Determinants of Intra-Industry Trade and Labour Market Adjustment

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A Sectoral Analysis of India

By

Sakshi Aggarwal

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LIST OF ABBREVIATIONS

ACGR	Annual Compound Growth Rate
AD	Aggregate Demand
ADB	Asian Development Bank
AFTA	ASEAN Free Trade Area
ALP	Average Labour Productivity
APTA	Asia-Pacific Trade Agreement
AR1	First Order Autocorrelation
ASEAN	Association of Southeast Asia Nations
ASI	Annual Survey of Industries
ASIC	Australian Standard Industrial Classification
BIMSTEC	The Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation
BTIA	Bilateral Trade and Investment Agreement
CAGR	Compound Annual Growth Rate
CD	Cross-sectional Dependence
CECA	Comprehensive Economic Cooperation Agreement
CEPA	Comprehensive Economic Partnership Agreement
CMIE	Centre for Monitoring Indian Economy
CR	Concentration Ratio
CSO	Central Statistical Office
DPIIT	Department of Promotion of Industry and Internal Trade
DVA	Domestic Value Added
EPW	Economic and Political Weekly
EU	European Union
FA	Framework Agreement
FDI	Foreign Direct Investment
FF	Fontagné and Freudenberg
FGLS	Feasible Generalized Least Squares
FRB	Federal Reserve Economic Database
FTA/FTAs	Free Trade Area/Free Trade Agreements
FTP	Foreign Trade Policy
FVA	Foreign Value Added
GATT	General Agreement on Tariffs and Trade
GCC	Gulf Cooperation Council

GDP	Gross Domestic Product
GHM	Greenaway, Hine and Milner
GHME	Greenaway, Hine, Milner and Elliott
GL	Grubel-Lloyd
GLC	Grubel - Lloyd Corrected
GLU	Grubel - Lloyd Uncorrected
GLS	Generalized Least Squares
GMM	Generalized Method of Moments
GNP	Gross National Product
GoI	Government of India
GPNs	Global Production Networks
GSTP	Global System of Trade Preferences
GVA	Gross Value Added
GVC(s)/GVC	Global Value Chain(s)
HIC	High Income Country
HIIT	Horizontal Intra-Industry Trade
HK	Hamilton and Kniest
H-O	Heckscher-Ohlin
HQVIIT	High-Quality Vertical Intra-Industry Trade
HS	Harmonized System
IASEAN	India-ASEAN
IBSA	India, Brazil, South Africa Dialogue Forum
ICIO	Inter-Country Input- Output
IICECA	India-Indonesia Comprehensive Economic Cooperation Agreement
IIT(s)/IIT	Intra-Industry Trade(s)
IJCEPA	India-Japan Comprehensive Economic Partnership Agreement
IKCEPA	India-South Korea Comprehensive Economic Partnership Agreement
IMCECA	India-Malaysia Comprehensive Economic Cooperation Agreement
IMF	International Monetary Fund
IPN /IPN(s)	International Production Network(s)
ISCECA	India-Singapore Comprehensive Economic Cooperation Agreement
ISIC	International Standard of Industrial Classification
ISLFTA	India-Sri Lanka Free Trade Agreement
IT	Information Technology
ITC	International Trade Centre
LDC/LDCs	Less Developed Country/Less Developed Countries

