

CHAPTER-III
REVIEW OF
LITERATURE

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This chapter discusses and reviews the earlier literature. It is divided into three parts. Part-I deals with the literature developed before the Linder theory. Part-II discusses the Linder theorem. In addition, part-III and IV will review the empirical tests conducted by the other economists.

Part I

3.1. International Trade Theories

The theories of international trade deal with causes, structure and volume of international trade. These theories attempt to solve the problems arising out of international trade. The following questions have been taken into consideration:

1. What is the direction or pattern of trade?
2. What are the terms of trade?
3. What are the gains from trade?

Adam Smith¹(1776): The first formulation of the international trade theory outlined by Adam Smith is known as the theory of absolute advantage. According to Smith, mutually beneficial trade takes place based on absolute advantage, that is, both nations gain from trade of goods if one nation is more efficient than the other one in producing a commodity of its absolute advantage, which is specialized to produce and exchange part of its output with another nation for the commodity of its absolute disadvantage. Adam Smith's theory assumed that there is a slight difference in cost between countries. If a country does not have a product with an absolute cost advantage, then Adam Smith's

¹ Adam Smith (1723 –1790) was an influential Scottish political economist and philosopher. In his book in 1776: “An Inquiry into the Nature and Causes of the Wealth of Nations “and latter abbreviated as “The Wealth of Nations”, he introduced the theory of absolute advantage in international trade based on principle of division of labor.

analysis is not able to deal with such a condition. In other words, beneficial international trade does not necessarily require an exporter with an absolute advantage over his foreign rivals, so the international trade will take place even if one country is superior to the other in production of both commodities.

David Ricardo¹(1817): The creator of classical theory of international trade solved this failure by his theory of comparative advantage. In this theory, the crucial variable used to explain international trade patterns is technology. According to Ricardo, differences in comparative cost of production determine pattern of trade that reflect a difference in technique of production. Ricardo's theory predicts that exporters of manufactures will display higher labor productivity in manufacturing, relative to labor productivity in other industries, than importers of manufactures.

In his famous example, Ricardo assumed that there are two countries (England and Portugal), two commodities (cloth and wine) and the labor is the only factor of production. Portugal is less efficient than England in production both cloth and wine, so it is beneficial for England to specialize in production of cloth and Portugal in wine if Portugal is comparatively more efficient in production of wine than cloth.

In the Ricardian trade theory, labor is the only factor of the production, so the analysis and conclusion depends on the restrictive assumption of the labor theory of value. The labor theory of value is not generally accepted as valid, because labor is neither homogenous nor the sole factor of production. Furthermore, the Ricardian theory does not explain the reason for existence of comparative cost differences between countries.

Eli Heckscher²(1919) and **Bertil Ohlin**³(1933): have explained the foundation of international trade by focusing on the relationships between the composition of countries'

¹ David Ricardo (1772 –1823) was a British political economist. He was one of the most influential classical economists. In 1817, he formulated the law of comparative advantages in his book "On the Principles of Political Economy and Taxation".

² Eli Filip Heckscher (1879 -1952) was a Swedish political economist and economic historian. In 1919, he developed the essentials of the factor endowment theory of international trade in a short article in Swedish.

³ Bertil Gotthard Ohlin (1899 –1979) was a Swedish economist and politician. He was a student of Heckscher, and he developed and elaborated the factor endowment theory. In 1977, He jointly won the Nobel Memorial Prize in Economic Sciences together with the British economist James Meade for their contribution to the theory of international trade and international capital movements.

factor endowments and commodity trade patterns. In the Heckscher-Ohlin theory, specialization and trade are determined by relative factor abundances. In this theory, Ricardo's labor theory of value is replaced by a multiple factors theory through increasing the factors of production to labor and capital. The H-O model is based on two countries, two factors and two commodities. The Heckscher-Ohlin analysis of the factor proportions model states that a country would have a comparative advantage in the good, which made by use of its relatively abundant factor. For instance, a country, which is relatively more capital abundant, would have a comparative advantage in production of the capital-intensive good and predicted to export capital-intensive manufactures and import labor-intensive manufactures. Conversely, the foreign country, which is relatively abundant in labor, has a comparative advantage in the production and export of labor-intensive goods. In the H-O model, factors of production are considered as scarce or abundant in relative terms and not in absolute terms. That is, one factor is considered as rare or abundant in relation to the quantity of other factors. Hence, it is possible even if a country has more capital in absolute terms than other country, it could be poor in capital. One country is considered rich endowment in capital only if the ratio of capital to other factors is higher in comparison to other countries. In other words, the link between commodity price ratios and factor price ratios is more direct than that between commodity price ratios and physical factor endowments. Thus, the Heckscher-Ohlin theorem is more likely to hold if relative factor abundance is defined in terms of relative factor prices before trade.

Some of the assumptions of H-O model do not seem realistic, i.e. there are no productivity differences, the production function is identical everywhere and all countries use the same technology. International trade is costless and there are no transport costs. These assumptions are less than sufficient to guarantee the Heckscher-Ohlin Theorem. Even if countries share the same technology, the commodity that is produced by relatively labor-intensive techniques at home may be produced by relatively capital-intensive techniques abroad. This is the phenomenon of factor-intensity reversal.

Leontief¹(1954): attempted to test the Heckscher–Ohlin theory empirically. In 1954, The Leontief empirical result known as “Leontief Paradox” showed apposite evidence to the conclusion of H-O theory. In his study, he found that United States exports are less capital intensive than the United States rivals whilst in the United States there is supposed to be more capital relative to labor than in the rest of the world. Hence, we can say factor abundant theory is useful just in explaining a significant part of world trade.

Linder² **Critics on the H-O Theory** (1961)³: Linder initiated the analysis of intra-industry⁴ trade and focused on “internal demand”. The H-O model is based on dissimilarities in factor endowment between countries. Furthermore, in this model country’s export and import are different products with different factor proportion, while the Linder theory is shaped on similarity in income levels between trading partners. Moreover, in the Linder model a country’s export and import are similar. In other words, Linder’s model is based on demand side, whilst the H-O model is based on supply side.

- According to Linder, the H-O theory is good to explain pattern of trade in primary products and agriculture goods. The factor proportions theorem explained the trade in primary products dictated by differences in natural resources endowment. The fact that primary products are natural-resource-intensive makes factor proportions important for prices of primary products. Because of a strikingly high pre-trade price in natural-resource-scare countries, a foreign demand easily becomes aware of it. Furthermore, primary products are often available without

¹ Wassily Wassilyovich Leontief (1906 - 1999), was a Russian American economist notable for his research on how changes in one economic sector may have an effect on other sectors. He won a Nobel Prize in 1973 for his contribution to the input-output analysis. Three of his students, Paul Samuelson, Robert Solow and Vernon Smith are also recipients.

