consisting of more imported parts and components. As a remarkable milestone in the history of international trade, in 2009, world total exports of intermediate goods surpassed the combined export values of final and capital goods (Gerefffi and Luo 2019). Moreover, the existence of network trade has caused the firms to depend on the import of intermediates. Consequently, in the absence of GPS, government will have an incentive to act like mercantilists in trade negotiations (Baccini et al. 2014).

Emerging economies have started playing intricate roles in harnessing the GPNs in the world. Aftermath of the global financial crisis, more trade has started growing between developing countries instead of with developed countries, which is the scenario referred as South-South trade (Athukorala and Nasir 2012). Thus, GPS has reintegrated the countries into a new face of global trade ultimately leading to economic development.

As per empirical studies conducted in this direction, being a member of a GPN can result in productivity gains and income growth for developing countries. Cross-country estimates suggest that a 10 percent increase in GPN participation can lead to 1.6 percent increase in average productivity and 11 to 14 percent increase in Per Capita GDP (The World Bank 2019). More openness and the GPN integration are contributing to better economic performance.

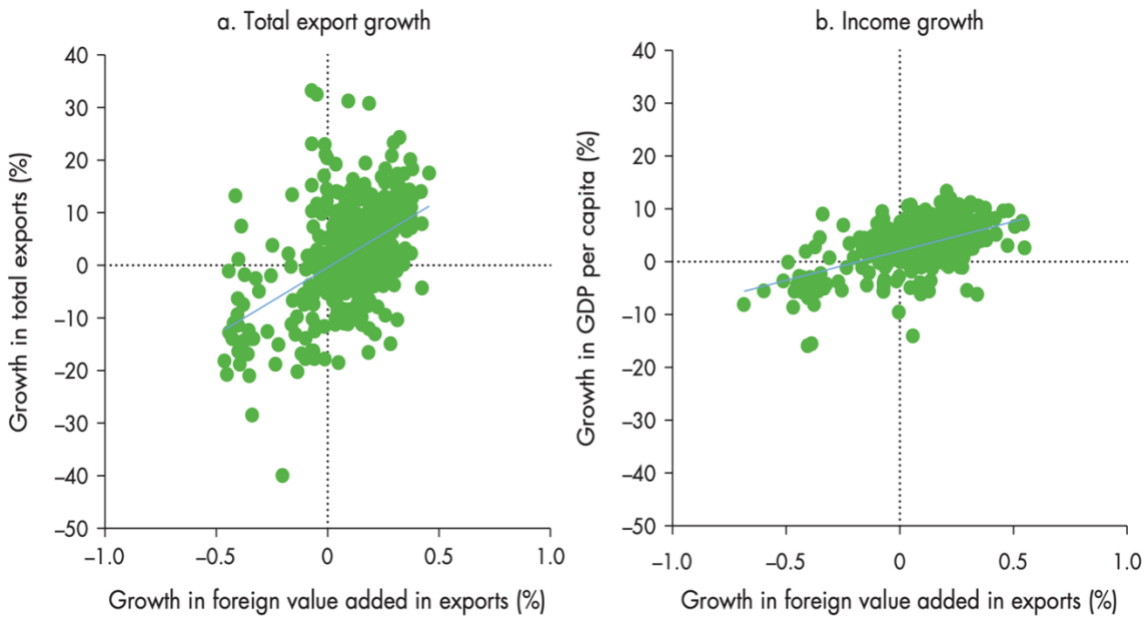

Figure 4.1: GPN Participation and Growth in Exports and Income
Source: The World Bank (2019).

In the Figure 4.1, GPN involvement has been measured using the percentage growth in foreign value added in exports. The figure clearly depicts that participation in GPN trade has positively correlated with total export and income growth. It has been a proven fact that economic development is a multi-dimensional phenomenon. It should start with economic growth with spillover effect of achieving higher level of employment, poverty reduction, distributional gains and reduction of gender gaps.

Rodrik (2018) argues that countries become more capital intensive as they engage more in GPN, hindering employment opportunities of country's labor. However,

> 'GVCs boost exports, their overall effects on employment in developing countries have been positive. Even though production is becoming more capital-intensive and less job-intensive, the positive productivity effects at the firm level are (unexpectedly) good for scale and employment. Through scale effects, higher productivity is expanding aggregate output and employment. GVC firms tend to employ more workers than other firms' (The World Bank 2019, 77).