LIC	Low Iincome Ccountry
LM	Lagrange Mmultiplier
LMIC	Lower-Mmiddle Iincome Ccountry
LPI	Logistic Performance Index
LQVIIT	Low-Quality Vertical Intra-Industry Trade
MFN	Most-Favored Nation
MII	Make-in-India
MIIT	Marginal Intra-Industry Trade
MLE	Maximum Likelihood Estimation
MNCs	Multinational Corporations
NAFTA	North American Free Trade Agreement
NEP	New Economic Policy
NESPD	New Earnings Survey Panel Dataset
NIC	National Industrial Classification
NSS	National Sample Survey
OECD	Organization for Economic Cooperation and Development
OLS	Ordinary Least Squares
PCA	Principal Component Analysis
PTA	Preferential Trade Agreement
PCGNI	Per Capita Gross National Income
PCSE	Panel Corrected Standard Errors
RCA	Revealed Comparative Advantage
RCEP	Regional Comprehensive Economic Partnership
R&D	Research and Development
ROO/ROOs	Rules of Oorigin
ROW	Rest of World
RTA/RTA(s)	Regional Trade Agreement(s)
RVCs	Regional Value Chains
SAARC	South Asian Association for Regional Cooperation
SACU	Southern African Customs Union
SAFTA	The South Asian Free Trade Area
SAH	Smooth Adjustment Hypothesis
SEZ(s)	Special Economic Zone(s)
SITC	Standard International Trade Classification
SME	Micro, Small and Medium Enterprises
SNA	System of National Accounts
STIP	Science, Technology and Innovation Policy
TB	Trade Balance
TiVA	Trade in Value - Added
UAE	United Arab Emirates

UK	United Kingdom
UMIC	Upper Middle Income Country
UNCTAD	United Nations Conference on Trade and Development
UNESCAP	The United Nations Economic and Social Commission for Asia and the Pacific
US/USA	United States of America
UV(s)	Unit Value/ Unit Value(s)
VECM	Vector Error Correction Model
VIF	Variance Inflation Factor
VIIT	Vertical Intra-Industry Trade
WIOD	World Input-Output Database
WITS	World Integrated Trade Solution
WLS	Weighted Least Squares
WTO	World Trade Organization

ABSTRACT

India's trade and investment regime was one of the most restrictive in the world during the mid-1950s, due to the framework of complex procedures and high tariffs on the import of manufactured products. Realizing the limitations of the import substitution policy, a process of reorientation began in the early 1980s in India, which gained momentum during the 1990s in the post-liberalization phase. In early 1990s, India embarked on major economic reforms to liberalize its economy and it has embraced the process of globalization since then. The liberalization measures included the dismantling of quantitative restrictions on imports, the rationalization of import tariff rates, industrial de-licensing and the opening up of a number of industries for inflows of foreign direct investment (henceforth FDI). The process of liberalization has led to interesting dynamics in India's production system, thereby leading to changes in the commodity structure of international trade.

The conventional wisdom is that trade liberalization entails the restructuring of production processes so that productive resources are reallocated from import-competing industries to those industries where a country has comparative advantages. This indicates an expansion of inter-industry trade as a consequence of economic reforms. However, empirical observations from different parts of the world are not in strict conformity with the aforesaid viewpoint, especially in the manufacturing sector. On the contrary, a process of greater intra-industry reallocation of productive resources has been witnessed as some countries open up their manufacturing industries to external competition. This can be attributed to the fact that trade liberalization gives rise to specialization in narrower product lines within the manufacturing sector, leading to the occurrence of simultaneous exports and imports within the same industry. This phenomenon is called intra-industry trade (henceforth IIT).

A series of 'new' trade theories provide the theoretical justification for the co-existence of inter- and intra-industry trade (Lancaster, 1979; Dixit and Norman, 1980; Falvey, 1981; Helpman, 1981; Krugman, 1980, 1981; Shaked and Sutton, 1984). The evolution of the literature on IIT has conceptualized the framework of product differentiation and economies of