² Hans Martin Staffan Burenstam Linder (1931-2000) was a Swedish economist and conservative politician. He was Swedish Minister for Trade from 1976–78 and from 1979-81. In his book: “An Essay on Trade and Transformation” in 1961, he proposed a possible resolution to the Leontief paradox, which questioned the empirical validity of the H-O theory.

³ See (Linder 1961:82-93)

⁴ Intra-industry trade refers to the exchange of similar products belonging to the same industry, where the same types of goods or services are both imported and exported. Inter-industry trade and intra-industry trade differ in terms of the basis of trade, the pattern of specialization and the direction of trade and the implications for policy. Most trade between developed and developing countries is inter-industry trade, while an increasing trade among developed countries is intra-industry trade.

particular inventive effort. However, it is inadequate to explain trade in manufactured goods. Domestic demand condition is the main issue affecting trade in manufactured products and because much of international trade involves manufactured goods, demand condition play a major role in explaining trade patterns.

- The factor proportions theorem (H-O theory) indicated that differences in relative factor proportions are the most important single cause of differences in price structures from one country to another country. However, classification of products according to their factor intensity and countries according to their factor abundance are overestimated out of all proportion in multi-factors, multi-products world.
- Factor proportion theory can be used just (1) where it is easy to be aware of the foreign demand in spite of the non-existence of home demand for the products, (2) where the product as such is available without inventive effort, and (3) when no or little product development is needed. Whereas its analogous cannot be applied to explain patterns of trade in manufactures.

Part II

3.2. Linder Trade Theory

Linder's theory, called the "theory of overlapping demand", implies that companies in one country are generally eager to produce manufactured goods for which there is a large domestic market and export the surplus, so a commodity will be potentially exported if there would be a large demand for it in the home market. Moreover, Linder stated that consumer demand is determined strongly by income levels. Countries with high per capita incomes will demand high quality manufactured goods and nations with low per capita income will demand lower quality goods. Consequently, countries with similar per capita income will have overlapping demand structure and will likely demand similar manufactured goods.

3.2.1. Trade in Manufactures: Principles

There must be a demand at leading world market price for a product in a country to be consumed (or invested). This is called “representative demand”, and it is necessary for a good to be a potential export product. Among all non-primary products, a country has a range of potential exports. This ranges of exportable products determined by internal demand. It is a necessary condition (but not sufficient) that a product be consumed (or invested) in the home country for this product to be a potential export product (Linder 1961: 87).

For a product to be exportable, domestic production is too important for the following reasons:

1. Production of any particular good is likely to be created according to domestic needs. In the world of imperfections, firms will reply to profit of opportunities of which they are aware of and this would arise from domestic needs. When a successful firm grows, the domestic market becomes insufficient for further expansion. The trade horizon of the firm is gradually lifted. International trade is nothing but an extension across national frontiers of a county’s own web of economic activity. The smaller the country, the larger the share of exports of total production (Linder 1961:88).
2. It is a country’s own needs which are the mother of not only innovation but also invention. An invention is likely to plan for solving the most obvious needs, domestic problems. It is easier to become aware of problems and to find their solutions if they are part of inventor’s environment (Linder 1961:89).
3. The developments of innovation or production must be in close contact with the market. If there is no home demand, a producer will be completely unfamiliar with conditions in foreign markets, and because of the difficulties in adapting to different circumstances; the possibility to fail is high. A firm will be successful in exporting products if he is aware of crucial information, which must be known between consumers and producers. Thus, domestic production gives him the access to this information (Linder 1962:89-90).

4. Internal demand determines which products will be imported. In this case, demand does not need to be representative. All products for which there is a demand at going prices are potential import products (Linder 1961:91).

3.2.2. Intensity of Potential Trade in Manufactures¹

To determine the volume of actual trade firstly, it must be clear which countries have the most intensive potential trade with each other. Intensive does not simply imply volume of trade. The absolute size of trade is naturally dominated by size of the trading partners. To calculate intensity of trade, effect of the size of the countries has to be eliminated.

The more similar the demand structures of two countries, the more intensive, potentially is the trade between these two countries. If two countries have exactly same demand structures, all import and export products of both countries will be the same. The level of average income is one of the most important forces influencing the demand structure of a country. The similarity of average income levels can be used as an index for the similarity of demand structures. The modal incomes are likely to be more representative than the arithmetic mean of average income but modal or median income is difficult to find. There is strong relationship between the level of per capita income and the types of consumer or capital goods demanded. Countries with high per capita incomes will demand high quality, “luxury “consumer goods and sophisticated capital goods, while low per capita incomes will demand lower quality, “necessary“ consumer goods and less sophisticated capital goods. High quality manufactured export products of the rich countries will find a good market in other rich countries where people demand such a products and not in poor countries where demand for such a products is small. However, possibilities of trade in manufactures between poor and rich countries cannot be denied. Unequal income distribution in a country widens the range of potential exports and imports and results in there being a greater overlapping of demands between countries with different per capita incomes than would be the case if incomes were more evenly

¹ See (Linder1961:94-101)

distributed. High-income earners in a poor country may demand the same goods as low-income earners in a rich country.

Linder indicates differences in capital/labor proportions are a potential obstacle to trade in manufactures. An increasingly labor-abundant country will face fall in per capita income levels. An increasingly capital-abundant country will experience rising income levels. Since demand structures of two countries will be different, the nature of their trade will change and potential scope of trade will decrease. Consequently per capita income differences are a potential obstacle to trade in manufactures.

3.2.3. Intensity of Actual Trade in Manufactures¹

A country can hardly export all its exportable products and just a certain proportion of them will be imported by other countries. Changes in cost and income levels will take place to balance actual exports and imports.

In countries with identical per capita incomes, all exportables and importables for both countries are the same. However, potential scope of trade is maximal, the actual scope of trade can be minimal. The forces create comparative advantage in trade between countries are same forces cause internal trade within a country. There are no differences between trade among countries with similar per capita incomes and trade within a country.

In countries with different per capita income levels, the number of goods for which demand overlaps will be fewer. The more representative demand for a good is, the more possible this good is an actual export.

In the absence of trade barriers, actual trade will approximately be potential trade. As a country grows and its per capita income increases, the demand structure of that country will change. Consequently, the range of potential and actual exports will change.