Moreover, employment and income generation through GPS can support poverty reduction effectively (Athukorala 2014). Hence, the classical trade theories argue that trade can enhance the average income levels of the people through higher growth. Furthermore, effective monitoring of GPNs with public private partnership for upgrading of the production networks and accurate trade metrics can produce more effective policy intervention for poverty reduction (Lee et al. 2011). Some of the existing literature in this direction suggests that proliferation of PTAs can boost the countries' engagement in GPS, thereby sustaining the growth momentum of their economies. After 1990, most of the countries in the world opted to sign deeper trade agreements by fragmenting the production internationally. Hence, deepening of trade agreements in the light of PTAs has been a major factor in the continuous rise in GPNs in the world (Laget et al. 2018). In contrast, some literature discusses the reverse causality with respect to above context by analyzing whether higher levels of GPS increase the likelihood of signing PTAs. According to Orefice and Rocha (2011), a 10 percent rise in the share of GPN over total trade volume increases the depth of the PTA by approximately 6 percentage points. Hence, there is a greater tendency that countries already involved in network trade by signing deeper agreements as per aforementioned findings.

Yet, certain studies argue that not all PTAs contribute towards the growth of production networks. The analysis of the impact of PTA provisions on multinational production through network trade relies on the shallow or deep integration resulted by the signed PTA. Thus, it is established that only deep integration through PTAs has a positive and significant impact on network trade (Miroudot and Rigo 2019). The notion of shallow and deep integration was initially coined by Lawrence (1996) in his book 'Regionalism,

Multilateralism, and Deeper Integration'. Empirical studies have identified the fact that shallow PTAs have a negative impact on cross-border production. Firms that offshore production are more likely to anticipate lower tariffs on re-imported products into their market. Hence, domestic firms are more willing to locate production stages in a PTA member that would result in lower tariffs on re-imported goods. (The World Bank 2017).

As most of the literature assess the relationship between PTAs and GPS, it is evident that studies conducted by the World Bank and WTO are advocating towards signing deep PTAs in order to enhance the network trade. However, Bhagwati (2008), Athukorala (2010), Baldwin and Freund (2011) and Eckhardt and Lee (2018) convey a different opinion on signing PTAs to boost the network trade. According to Bhagwati (2008), proliferation of PTAs is neither favorable towards network trade nor towards the entire trading mechanism. Jagdish Bhagwati was the earliest to warn against PTAs starting in 1990 when he sensed that PTAs can be a systemic threat to the principle of non-discrimination in international trade. Bhagwati sees Free Trade Agreements (FTAs) as two faced. Even though FTAs free trade among members, they increase protection against non-members. Bhagwati (2008) discerns the hindrance of PTAs as the 'Spaghetti bowl' effect of PTAs. This elaborates that PTAs are to reduce or eliminate tariffs only on specific products imported from a pertinent country. Supposedly, the existence of such kind of trading structure hampers the utilization of an optimal GPN due to different RoO. Hence, intermediate parts and components have to go through different PTAs based on different tariff structures in an effort to export final products to the consumer nations. Consequently, this could be visualized as crisscrossing strings of spaghetti in a bowl. Figure 4.2 depicts a sketch of the spaghetti bowl for Asia-Pacific FTA projects by June 2007.