scale to facilitate explicit modelling in the formal analysis of IIT (Dixit and Stiglitz, 1977; Krugman, 1979; Lancaster, 1979). Subsequently, an emphasis has been laid on the decomposition of total IIT into horizontal intra-industry trade (henceforth HIIT) and vertical intra-industry trade (henceforth VIIT), following the Abd-el-Rahman (1991) methodology. HIIT can be explained as trade in differentiated varieties of similar products, whereas VIIT represents trade in vertically differentiated products that are distinguished by quality and price to segregate low quality products from high quality products. The process of economic integration through participation in global value chains (henceforth GVCs) has raised both welfare-related concerns and long-term economic benefits in regard to VIIT and therefore, the distinction between HIIT and VIIT is important given their potential implications on sectoral outcomes (Blanes and Martín, 2000). As HIIT is concerned with products of similar quality, a rise in such a type of trade might be associated with certain labour market adjustment costs (Brülhart, 1999, 2000). Conversly, VIIT may lead to the displacement of workers specializing in producing lower quality varieties (Shaked and Sutton, 1984; Motta, 1992) given the difference in factor contents of exports and imports (Greenaway and Hine, 1991).

The adoption of an export-oriented strategy in mid-1980s happened simultaneously with the international fragmentation of production processes. This framework of the modern manufacturing process and patterns of trade (Manova and Yu, 2016; Alfaro et al., 2019) in both developed and developing economies has led to the production globally of cost-competitive finished products. The existing literature highlights the fact that economic reforms have the potential to positively influence the participation of different geographies in GVCs (Yi, 2003; Miroudot et al., 2013; Kowalski et al., 2015). It has been noted that the total exports originating from a country are made up of two core components: (1) pure domestically produced components, *i.e.*, the domestic value added (henceforth DVA) content and (2) the import components embodied in the exports, *i.e.*, the foreign value added (henceforth FVA) content. DVA in exports is a critical factor for many developing economies which are largely stuck in the low-value manufacturing stages of GVCs (Gereffi and Korzeniewicz, 1994; Baldwin, 2013; Gupta, 2016). Therefore, it has been asserted that developing countries must integrate with GVCs, and over a period attempt to graduate towards higher-end production.

An overview of the literature reveals that the relationship between IIT and industrial adjustment is rich with both empirical and theoretical perspectives. The launch of the General Agreement on Tariffs and Trade

(henceforth GATT) negotiations led to the rationalization of tariff barriers on manufacturing products through multilateral, regional as well as uniform reform processes (Bown and Irwin, 2016). These reforms are, however, associated with necessary adjustment costs depending on the type of trade. In this regard, Balassa (1966), followed and further developed by Greenaway and Milner (1986), Brülhart and Elliott (2002) and other scholars, assessed the adjustment implications of trade expansion by analyzing the patterns of IIT. It has been argued that employment and production disruption is minimized when adjustment is internal to an industry due to easier mobility of resources among firms within the product category (Krugman, 1981; Greenaway and Milner, 1986; Brülhart and Elliott, 2002; Brülhart et al., 2006). This proposition that IIT entails lower costs in terms of factor-market adjustments than inter-industry trade is known as the '*smooth adjustment hypothesis*' (henceforth SAH). A dynamic measure on IIT, namely the marginal intra-industry trade (henceforth MIIT) index, is widely used in the literature for analyzing the interrelationship between IIT and labour market adjustment effects (Lovely and Nelson, 2000, 2002; Brülhart et al., 2006).

The economic liberalization process was initiated in the early 1980s in India, and got further intensified in 1990s. The economic reforms have led to a restructuring of production units in accordance with consumer preferences. These evolving changes are expected to bring about rationalization in the choice of product lines by individual firms, thereby enabling them to specialize in the production of narrower product lines to meet export and domestic demand while product lines not supplied domestically are imported. Such specialization patterns may occur at the level of final consumer goods as well as intermediate producer goods (Veeramani, 2004; Linden et al., 2009). A manifestation of this process is evident in the rise in India's IIT index (Backer and Miroudot, 2013; Banga, 2014a; Gupta, 2016).

In the analysis of international and intra-regional specialization, the evaluation of IIT is an emerging area of research. Therefore, it would be interesting to study the changes which the Indian economy has witnessed in the past two decades in order to analyze: (1) the pattern of trade at the aggregate and sectoral levels with key trading partners, (2) compute the dynamics and the level of IIT and then decompose the same into horizontal and vertical components, (3) understand the relationship between the DVA content of exports and the factors influencing its pattern across industries and (4) evaluate the impact of dynamic IIT on its associated adjustment cost in the manufacturing sector labour market.