Beside existence of trade-creating forces, there are also trade-braking forces such as “distance”, “transport cost” and” man-made trade obstacles that not only make actual

¹ See (Linder 1961:101-109)

trade-creating forces smaller than potential trade, but also they introduce distortion in the sense that countries with similar per capita income levels do not necessarily trade most intensively with each other. If trade-creating forces are strong enough to make all potential trade to happen, the amount of actual trade will depend upon the strength of the trade-braking forces.

3.2.4. Diagrammatic Principles of Trade in Manufactures¹

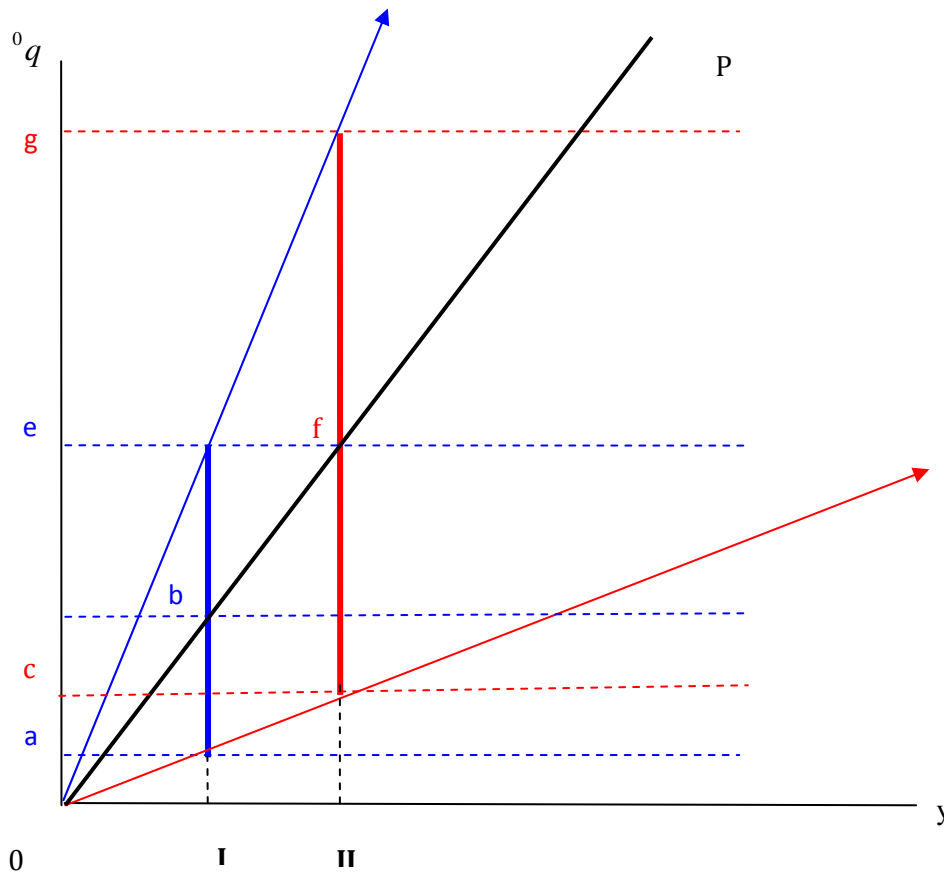
Figure 20 shows the relationship between per capita income and quality of demanded products.

Per capita income (y) is measured on the horizontal axis. On the vertical axis in ordinal numbers, the degree of quality or sophistication of each manufactured product (that is demanded and of demand as a whole (0q)) will be measured. The more complex or luxurious the products, the higher will be 0q . The theory of overlapping demand indicates that there is a positive relationship between per capita income and the quality of demand. The line OP with positive slope represents this relationship. Supposed there are two countries II and I with close per capita income levels. Since there is uneven distribution of income, different range of quality of products will be demanded that is shown around the average degree on OP . The inner area of blue and red arrows represents different degree of qualitative of demands of two countries with different per capita income levels. The variety of demanded products, for country I lies within a range of $a-e$ with b as average. Country I does not have any demand for products of a higher quality than e and thus neither can import nor export such manufactures. This range for country II is $c-g$ with f as the average respectively country II does not want products of a lower quality than c and can neither export nor import such products. These ranges show respectively the potential export and import of country I and country II. The range $c-e$ is common to the two countries. The overlapping of demand in two countries must relate to those products whose quality falls within this range. In addition, trade may take place between two countries in such products.

¹ See (Linder 1961:99-104)

Between countries with different per capita income levels for products having overlapping demands, there are differences in degree of representativeness. The more representative the demand for a good is, the more possible this good is an actual export. However, level of trade between countries with different per capita incomes would be very low because there will be a little overlapping demand for such countries.

Figure 3.1: Diagrammatic principles of trade in manufactures



3.2.5. Formulation of Trade in Manufactures¹

The effect of relative shifts in per capita incomes on trade is analyzed by dividing countries into two categories: country I (an acting country that is growing faster than other countries, moving ahead or catching up in this group) and country II (a reacting country that is growing less rapidly than the other, lagging behind or in process of having its lead decrease).

One of the important way in which trade is affected by relative changes in income levels is the type of reaction experienced by reacting countries.

Whether a country is caught up or left behind, the possible reaction may be of four different kinds: a. induced innovation, imitation, and reallocation, b. price competition, c. unemployment, and d. protection.

The first form of reaction is a positive one. It is easier to react in this way if a country is moving ahead. The last three forms of reaction are negative. Price competition reduces reward for some import-competing factors. As factor prices may not be easily adjustable downwards, unemployment may arise.

In trade theory, the "law of the declining importance of foreign trade" suggests that the share of foreign trade in total income is bound to decrease in a growing country. The basic of this law is that the proportion of services tends to increase as national income grows and services are traded much less than goods.

In the beginning of growing phase, when firms raise their trade, there should be an increase in the share of foreign trade in GNP.

A country surging ahead of other countries is isolating itself. Its scope for trade decreases as its demand structure becomes increasingly different from other countries. The share of foreign trade in GNP should be expected to fall. On the other hand, a country, which is catching up with the main trading countries, should gain greater scope for trade and its

¹ See (Linder 1961:110-153)

trade should increase more than GNP, since its demand structure will correspond to the demand structures of other countries. The country that is left behind becomes more isolated. Its trade should rise less than GNP.

According to empirical research in relationship between GNP and trade, it is concluded that, in the early stages of industrialization, the trade/income ratio tends to increase. Therefore, the “law of declining ratio” is not strong or would not exist.