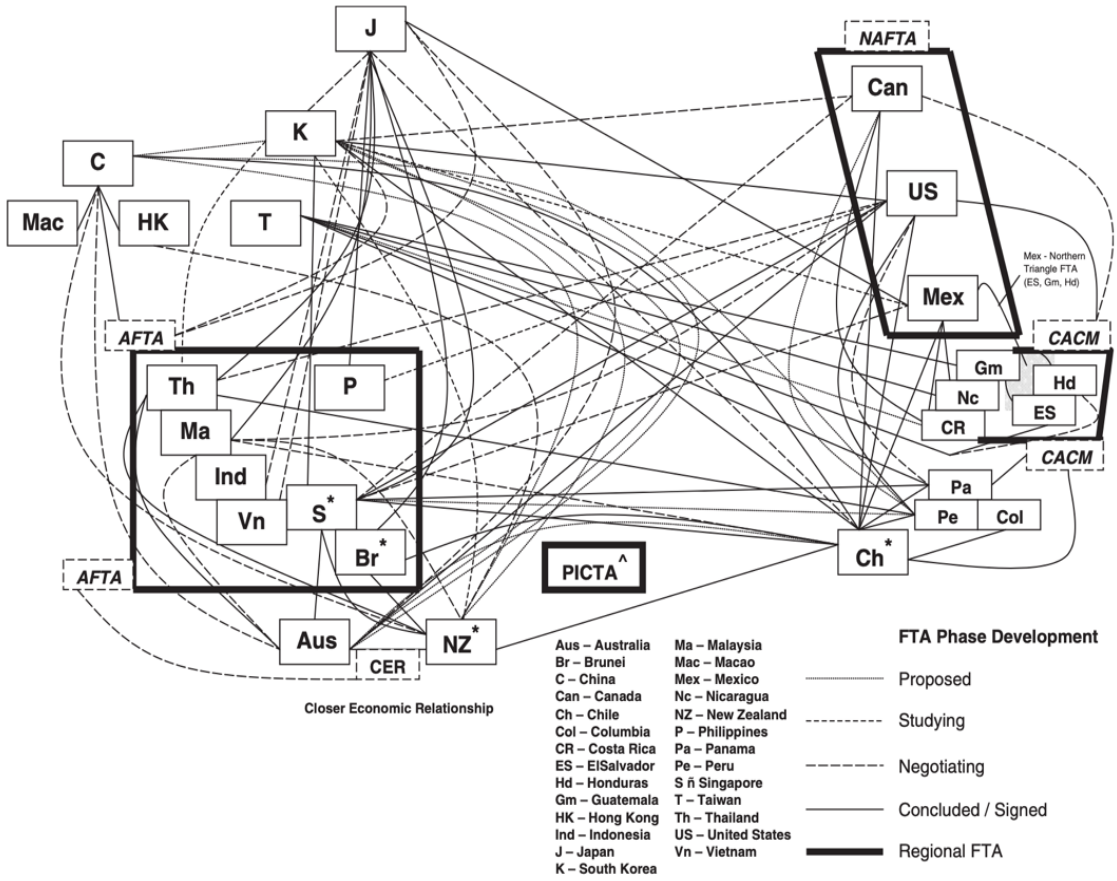

Figure 4.2: Asia-Pacific FTA Projects by June 2007
Source: Bhagwati (2008).

Athukorala (2010) forewarns a parallel idea about PTAs. He argues that it is doubtful to perceive PTAs as an approach of trade liberalization owing to the fact that GPNs have proliferated encompassing many industries and countries. Moreover, the effectiveness of a PTA majorly depends on the nature of the RoO affiliated to the respective PTA. Thus, RoO can be harmful to network trade than to conventional trade due to the presence of high transaction costs and extensive bureaucratic supervision with respect to measuring of value added in production coming from different locations in the world. More

importantly, in network trade, value addition is irrelevant. What matters most is the volume of the trade. Hence, RoO can be detrimental towards the affluence of GPNs.

The economists who at least understand the Ricardian agreement would support free trade. Then why do we need trade agreements to lower tariffs. Each country can be unilaterally better off with a tariff, but jointly they both would lose. Hence, it is a prisoner's dilemma situation in the international trade (Baldwin and Freund 2011). The presence of PTAs in the trading platform magnifies the costs of network trade. The deadlock in the Doha round of WTO negotiations reveals the risk of countries detaching from free trade. It seems that hassle of PTA negotiations has impaired the nations' belief in free trade. It is a misconception to perceive PTAs as a solution of enhancing trade at the cost of establishing discrimination among countries in the world. The more world focuses on PTAs, the more world revisits the mercantilist view of trade. Supposedly, the time has dawned to focus our attention on unilateral reforms, which have been prudently successful in the past. The Chilean experience in imposing a lower uniform tariff on all the imports which ultimately raised the tariff revenue of the country remarkably is a classic case of practicing unilateral trade (Corbo 1997). Unilateral reforms with lower tariff rates and reduction of bureaucratic regulatory barriers that hinder the trade would expedite the custom procedure with increased tariff revenues. Purportedly, the world needs a trade liberalization which emphasizes on the need of unilateral trade reforms opening up trade to all the countries in the world without any discrimination.

CHAPTER 5: CONCLUSION

The emergence of GPS has reshaped the traditional trading platform in the world with implications of increasing revenues, employment generation and poverty reduction. This new phenomenon in international trade has empowered the developing nations in the world to enhance their production capacities. The empirical findings of the study suggest that GPS has a positive relationship with the economic growth. According to the estimates of fixed effects model, 10 percent increase in GPN trade is associated with 1 percent increase in GDP Per Capita. At this backdrop, it is very much prudent to design economic policies that positively influence the parts and components assembly exports. Hence, such policies can enhance and sustain the recent growth momentum in Asia. Moreover, the proliferation of PTAs has mixed effects on GPS with more weight on detrimental aspects of PTAs. Although the deep PTAs can increase the countries' participation in production sharing, the different tariff structures pertinent to different PTA member countries can hamper the utilization of an optimal GPN due to different RoO. Moreover, PTAs legally violate the Most Favored Nation (MFN) principle by engaging in discriminatory trade practices which can be detrimental towards the factual free trade in the world. Hence, the study points out the necessity to look beyond the prescriptions of PTAs. An innovative global trade paradigm empowered by the unilateral trade liberalization appears to be necessary in order to prevent the global economy dripping into incurably grave malaise.