An exploration of the existing literature reveals that there are comparatively few empirical studies in the context of developing economies that focus on the country-industry-specific determinants of aggregate and sectoral IIT. Empirical analysis of the relationship between GVCs and IIT at the sectoral level is an even less researched area. In recent years, the qualitative differentiation of IIT patterns into horizontal- and vertical-types has gained relevance in the literature. However, evidence on the effects of various industry-specific variables on the determinants of VIIT has been relatively unexplored in the present context. The consequent impact of rising IIT on labour-market sectoral dynamics in the context of developed countries is primarily concerned with the analysis of the effects of MIIT and labour-trade related control variables on employment changes. However, the only contribution such analysis will make to the literature is to validate/negate the proposition of the SAH in the Indian context. This thesis conducts an empirical analysis for the period 2001-2015 with the key manufacturing industries of Indian economy in an attempt to bridge the aforesaid research gaps.

Based on the identified research gaps, the following hypotheses are analysed in the current context. First, several country-specific variables, including demand-driven (e.g., income difference), supply-induced (e.g., technology difference), friction-led (e.g., distance, logistic performance, contiguity, language, and tariffs) and policy-oriented (e.g., FTA partnerships) factors, influence the level of bilateral aggregate IIT. Second, in addition to the aforesaid country-specific factors, several industry-specific characteristics (e.g., state of vertical product differentiation and average labour productivity) impact the bilateral sectoral IIT levels. Third, the diverse factors of production (technology-intensity as well as unskilled labour) and trade overlap, reflected through IIT patterns, influence the DVA content of exports. Fourth, several country-specific, industry-related and policy-oriented variables impact India's aggregate VIIT at sectoral level. Finally, several trade-related, labour-specific and trade overlap-induced factors influence employment levels in the manufacturing industry.

The thesis has three main sections that conduct empirical analysis for the period 2001-2015. The first section focuses on an empirical analysis of the factors influencing India's bilateral IIT. This section consists of two sub-sections that detail: (1) an empirical analysis of the determinants of India's bilateral composite IIT and (2) an empirical analysis of the determinants of India's bilateral sectoral IIT. The analysis of the first section is further extended in the second section by investigating the relationship between

IIT and deepening participation in GVCs and the decomposition of total IIT into HIIT and VIIT. The study observes that in the composition of IIT values, VIIT values are consistently higher than the corresponding HIIT values. Therefore, the empirical analysis in the second section is comprised of two sub-sections that explore: (1) the determinants of the DVA content in India's exports and (2) the determinants of India's VIIT. Finally, the impact of dynamic IIT on labour market adjustments in India's key manufacturing sectors is examined in the third section of the thesis. This section explores the relationship between MIIT and the absolute value of the total employment changes in the Indian context. Several interaction variables have also been incorporated in the study to examine the impact of industry-trade-labour related control variables on the labour market sectoral dynamics.

The thesis adopts a panel data framework for conducting empirical analysis. Major findings of the thesis are the following. First, India's trade pattern underlines the presence of VIIT-type trade with both high income and low income countries. So, there can be a qualitative difference in the products being traded. Second, an improvement in trade facilitation among the trading partners enhances the effectiveness of the physical infrastructure in the logistics movement of products between the countries, leading to a rise in IIT levels. Therefore, trade facilitation is a key determinant that can significantly enhance India's bilateral composite as well as sectoral IIT with respect to its partners in general and in relation to high income groups in particular. Third, a rise in capital intensity among the factors of production by employing sophisticated capital machinery and equipment in the production processes facilitates VIIT in India's trade pattern across sectors. Furthermore, the empirical results reveal that India's potential to move up the technology ladder is primarily determined by the growing capital intensity, the relative presence of skilled workers, and research and development (henceforth R&D) expenditure within sectors that may enable firms to specialize in exporting relatively higher quality products. Fourth, technological processes might be detrimental for unskilled labour in India's key manufacturing sectors. Finally, the implication of MIIT on labour market dynamics is explored. The results show that high relative growth rate, skill intensity, incremental FDI inflows, and average labour productivity in a sector characterized by higher MIIT, may lead to greater labour market adjustments. Hence, it can be observed that given the structural characteristics of the Indian economy, the outcomes do not provide support for the SAH in the present context.