To find a relationship between per capita income and the share of foreign trade in total income, Linder(1961) compares import propensities of various countries in a given year (like the year 1958). He believes that a relatively small country tends to have a relatively high propensity to import. In order to eliminate the size factor, he calculated the hypothetical propensity to import for each country. First he divided a country into a number of comparable units, each unit being one dollar of GNP of the country. The average purchase of a unit from each other unit is called by m . the definition of m is:

$$m = M / (Y_w - 1) \quad (1)$$

Where,

M is the total purchases made by the unit,

Y_w is total world income (the total number of units),

and $(Y_w - 1)$ is the total number of other units.

From equation (1) Linder obtains definition of the total purchases of one unit:

$$M = m(Y_w - 1) \quad (2)$$

A country consist of Y_c units, where Y_c is the total GNP of the country. The total purchases of all units of a country are:

$$M_c = mY_c(Y_w - 1) \quad (3)$$

To obtain the total imports of the country, he deducts the purchases of all the units of the country from other units of the same country. The internal purchases of one unit are $m(Y_c - 1)$ and the internal purchases of all units of a country are $mY_c(Y_c - 1)$. If this expression is deducted from the total purchases of all units of a country, the total imports of a country are as follows:

$$M_{cf} = mY_c(Y_w - 1) - mY_c(Y_c - 1) \quad (4)$$

By simplifying:

$$M_{cf} = mY_c(Y_w - Y_c) \quad (5)$$

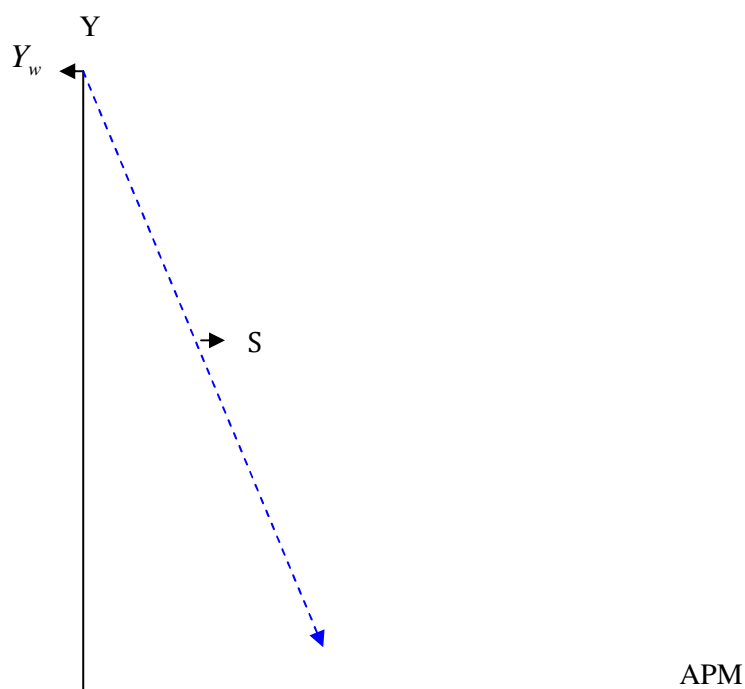
The economic meaning of this equation is that the total imports of a country equal the average purchases of each unit of the country from each other unit, times the number of units of which the country consist, times the number of foreign units.

Linder calculates the value of m for a reference country by solving equation (5) for the reference country. By putting M_{cf} of each country unknown, He obtains the hypothetical import value of each country. Then he calculates the hypothetical propensities to import of each country. To obtain this the hypothetical import value of a country is divided by its GNP (Y_c):

$$APM = m(Y_w - Y_c) \quad (6)$$

Equation (6) is a liner relation between APM and Y_c a straight line can show it. The bigger the country, the smaller will be both $(Y_w - Y_c)$ and the hypothetical propensity to import. GNP can be measure on vertical axis and propensity to import on horizontal axis. Y_w Shows total GNP for all countries combined.

Figure 3.2: The relative degree of participation in foreign trade



The hypothetical propensities to import lies along the dash line that have negative slope (The bigger the country, the smaller will be APM). Dash line has zero value at Y_w because, if there is just one country, $(Y_w - Y_c) = 0$ consequently $M_{cf} = 0$ and $APM = \text{zero}$ (if there is only one country, there is no foreign trade).

The particular reference country on dash line (P) can be chosen. The values left of P show countries that trade less intensively than the reference country and vice versa.

It is assumed that the world consists of 32 countries and provides a matrix called “trade matrix“. In this matrix, every column states what a particular country exported to each of the other 31 countries. Every row indicates that how much each country exported to the particular country. Size of a country affects volume of trade. It is obvious that Sweden trade with USA is absolutely bigger than with Belgium. To eliminate the effect of size, “trade matrix of average propensity to import” for all countries from in trade matrix is

extracted by dividing the row figures of the trade matrix by the GNP of the country of row:

$$(7) \quad \frac{\text{Country import from other country}}{\text{Country GNP}} = \text{How much each dollar unit of country trades with other country}$$

For instance, Canadian exports to the US (US row) divided by US GNP indicates that Canadian exports to US should be same as US imports from Canada. In this way, US propensities to import is calculated from each of the other countries.

The smaller the country, the higher is its total propensities to import. The reason is that the smaller the country, the larger proportion of its total trade in foreign trade. Although the propensities of small country to import are high, the propensities of other countries to import from a small country are small.

By assuming Sweden as reference country, it is found that, out of five countries with higher per capita income levels, 2 trades more intensively than Sweden. Out of 26 countries with lower per capita income levels, 15 trade less intensively than Sweden. Hence, it can be concluded that there is no tendency for countries with higher per capita income levels to trade less intensively than countries with lower per capita incomes levels.

3.2.6. Additional implication of trade in manufactures¹

Not all countries are necessarily able to participate in international trade. It is possible that a demand structure of a certain country is so different of other countries, that there is no overlapping demand for manufactures. If this country has no primary products to export, it will not be able to take part in foreign trade at all. If the comparative

¹ See (Linder 1961:137-153)

disadvantage lies in goods not demanded at home and the comparative advantage in goods not demanded abroad, there can be no trade.

Distinguishing between the production of import substitutes and the production of exports is important, especially in determining direction in which the development efforts for developing countries should be made. However, it cannot be applied to the whole field of manufactures. Potential exports and imports are same products. An actual import product today is a potential export today and maybe an actual export product tomorrow. In the same way, an actual export product today might be an actual import product tomorrow. In fact, today's actual imports may indicate which products it would be easiest to change into tomorrow's actual exports. Imports of manufactures may help the entrepreneurs to become aware of the existence of what is called a "representative demand" for a product.