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APPENDIX A: PARTS AND COMPONENTS

Table A.1: Parts and Components, at the Five-Digit Level of SITC Revision 3

58291	Cellular plastic sheet
58299	Non-cellular plast sheet
59850	Doped chemicals (electr)
61290	Leather manufactures nes
62141	Uh rubber tube no fittng
62142	Uh metal-reinf rubr tube
62143	Uh text-reinf rubbr tube
62144	Uh nes-reinf rubber tube
62145	Uh rubber tube + fitting
62921	Conveyor/etc belts v
62999	Uh non-cell rub articles
65621	Woven textile labels etc
65629	Non-woven text label etc
65720	Non-woven fabrics nes
65751	Twine/cordage/rope/cable
65752	Knotted rope/twine nets
65771	Textile wadding nes etc
65773	Industrial textiles nes
65791	Textile hosepiping etc
65792	Machinery belts etc,text
66382	Asbestos manuf-friction
66471	Tempered safety glass
66472	Laminated safety glass
66481	Vehicle rear-view mirror
66591	Laboratory etc glass
66599	Other glass articles nes
69551	Band saw blades
69552	Steel circular saw blade
69553	Circular saw blades nes
69554	Chain saw blades
69555	Straight saw bl for metl
69559	Saw blades nes
69561	Cutting blades for machn
69562	Carbide tool tips etc
69563	Rock etc drilling tools.
69564	Parts to insert in tools
69680	Knives and blades nes
71381	Spark-ign piston eng nes
71382	Diesel engines nes
71391	Parts nes spark-ign engs
71392	Parts nes diesel engines
71441	Turbo-jets
71449	Reaction engines nes
71481	Turbo-propellers
71489	Other gas turbines nes
71491	Parts nes turbo-jet/prop
71499	Parts nes gas turbines
71610	Electric motors <37.5w
71620	Dc motor(>37w)/generator
71631	Ac,ac/dc motors >37.5w
71632	Ac generators
71651	Gen sets with pistn engs
71690	Pts nes motors/generator
71819	Parts nes hydraul turbin
71878	Nuclear reactor parts
71899	Parts nes of engines nes
72119	Agric machinery parts
72129	Pts nes of machy of 7212
72139	Pts nes dairy machinery
72198	Parts wine/etc machines
72199	Pts nes agric machines
72391	E-m bucket/grab/shovels
72392	Bulldozer etc blades
72393	Boring/sink machry parts
72399	Pts nes earth-movg mach
72439	Sew mch needles/furn/pts
72449	Pts nes textile machines
72461	Auxil weave/knit machine
72467	Weaving loom parts/acces
72468	Loom/knitter etc pts/acc
72488	Parts for leather machns
72491	Washing machine parts
72492	Textile machinry pts nes
72591	Paper manuf machine pts