The empirical results indicate interesting policy implications for the Indian economy. The recently launched 'Make in India' (2014), 'Atmanirbhar Bharat Abhiyan (ABA)' (2020) and other initiatives underline the importance accorded to the industrial sector by policymakers. However, the deepening participation with the Asian production networks, with simultaneous exports and imports, has resulted in diverse dynamics across sectors. While the composite and sectoral IIT indices show an increasing trend, the underlying pattern, once a decomposition exercise is undertaken, happens to be predominantly vertical in nature. In other words, India generally treads on a higher or lower quality plane vis-à-vis its trade partners. While the move towards a higher quality plane is warranted, there is a potentinal threat for the sectors lying on a lower quality plane, many of which are also characterized by net trade deficits. As the empirical analysis on the labour market adjustment process suggests, the sectors characterized by greater trade openness and higher productivity levels witness larger changes in the sectoral employment pattern. The observation indicates that while a higher quality sector (i.e., HQVIIT) may experience productivity gains, possibly leading to a net trade surplus and rising employment, the reverse scenario may prevail in lower quality sectors (i.e., LQVIIT). In effect, there is a strong case for the government to ensure three objectives. First, the LQVIIT sector needs to receive certain protections in a time-bound fashion till their quality and efficiency levels reach a critical threshold. As there is a limit to enhance the WTO-compatible tariff protection, the government decision to opt out of the Regional Comprehensive Economic Partnership (RCEP) negotiations needs to be viewed in this light. The other ongoing and proposed trade bloc negotiations, e.g., the proposed India-EU FTA and India-US FTA, need a close cost-benefit analysis, before preferential tariff reform measures are rolled out. Second, there is a need to enhance the productivity and quality of the industrial sector in general and the segment in the lower quality plane in particular. As the micro, small and medium enterprises (MSMEs) play a crucial role in the Indian industrial sector, focused supports to this segment need to be considered as a top priority. Phase 1 of ABA promises to look into this segment. There is a particular need to facilitate quality upgradation in their product baskets so as to deepen their meaningful participation in the Asian production networks, without any negative labour market repercussions. Finally, in the short run, given the productivity and quality concerns, labour market restructurings in trade-deficit sectors are unavoidable. While government interventions like 'Skill India Mission' are there to facilitate more employment opportunities for the job-seekers by providing training in

‘market-relevant skills’, the possible scope and coverage of re-training the displaced industrial workers from trade deficit sectors need to be judged closely. In particular, their possible re-employment in a growing sub-segment within the same industrial product group after necessary re-training would minimize the labour market adjustment costs on the one hand and facilitate industrial growth on the other.