Part III

3.3. Some Critics on the Linder Trade Theory

Linder in his theory determined the volume of trade. However, he did not explain what directs the pattern of trade. Further, he did explain what factor determines comparative advantage among trading partners. In addition, Linder's theory does not match trade in developing countries. The lower income developing countries tend to have more trade with high-income countries rather than other lower-income nations. Additionally, countries follow export-oriented strategy and prefer to target international market rather than domestic one, so Linder's view is less appealing.

Johnson (1964) had criticized Linder's theory for its inability to explain the factors that present comparative advantage. He called it a "non-theory", and criticized the idea of strong home market as creator of trade. He asserted Linder's theory that entrepreneurs have difficulties to get information about and export to countries dissimilar to their own is naive.¹

¹ For more Information see (Johnson 1964: 88)

Linder attempted to test his theory by charting average proportional propensities to import from a particular country against the array of incomes per capita of the importing countries. Unfortunately, this test failed to take proper account of the influence of the varying sizes of the supplying countries on the possible volume of imports by other countries. Padma Mallampally has regressed the average propensities of other countries to import from a given country on the per capita income differences between them for eighteen of Linder's thirty-two countries. In only half of the cases the computed relationship was significant, and only in the case of West Germany, it accounted for a substantial proportion (42 percent) of the variance. Linder's hypothesis does not possess much explanatory value. Although a multiple regression analysis of data on trade in manufactures, allowing for the influence of distance, political ties, and other obvious variables, would be necessary to test the hypothesis thoroughly (Johnson 1964:89).

However, Linder has mentioned that the modal or median incomes are likely to be more representative than the arithmetic mean of average income¹, but in his model, he used per capita income levels as the single variable to determine a country's demand structure. He asserted that the level of average income is the most important single factor and dominating influence on the structure of demand². The average income is calculated by dividing national income figure by the population figure. This data cannot be reliable for under-developed countries where income distribution is very widespread. In these countries, a small proportion of population covers a disproportionately high percentage of the income. The median income seems to be more reliable especially for countries, which have skewness in the distribution of income such as Kuwait or Saudi Arabia.

Linder has declared that distance factor is the most important trade-breaking force and makes actual trade decline from what is potentially possible. Firms in the various part of the world have not lifted their trade horizons high enough to include all countries and just a few of them can lift their trade horizon above home market. Linder has also mentioned that transport cost and man-made trade obstacles (tariffs, etc.) have a trade-breaking

¹ See (Linder 1961:94)

² See (Linder 1961:94)

effect and decrease actual trade.¹ Nonetheless, Linder has mentioned importance of these factors as a major determinant of trade patterns; he has not taken them seriously in account and has actually not tested the effect of these factors on trade patterns.

Despite the existence of some Standard International Trade Classification called “SITC”², Linder did not define the meaning of manufactured goods.

Linder has not sufficiently theorized all of intra-industry trade, much of which is trade within multinational firms. Intra-firm trade is embedded in reported trade statistics because, by law, firms must report intra-firm trade values as if they were arms-length transactions. Moreover, Linder’s thesis is not sufficiently theorized in terms of intermediate products, which constitute a large share of intra-industry trade and an even larger share of trade within multinational firms (Lewandowski 2001:504).

Linder did not actually test his theory as he wrote; a full econometric investigation could be worthwhile (Linder 1961:117).

Part IV

3.4. Empirical Studies of the Linder Hypothesis

The empirical validity of Linder hypothesis is not clear. The degree of accuracy of Linder’s theory at an empirical level is disputable. Several studies have found a significant impact of Linder effect and have supported Linder’s proposition. A high proportion of international trade in manufactured goods takes place among the relatively high-income industrial countries and involves exchanging same products. However, other has had weaker result. Some writers have questioned the trade-creating forces of the Linder theory. Furthermore, Linder has not presented any formal model to test his hypothesis, so economists tested his theory by different methods.

¹ See (Linder 1961:107)

² See U.N.

3.4.1. In Favor of Linder Hypothesis

Hong¹(1969) tried to formulate a theoretical framework, which can specify the pattern of production and trade based on internal demand pattern using the traditional Heckscher-Ohlin model, and to incorporate the essential of Linder's idea into the model. He concluded that if there is systematic relationship between the demand pattern and factor supply ratios (and hence the per capita income level), it would be probable to forecast the possible range of q according to the level of economic growth of a country.

Fortune² (1971) studied Linder hypothesis in manufactures. Results showed significant similarities in per capita income between seven of 23 exporting countries and the significant effect of distance for 17 of 23 countries included in study. Overall results showed some support for Linder hypothesis.

Sailors, et al.³ (1973) attempted to test Linder thesis empirically which indicates that trade in manufactured goods is demand-oriented and that countries which have similar

¹ He has declared that as Bhagwati says:” Unfortunately, Linder has not rigorously formulated his analytical framework and has left his ingenious idea hanging in the air without chiseling it down into a theory.” In his study, he suggested that trade pattern of a country is determined by the difference between its internal demand pattern and production pattern. Since there are more than one $q (= B t)$ vectors which can exhaust the given factor endowments of a country if $m < n$, even if we were given a definite demand pattern (x) corresponding to the specific factor endowments of a country, we cannot have a definite idea about what production and trade pattern a country would assume. He introduced the assumption that that each country tends to minimize its international transaction activities that is domestic producers satisfying domestic consumption as much as possible with available productive resources. This would mean that the consumers pay the same price for a given good whether it is imported or domestically produced. In this way, a unique global solution of the model can be obtained with respect to the pattern of production and trade by specifying the internal demand patterns of the countries. Hong has asserted that according to Linder the amount of trade should be maximized because “there is no difference between trade among countries with the same per capita income and trade within a country” (Linder, 1961:102). Linder's proposition is self-contradictory to his initial emphasis of “the world of imperfect knowledge,” “unfamiliarity with foreign markets” and “the significance of internal demand structure.” Hong assumed that a producer in a country would be able to use the most efficient production function available if there is a domestic demand for the good, and once he succeeds in using the same international production function, he will be able to survive the competition in both his domestic and foreign markets. The magnitude of domestic demand itself is very important for the start of domestic production. A country cannot include those processes whose domestic demands are less than certain minimum amounts.

² He used 23 cross-national regressions with 50 observations in 1967. He used regression with average propensities to import from exporting countries as the dependant variable. He also used distance variable as trade-breaking force.