69915 Base mtl vehicle fitment
69933 Base metal buckles etc
71191 Pts nes of boilers 711.1
71192 Pts nes boiler equ 711.2
71280 Stm turbine(712.1) parts
71311 Aircraft piston engines
71319 Pts nes a/c piston engs
71321 Recip piston engs<1000cc
71322 Recip piston engs>1000cc
71323 Diesel etc engines
71332 Marine spark-ign eng nes
71333 Marine diesel engines
72855 Parts nes, machines 7284
73511 Tool holder/slf-open die
73513 Metal mch-tl work holder
73515 Dividing head/spec attach
73591 Pts nes metal rmvl tools
73595 Pts nes mtl nonrmvl tool
73719 Foundry machine parts
73729 Roll-mill pts nes, rolls.
73739 Mtl weld/solder eq parts
73749 Parts gas welders etc.
74128 Furnace burner parts
74135 Elect furnace/oven parts
74139 Parts ind non-el furn/ov
74149 Pts nes indus refrig equ
74155 Air-conditioners nes
74159 Air-conditioner parts
74172 Water proc gas gen parts
74190 Parts indus heat/cool eq
74220 Piston eng fuel/wtr pump
74291 Pump parts
74295 Liquid elevator parts
74363 Engine oil/petrol filter
74364 Engine air filters
74391 Parts for centrifuges
74395 Parts filters/purifiers
74419 Trucks pts nes
74443 Jacks/hoists nes hydraul
74491 Parts for winches/hoists
74492 Lift truck parts
74493 Lift/skip h/escalat part
74494 Lifting equip parts nes
74519 Pts nes of tool of 7451
74529 Packing etc mchy pts nes
74539 Weighng mach wts,pts nes
72599 Paper product mach parts
72635 Printing type,plates,etc
72689 Parts of bookbind mchn
72691 Type-setting machn parts
72699 Printing press parts
72719 Cereal/dry legm mach pts
72729 Indus food proc mach pts
72839 Pts nes of machy of 7283
72847 Isotopic separators
72851 Glass-working machy part
72852 Plastic/rubber mach part
72853 Tobacco machinery parts
74790 Tap/cock/valve parts
74821 Ball/roll bearing housing
74822 Bearing housings nes
74839 Iron/stl articulated link chain parts
74840 Gears and gearing
74850 Flywheels/pulleys/etc
74860 Clutches/sh coupling/etc
74890 Gear/flywheel/cltch part
74920 Metal clad gaskets
74991 Ships propellers/blades
74999 Mach parts nonelec nes
75230 Digital processing units
75260 Adp peripheral units
75270 Adp storage units
75290 Adp equipment nes
75991 Typewrtr parts,acces nes
75993 Dupl/addr mach parts etc
75995 Calculator parts/access.
75997 Adp equip parts/access.
76211 Mtr vehc radio/player
76212 Mtr vehc radio rec only
76281 Other radio/record/play
76282 Clock radio receivers
76289 Radio receivers nes
76432 Radio transceivers
76491 Telephone system parts
76492 Sound reprod equip parts
76493 Telecomm equipmt pts nes
76499 Parts etc of sound equip
77111 Liquid dielec transfrmrs
77119 Other elec transformers
77125 Inductors nes
77129 Pts nes elec power mach.
77220 Printed circuits

74568 Spraying machinery parts
74593 Rolling machine parts
74597 Automatic vending machs
74610 Ball bearings
74620 Tapered roller bearings
74630 Spherical roller bearing
74640 Needle roller bearings
74650 Cyl roller bearings nes
74680 Ball/roller bearings nes
74691 Bearing ball/needle/roll
74699 Ball etc bearng part nes
74710 Pressure reducing valves
74720 Pneumat/hydraulic valves
74730 Check valves
74740 Safety/relief valves
74780 Taps/cocks/valves nes
77257 Lamp holders
77258 Plugs and sockets
77259 El connect equ nes<1000v
77261 Switchboards etc <1000v
77262 Switchboards etc >1000v
77281 Switchboards etc unequip
77282 Switchgear parts nes
77311 Winding wire
77312 Co-axial cables
77313 Vehicle etc ignition wir
77314 Elect conductor nes <80v
77315 El conductor nes 80–1000
77317 El conductor nes >1000v
77318 Optical fibre cables
77322 Glass electric insulator
77323 Ceramic elect insulators
77324 Other electrc insulators
77326 Ceram elec insul fit nes
77328 Plastic el insul fit nes
77329 Other elec insul fit nes
77423 X-ray tubes
77429 X-ray etc parts/access.
77549 Electr shaver/etc parts
77579 Parts dom elect equipment
77589 Domest el-therm app part
77611 Tv picture tubes colour
77612 Tv picture tubes monochr
77621 Tv camera tubes etc
77623 Cathode-ray tubes nes
77625 Microwave tubes
77231 Fixed carbon resistors
77232 Fixed resistors nes
77233 Wirewound var resistors
77235 Variable resistors nes
77238 Elect resistor parts
77241 High voltage fuses
77242 Auto circuit breakr
77243 Other auto circuit brkrs
77244 Hi-volt isolating switch
77245 Limiter/surge prtect etc
77249 Hi-volt equipment nes
77251 Fuses (electrical)
77252 Automatic circuit breakr
77253 Circuit protect equi nes
77254 Relays (electrical)
77255 Other switches
77831 Ignition/starting equipm
77833 Ignition/starting parts
77834 Veh elect light/etc equ.
77835 Veh elect light/etc part
77861 Fixed power capacitors
77862 Tantalum fixd capacitors
77863 Alum electrolyte capacity
77864 Ceram-diel capacit sngle
77865 Ceram-diel capacit multi
77866 Paper/plastic capacitor
77867 Fixed capacitors nes
77868 Variable/adj capacitors
77869 Electrical capacitr part
77871 Particle accelerators
77879 Parts el equip of 778.7
77881 Electro-magnets/devices
77882 Elec traffic control equ
77883 Elec traffic control pts
77885 Electric alarm parts
77886 Electrical carbons
77889 Elec parts of machy nes
78410 Motor veh chassis+engine
78421 Motor car bodies
78425 Motor vehicle bodies nes
78431 Motor vehicle bumpers
78432 Motor veh body parts nes
78433 Motor vehicle brake/part
78434 Motor vehicle gear boxes
78435 Motor veh drive axle etc
78439 Other motor vehcl parts