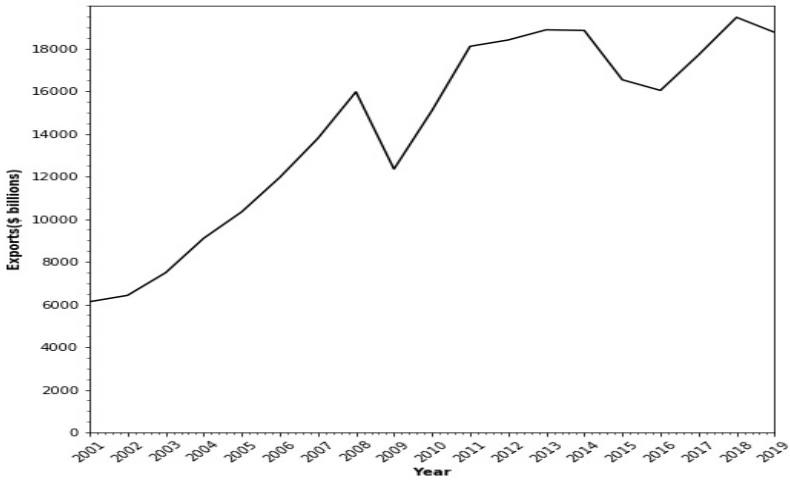
CHAPTER 1

INTRODUCTION - INTERNATIONAL TRADE AND INTRA-INDUSTRY TRADE

1.1 International Trade Dynamics

Over the last two decades, economies have undergone major structural changes in response to growing world trade. These changes are partly the result of India's New Economic Policy (henceforth NEP), which was launched in 1991. Liberalization, deregulation of markets and privatization, and globalization are the three major components of NEP. The globalization process has led to increasing participation of economies – both developed and developing - in global trade through both backward and forward integrations with the world market, inflows of foreign investment, rises in international competitiveness, etc. (Papageorgiou et al., 1991; Thomas and Nash, 1991). International trade flows have registered fairly strong growth over the 2002 to 2008 period, accompanied by rising commodity prices. Following the financial crisis of 2008, trade fell steeply before rebounding strongly during 2010-11 (WTO, 2015). After witnessing modest growth in 2012-14, followed by a downturn in 2015-16, finally a strong rebound was observed in 2017-18 (UNCTAD, 2019). Figure 1.1 reports the year-wise trend of world exports that has witnessed growth in its value from US $6,127 billion to US $18,755 billion during the period 2001-2019.

Figure 1.1: Trend in world exports (2001-2019)

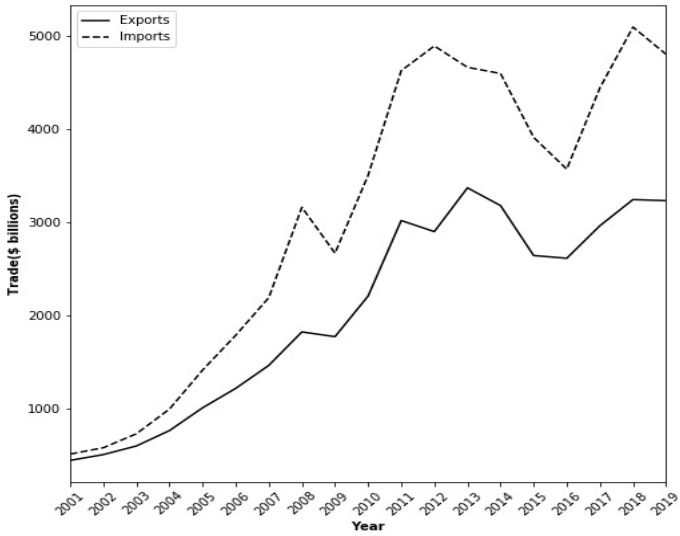


Source: Own construction from Trade Map (ITC, undated) data

The rise in world exports in recent years can be attributed to growth in the international competitivenes of key economies. According to the World Economic Forum (2012), international competitiveness can be described as *"the set of institutions, policies, factors that determine the level of productivity of a country."* An extensive literature has shown that international competitiveness is linked with low costs of labour, offering attractive geographical locations for new investment, fostering increases in labour and capital productivity through technology transfers, and accessing new knowledge (Bernard et al., 2007; Spencer and Brander, 2008). This underlines the importance of technological progress in a country's ability to develop in the long-term perspective. The above-mentioned factors can be acquired using international trade channels, which are positively associated to a country's innovativeness and allow them to compete in the globalized market (Alcalá and Ciccone, 2004; Sun and Heshmati, 2010). The positive impact of broad internationalization, leading to growth in international competitiveness via trading has been reported in a broad array of studies (Rodriguez and Rodrik, 2000; Dollar and Kraay, 2003; Falvey et al., 2012; Kotlewski, 2013; Rani and Kumar, 2018).