³ They selected “base country” data and evaluated the absolute differences of this country's per capita income with those of the other countries listed in Linder's data. They collated these differences with the average propensities of these countries to import from base country and ranked the correlation. According to Linder, it must be negative rank correlation.

per capita incomes will trade relatively more intensively in manufactures than countries which have relatively different per capita incomes. The result showed that out of 31 countries of Linder's data, 16 were significantly negative. However, the result of this study criticized by Hoftyzer¹. He asserted that authors failed to include geographic distance in their analysis (Hoftyzer 1975).

Kohlhagen² (1977) extended past studies of the Linder's thesis. The result suggested that Linder's representative demand theory partially explains trade flows.

Fortune³ (1979) has tried to develop a theoretical model in which trade intensities are measured as the bilateral average propensity to import of finished manufactured consumer commodities out of national income. Estimating results provides a significant, but small, improvement in the "explanation" of the intensity of countries' imports of the finished manufactured consumer commodities from some of the exporting countries.

¹ He asserted that the geographic distance is a proxy variable for both transport cost, market horizons, and is a powerful explanatory of trade intensity variations between countries. The shorter the distance between two trading partners, the more intensive the trade between them should be. He has declared that about 10 of the 16 countries in later study are both wealthy and located in Europe. Per capita income differences and distances between them are both small. Thus, the explanatory power credited to per capita income differences by authors can simply be due to this variable's high correlation with geographic distance.

² He utilized simple regression analysis with various measures of relative demand patterns among countries, including per capita GNP, consumption indices, and income distribution data, to explain bilateral trade flows. To test Linder's hypothesis(that the propensity to import (dependent variable) is explained by absolute differences in per capita income),he regressed the column vector a^i against the column vector b^i . a^i represents each country's propensity to import out of GNP from country i, and can be used as the dependent variable in regressions explaining trade patterns. b^i is country j's absolute per capita income difference from country i.

³ The Linder hypothesis, re-specified according to equation (8), is tested for a for twenty countries over the period 1948-57
$$M_{kj} / X_k = a_j + b_j [\sigma_k^2 + (\mu_k - \mu_j)^2] / \mu_k + c_j D_{kj} \quad (8)$$
 Where, M_{kj} is an import of the finished manufactured consumer commodities from country j by country k, μ is national income per, $N_k = X_k$ population in country k ,and D_{kj} is distance between country k and country j. According to the theory, b_j and D_{kj} must be negative. Equation (8) states that the average propensity to import of the finished manufactured consumer commodities by country k from country j depends negatively on the inverse of per capita income in country k, on the variance of the income distribution in country k, on the square of the difference between country k's and country j's per capita incomes, and on the distance between country k and country j. Since b_j is negative for all countries, income redistributions (which reduce the degree of inequality and increases in per capita incomes μ_k), tend to increase countries' bilateral per capita imports.

Furthermore, the statistical results indicate that distance is a powerful trade braking force for most countries' bilateral exports, but political and other factors are also likely to be effective.

Kennedy and Mchugh¹ (1980) have asserted that previous empirical verifications of Linder hypothesis could not statistically separate the influence of distance and the Linder effect on the intensity of trade. They have suggested an alternative method. In total, the results did not support the Linder effect. The intertemporal analysis produced no significant correlations, and the 1975 cross-section was also not supportive of Linder.

Arad and Hirsch² (1981) reformulated Linder's model by asserting that tradability of a good is dependent on its relative cost of production where transfer cost included in it.

Thursby and Thursby³ (1987) have used bilateral trade flows to examine Linder hypothesis. They found overwhelming support for the Linder hypothesis and the gravity model.

¹ In their method, they tested hypothesis in terms of changes in propensities to trade against changes in income differences between two points in time by eliminating the influence of distance. They examined correlation between changes in per capita income differences and changes in the propensities to import between the years 1960 and 1975. The time period is long enough to allow changes in preferences to exhibit themselves, to produce changes in the national industrial composition and finally to result in subsequent cost advantages as hypothesized by Linder. The tests are performed for total trade among the fourteen countries classified as "industrial countries". The use of industrial countries is valuable since trade among these countries is relatively concentrated in manufactured goods.

² They combined the supply and demand-oriented approaches and incorporated them within the single model in which constituted an especial case. In addition, they examined the implications of the unified model for the distribution of trade among countries with different income levels. They placed their emphasis on the cost involved in market research and in adapting good initially produced for the domestic market to export market. It is expected that exporting countries with similar per capita incomes and, hence, demand patterns incur lower transfer costs, trade more intensively among each other. Thus, for Arad and Hirsch, Heckscher-Ohlin model determines countries' potential export while Linder's model determines their actual trading partners. (Arad and Hirsch, 1981 , Perdakis and Kerr,1998:94)

³ They also tested the effect of exchange variability in a gravity-type model derived from an underlying demand and supply model .They used a sample of 17 countries for the period 1974-1982. A behavioral model is used to justify examining this issue jointly. The model performs well empirically.

Hanink¹ (1988) extended the Linder model. Empirical tests of model indicate that, as expected, trade intensity is an increasing function of market homogeneity, a decreasing function of distance, and an increasing function of variety across goods.

Doroodian² (1990) examined Linder's thesis. The results indicated that while trade patterns may be related to demand in the manner hypothesized by Linder, this relation is not sufficiently strong. Other variables, such as the relative price of imports and the real exchange rate, seem to play a more important role in international trade than the Linder effect.

Bergstrand³ (1990) introduced a model to calculate determinants of cross-country bilateral intra-industry trade indexes. The model revealed that a greater similarity of two countries' per capita incomes would be associated with more intra-industry trade both for supply (Heckscher-Ohlin-Samuelson) and demand (Chamberlin-Linder) reasons simultaneously. Several other testable propositions evolved from the model, which used a gravity-like equation as a pedagogical device.

¹ He has asserted that, according to Linder, international trade caused by market homogeneity but limited by distance is the same thing as intraregional trade. Linder's model, however, does not incorporate the hierarchical flow of goods that is a common feature of trade within a region. He extended the Linder model, to incorporate hierarchical flow, and therefore variety across goods, as an additional rationale for existing geographical patterns of international trade.

² He employed time series data comprised of exports from the United States, Canada, and Japan to 15 European market economy nations from 1970-85.

³ He selected an SITC7 (non-electrical machinery (71), electrical machinery (72), and transportation equipment (73) industry grouping that was representative of the bulk of OECD trade.