77627 Electronic tubes nes
77629 Electrnic tube parts nes
77631 Diodes exc photo-diodes
77632 Transistors <1watt
77633 Transistors >1watt
77635 Thyristors/diacs/triacs
77637 Photo-active semi-conds
77639 Semi-conductors nes
77649 Integrated circuits nes
77681 Piezo-elec crystals,mntd
77688 Piezo-elec assmbly parts
77689 Electrnic compon pts nes
77812 Electric accumulators
77817 Primary batt/cell parts
77819 Elec accumulator parts
77821 Elec filament lamps nes
77822 Elec discharge lamps nes
77823 Sealed beam lamp units
77824 Ultra-v/infra-r/arc lamp
77829 Pts nes of lamps in
82119 Parts of chairs/seats
82180 Furniture parts
84552 Girdles/corsets/braces..
84842 Headgear plaited
84848 Parts for headgear
87119 Binoc/telescope part/acc
87139 Electron/etc diffr parts
87149 Microscopes parts/access
87199 Parts/access for 8719
87319 Gas/liq/elec meter parts
87325 Speed etc indicators
87329 Meter/counter parts/acc.
87412 Navigation inst parts/acc
87424 Pts nes inst in SITC 8742
87439 Fluid instrum parts/acc
87456 Thermometer etc parts/acc
87463 Pressure regulators/etc
87479 Elec/rad meter parts/acc
88113 Photo flashlight equipmt
88115 Flashlight parts/access
88124 Movie projector part/acc
88136 Photo,cine lab equip ne
88431 Camera/etc objectiv lens
88433 Optical filters
88571 Instr panel clocks/etc
88591 Watch cases,case parts
78535 Parts/access motorcycles
78536 Parts/acces inv carriage
78537 Parts,acces cycles etc
78689 Trailer/semi-trailer pts
79199 Rail/tram parts nes
79283 Aircraft launchers etc
79291 Aircraft props/rotors
79293 Aircraft under-carriages
79295 Aircraft/helic parts nes
79297 Air/space craft part nes
81211 Radiators, parts thereof
81215 Air heat/distrib equipmt
81219 Parts for c-heat boilers
81380 Portable lamp parts
81391 Glass lighting parts
81392 Plastic lighting parts
81399 Lighting parts nes
82111 Aircraft seats
82112 Motor vehicle seats
82113 Bamboo/etc seats/chairs
89395 Plastc furniture fittngs
89890 Musical instr parts/acc.
89935 Cig lighter parts/access
89949 Parts nes umbrella/canes
89983 Buttons/studs/snaps/etc
89985 Slide fasteners
89986 Slide fastener parts
89129 War munitions/parts
89191 Pistol parts/accessories
89195 Shotgun/rifle parts nes
89199 Military weapon part nes
89281 Labels paper,paperboard
87414 Survey instr parts/acc.
87426 Meas/check instr parts/acc
87454 Mech tester parts/accs
87461 Thermostats
87469 Regul/cntrl inst parts/acc
87490 Instrument part/acc nes
88114 Camera parts/accessories
88123 Movie camera parts/acc.
88134 Photo equip nes part/acc
88422 Spectacle frame parts
88432 Objective lenses nes
88439 Mounted opt elements nes
88579 Clocks nes
88592 Watch straps/bands metal

88593 Watch strap/band non-mtl
88597 Clock cases,case parts
88598 Clock/watch mmnts unass
88599 Clock/watch parts nes
89111 Armoured tanks/etc

Source: Athukorala, Prema-chandra, and Tala Talgaswatta. 2016. 'Global Production Sharing and Australian Manufacturing'. Australia: Department of Industry, Innovation and Science of Australia.