Along similar lines, India has witnessed a rise in trade growth over the past two decades. This is evident from Figure 1.2, which reports the year-wise trend of India's exports and imports during the period 2001-2019, based on Trade Map data (ITC, undated).

Figure 1.2: Trend in India's exports and imports (2001-2019)



Source: Own construction from Trade Map (ITC, undated) data

Annexure 1.1 reports the average share of traded commodity groups in India's trade basket at the Harmonized System (henceforth HS) 2-digit level of trade classification. To observe the temporal perspective, the average shares are compared over the periods 2001-05, 2006-10, 2011-15 and 2016-19 respectively. It is observed that the shares of several product groups, e.g. chemicals (HS 28, 29), electrical machinery and equipment (HS 84, 85), vehicles and auto-components (HS 87), have significantly increased in India's trade basket over the years. All these sectors are generally characterized by the international production fragmentation that has been a notable feature of the global economy in recent years. The economic policy reforms in India, coupled by tariff and other procedural liberalizations, have led to increased integration of these sectors with global value chains (Chase, 2005; Manger, 2009; Blanchard and Matschke, 2015; Gawande et al., 2015; Baccini et al., 2017) and consequently a rise in

overlapping trade across different manufacturing segments of the Indian economy.

1.2 Importance of Intra-Industry Trade

Classical trade theories postulate that trade occurs because a country can source goods and services from abroad at a cheaper price as compared to the domestically produced varieties. The classical trade theories also propound that a country should specialize in exporting the goods most suited to its factor endowments, technology and climate, while importing those products which are not well-suited to its prevailing national characteristics.

In the pre-twentieth century period, the 'Labour Theory of Value' was first put forward to explain trade flows. The two leading economists of the era, Adam Smith and David Ricardo, proposed two drivers of trade, popularily known as *Smithian* and *Ricardian* logic. The Smithian (1776) logic of trade was characterised by the assumption that countries did not need to be different before they initiated exchange. It was through trade and subsequent specialization that countries started to differ in their production process, based on unit labour costs. Thus, trade flows could result in growth, as specialization led to an enhanced division of labour. The Ricardian (1817) logic on the other hand was based on the assumption that advantages were exogenously given before trade took place between economies. According to this logic, differences between countries were the only reason for the exchange of goods. Thus, the Ricardian theory relied on comparative advantage to explain international trade.

In the subsequent period after Industrial Revolution, the limitations of the 'Labour Theory of Value' became apparent, with the rising relevance of capital in the production process. Consequently, a substantial development of the theory was laid out by Heckscher (1919) and Ohlin (1933). This Heckscher-Ohlin (henceforth H-O) theory proposed to explain trade flows on the basis of factor price (i.e., wage and interest), determined by factor abundance. An abundant supply of a factor would lower its price in the home country, providing a competitive edge to the sectors using that factor in their production process intensively. In a pure H-O world, for instance, labour abundant countries would therefore specialize in relatively labour-intensive industries and trade with countries that specialized in relatively capital-intensive industries. As such, the trade that took place would be of the inter-industry type, wherein a country's export and import baskets would be dominated by different product groups. The H-O theory was

successful in explaining trade flows between capital-intensive and labour-intensive countries. However, with the passage of time, it was realized that capital was not homogeneous and there was a need to differentiate between human and physical capital. Human capital is influenced by education level, job training and health embodied in workers, which increases labour productivity. The mixing of the human capital component with physical capital was the major reason behind the reporting of the Leontief Paradox observed within the H-O theorem framework. The Leontief Paradox (1953) added a new dimension to the analysis of international trade flows. In the following period, a branch of literature focused on testing the empirical validity of the H-O theorem and providing a possible solution to the Leontief Paradox. Linder's hypothesis (1961) opened a new vista for explaining the underlying determinants of international trade by advocating demand-side characteristics, rather than the prevailing supply-side analysis with factor endowments. In other words, the Linder theory and subsequent literature along this line paved a newer route for explaining trade between two countries belonging to similar income and endowment groups (i.e., both partners being developed or developing countries).