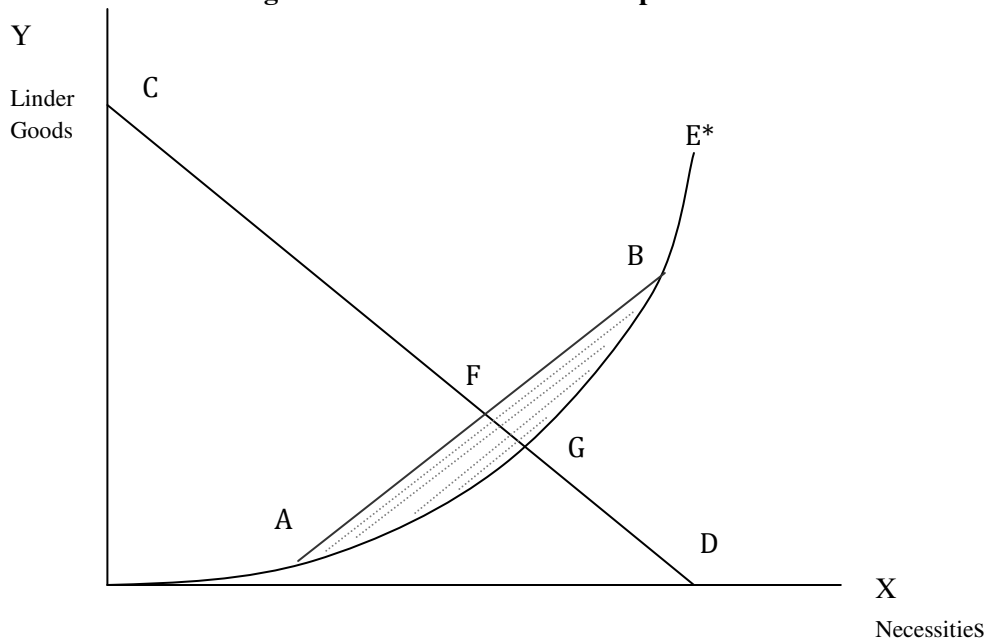
Francois and Kaplan¹ (1996) formulated a model and concluded that with higher income inequality, per capita incomes being equal, will allocate a higher share of aggregate income towards Linder goods. An increase in income or a less equal income distribution thus implies a systematic shift of import demand toward Linder goods (Francois and Kaplan 1996:244-250).

¹ They studied the systematic relationship between non-homothetic preferences and trade patterns by focusing in income distribution. They divided commodities into two broad classes, Linder goods (Y) and necessities (X). Preferences are assumed non-homothetic, with convex income expansion paths, so that preferences shift toward Linder commodities as income increases. Consequently, as an individual's income rises, the ratio of Y to X that characterizes his consumption bundle will rise as well. The convexity assumption implies that expenditures will follow path E* as an individual's income increases. In the figure (20), line CD shows per capita income of each individual and the axes represent the total national incomes. The expenditures of any single individual must lie on the expansions path, E *, national expenditures must lie on line CD. Individuals move by distribution of the per capita income from point G (intersection of CD and Expansion path E*) to northwest along line CD. Under the extreme case where all individuals are located at either point A or B on the income expansion path, average per capita consumption will be at point F, that represents the intersection of line CD (the per capita budget constraint) and line AB (that represents linear combinations of A and B). In general case, by income distribution bounded by A and B and located along expansion path E*, the ratio of Y to X in national expenditures will be above point G, on the segment of the budget line that lies in the shaded area. With such a distribution, the expected value of the ratio (Y/X) rises as income distribution becomes less equal. For relationship between income distribution and aggregate demand:

$$(9) \quad \left[\frac{Y(I)}{X(I)} \right] = g(I) \quad g', g'' > 0$$

Equation (9) formalizes the convexity assumption. Under this scenario, a regressive transfer will raise $g(\cdot)$ and lead to an increase in aggregate expenditures on Y, and a decrease in aggregate expenditures on X. Consequently, any increase in income inequality will shift preferences toward Linder goods. This implies that countries with higher per capita incomes, distributions being equal, will allocate a higher share of aggregate income towards Linder goods. Countries with higher income inequality, per capita incomes being equal, will allocate a higher share of aggregate income towards Linder goods. An increase in income or a less equal income distribution thus implies a systematic shift of import demand toward Linder goods (Francois and Kaplan, 1996:244-250).

Figure 3.3: Income and relative preferences



Kristensen and Zhang¹ (1998) tested the Linder effect. Estimated results of their model imply that the trade diversion is strongest for the European countries with per capita incomes close to the European average. Non-European countries with per capita incomes close to the European average income face the highest negative trade diversion effects, while the EEC countries with an average income face the highest positive trade diversion.

Arnon and Weinblatt² (1998) provided empirical evidence supporting the comprehensive validity of Linder's hypothesis for all countries, rich or poor.

¹ They have investigated the Linder effect in context of the formation of the EEC trade block. The Linder effect was used to analyze, over the 1971–1992 time horizon, the export shares of the 12 countries, which in 1986 were members of the EEC (EEC12) with each other. The formation of trade blocks includes trade diversion effects. In their study, these effects combined with the Linder's theory.

² They tested existence of the Linder effect among developed and less developed countries. The results of this study clearly indicate that the closer the levels of income per capita, the greater bilateral trade volumes, *ceteris paribus*. This phenomenon surprisingly seems to be more powerful for trade between low income rather than high-income countries.

Chow, et al.¹ (1999) examined the Linder theory. Results approved the Linder hypothesis as a relatively good explanation of trade for countries above some per capita income limit. The results tend to support the Linder model as an important explainer of the changing pattern of trade for this sample of trade partners.

McPherson, et al.² (2000) has examined the Linder theory. The results show significant empirical evidence in support of Linder's hypothesis for demand similarity among 18 of the 19 OECD countries in their study.

Ramezzana³ (2000) introduced a model and showed that in an integrated world, while total GDP is constant in all markets, as the similarity in the trading partners' per capita income levels increase (as in the Linder thesis), the number of varieties exchanged and the volume of bilateral trade will increase. He also concluded that countries at different levels of development gain from trade to a different extent, poorer countries gaining relatively more than richer ones.

McPherson, et al.⁴ (2001) have tested Linder hypothesis. The results showed that countries under investigation trade more intensively with others having similar per capita income levels.

¹ In their study, they tested the degree to which the Linder hypothesis explains trade patterns between the "Four Tigers' East Asian New Industrial Countries (NICs), and their major OECD markets (and suppliers) in the period 1965-90. They used an extensive disaggregated data set including all manufactured exports from the East Asian NICs to various major OECD markets.

² They used data from the OECD countries. In addition, in their model they employed a censored dependent variable to include data on all potential trading partners, even when the given OECD country has a zero or negative desire to export to that potential trading partner.