Until the 1960s, the traditional theories explained trade flows by production and the exchange of goods of different industries by different countries, i.e., through engagement in 'inter-industry trade'. However from the 1960s onwards, industrialization across developed countries did not lead to 'specialization', as proposed by the classical theories, but paved the way for simultaneous exports and imports (Caves, 1981). The H-O postulation that countries specialize in and export commodities which used their abundant factor intensively had limited success in explaining intra-industry trade. This observation received theoretical support from the "Product Cycle Model" proposed by Vernon (1966). This proposition was based on the logic that when a new product was introduced, it usually required high-skilled labour and sophisticated technology to produce, and therefore it was initially produced in developed (capital-abundant) countries. But as the product matured and became standardized, it could then be produced by mass production techniques with less-skilled labour in developing (labour-abundant) countries. In other words, after the product gets adopted in the world markets, the production gradually moves away from the point of origin and after a time lag, may be imported by the original country of invention. Now, if the product groups become non-homogeneous or 'diversified' in terms of quality, it may happen that a developed (capital-abundant) country may continue to produce high-quality manufacturing products (say, automobiles) and export the same to

a developing (labour-abundant) country, where the population in the richer income quintiles will demand the products in line with the Linder thesis predictions. However, the thesis also envisages the possible export of low-quality products originating from the developing country to their developed counterparts. In other words, this framework enables countries belonging to different income groups and endowment brackets to simultaneously export a particular product to each other, which cannot be explained by the classical supply-side theories.

Between 1955 and 2019 the value of world exports at current prices increased significantly from $93 billion to $18,754 billion. Over the same period, the share of manufacturing sectors in the total merchandise exports increased from 48 percent to 68 percent (WTO, 2019). The importance of less-developed countries (henceforth LDCs) increased as exporters of manufactures over this period (UNCTAD, 2020). A phenomenon which appears to have increased in importance as a consequence of the growth of manufacturing trade between nations across development spectrum is popularly known as '*intra-industry trade*' (henceforth IIT) (Greenaway and Milner, 1983). The specific term IIT was first used by Balassa (1966) to describe the simultaneous export and import of products within the same industry between trade partners. The first empirical work on this line of research was undertaken by Grubel (1967), and explored the nature and pattern of IIT in the European Common Market. The literature on the measurement of IIT was further enriched by the subsequent works of Grubel and Lloyd (1971, 1975), which motivated a rich branch of literature on this research question (Bhattacharyya, 2005; Bergstrand and Egger, 2006; Mezo, 2007; Sawyer et al., 2010; Bano, 2014; Kaur and Sarin, 2016). A branch of literature dealing with LDCs show that IIT is also present in their trade as well (Hu and Ma, 1999; Arvis et al., 2014; Hoang, 2019). There is also the possibility that adjustment to trade expansion may be easier when the expansion takes the form of an increase in intra- as opposed to inter-industry exchange (Greenaway and Milner, 1983; Globerman and Dean, 1990).

While the empirical measurement of the IIT phenomenon was enriched further in the subsequent period, during late 1970s the theoretical framework for IIT-type trade was systematically developed. First, the pioneering work of Dixit and Stiglitz (1977) focused on the issue of quantity versus diversity in explaining trade patterns. Since consumers prefer diversity in product characteristics, the model is also known as the 'love for variety' model. Second, a series of works by Krugman (1979, 1980, 1981) explained IIT by focusing on the effect of the home market on