³ He introduced a monopolistically competitive model of international trade where goods must be consumed in indivisible amounts. The number of varieties that enter a consumer's optimal consumption bundle is increasing in the consumer's per capita income. He showed that, for a given level of GDP, less populous and richer economies have a larger equilibrium number of product varieties.

⁴ They employed a panel data set among five of the six East African developing countries: Ethiopia, Kenya, Rwanda, Sudan and Uganda. In their study, they provided new information about the Linder hypothesis by focusing on developing countries.

Lewandowski¹ (2001) tested a modified Linder model of trade. Results from estimations of bilateral flows in four manufacturing sectors for US and its top forty trade partners, strongly support Linder's thesis.

Hutchinson² (2001) examined a modified gravity model. Results implied that US exports were generally greater to other English-speaking countries and to countries with per capita incomes similar to the United States. This relative per capita income effect became stronger during the latter part of the period, whereas the immigrant stock effect diminished after 1885.

Choi³ (2002) tested Linder hypothesis. He got several results; first, countries with a smaller difference of per capita GNP tend to trade more. Secondly, richer countries trade more and finally the coefficients of Linder variables grow by time.

Baltagi, et al.⁴ (2003) in their model also included the Linder's hypothesis. Estimation results showed that all the interaction effects are significant and the omission of any of these effects leads to biased estimates and misleading inference. Full interaction model finds empirical support for the New Trade Theory and Linder's hypothesis.

¹ He asserted that Linder's thesis explaining trade among industrialized partners does not account for trade within the multinational firms. He argued that there are dimensional and geographical biases in empirical tests of Linder's thesis. By law, intra-firm trade must be reported as arms-length transactions and so is included in aggregate measures of trade volume. The volume and geography of that trade introduce a bias into those tests. Hence, Lewandowski reviewed Linder in terms of intra-firm trade. He demonstrated that intra-firm trade should be treated as an endogenous variable.

² He tested the impact of a stock of immigrants in the United States on American exports to their home country during 1870 - 1910. The study included the exports of 44 commodities to 17 countries during 5 years. In a gravity model, he examined the immigrant stock-export relationship and showed that United States exports were greater to a country due to the presence of immigrants from that country. The estimated effect has to vary across "Old" Europe, "New" Europe, and non-Europe groupings of the trading partner countries.

³ He used modified gravity trade equation and pooled trade data from 63 countries for 1970, 1980, 1990, and 1992. His results can partly explain some of the earlier empirical results that rejected the Linder hypothesis and recent results supporting it. It can be partly explained by the proliferation of Free Trade Areas and globalization in the 1990s. The recent movement towards regional and global trade liberalization may have strengthened the Linder hypothesis.

⁴ They suggested a full interaction effects design to analyze bilateral trade flows by using an unbalanced panel of bilateral export flows from the EU15 countries, the USA and Japan to their 57 most important trading partners over the period 1986–1997. They estimated the impact of overall bilateral size (LGDT), the similarity in bilateral size (LSIM), the difference in relative factor endowments (LRFAC), and transportation costs (LTC).

Hallak¹ (2003, 2004, 2005, and 2006) built a framework to estimate the impact of cross-country differences in product quality on bilateral trade flows. The empirical results confirmed that rich countries import relatively more from exporter countries with high-quality products, and quality differences between countries have a significant effect on the pattern of international trade flows.

Castejon and Sanz² (2004) introduced a model to test the Linder hypothesis. Results of their model described that trade horizons determined by bilateral proximity in development and geographical distance, along with multilateral convergence in economic development are the main determinants for selecting trade partners and reached to the idea that foreign markets can be considered as an extension of the home market. The results also approved the importance of the characteristics of internal demand, essentially of income distribution and non-homothetic preferences

Fink et al.³ (2005) examined an extended model of Linder. The results supported the hypothesis in most of the consumer goods sectors but not in intermediate goods sectors. The result suggested that developing countries' market access interests in the developed world might differ significantly from it in the developing world. In addition, they concluded that developing countries might have disadvantage in selling manufactured products to rich countries.

¹ He estimated the model using cross-sectional data on bilateral trade flows at the sectoral level for 54, 60 and 64 countries in 1995. Hallak argued that the quality of goods that countries produce and consume varies systematically with their income levels. On the production side, export prices are strongly correlated with countries' income per capita, suggesting a positive relationship between per-capita income and quality production. Hallak's model allows countries to differ both in the quality of goods they produce and in their aggregate demand for quality. It also considers other determinants of international trade, such as differences in factor proportions.

² They proposed a complete empirical model of bilateral trade containing all the determinants suggested by Linder. They included non-homothetic preferences, national income distribution, international economic convergence and geographic distance in their model. They tested the model for Spain during the period of its economic transition running from approximately 1959 to 1986. This period was characterized by increasing openness and structural change, as well as by convergence until that country's integration into the European Economic Community.

³ They considered the extent of horizontal product differentiation as another determinant of the closeness of supply and demand. They used trademark registration data that employs information on unit values. Cross-country differences in unit values of imports can be due to the quality but can also derive from other elements, such as differences in markups countries, discounts for large quantities, buyer monopoly and transport costs. The empirical analysis tested whether richer countries tend to import more from countries with higher quality products and exhibit a greater degree of product differentiation.

Haider, et al.¹ (2005) tested the Linder theory and got empirical evidences in support of it. Results of their model showed that countries under investigation trade more intensively with countries of other regions, which may have similar per capita income levels.

Miniesy and Nugnet² (2005) investigated the Linder hypothesis. The results based on OLS and Tobit supported hypothesis.

Kand³ (2006) studied the Linder effect. Results of his model showed that trade patterns depend on the similarity of per capita income. He also concluded that the level of trade in manufactured goods between two countries would be inversely related to the differences in their per capita income. The study also showed that the Linder hypothesis is stronger for Hong Kong and Singapore than for Korea and Taiwan.

Leitão and Faustino⁴ (2006) examined a model to test the Linder theory. The results of their model presented a negative (positive) relationship between income per capita difference and IIT, HIIT (VIIT). Their findings revealed that the demand similarity hypothesis (Linder's hypothesis) is confirmed by including the supply-side variables.

Guo⁵ (Jun 2006) tested Linder's hypothesis. He got evidences for existence of the Linder's effect for both high and lower middle-income group. However, in his model no clear evidence found for existence of the Linder's effect in low-income group

¹ They presented a model for three of the South Asian countries, Bangladesh, India, and Pakistan.

² They used the bilateral trade model of gravity type based on the trade matrices for over 100 countries and 5 time periods (1985, 1990, 1995, 1997 and 2000). They studied the negative effects of intra-national inequality on bilateral trade for countries at similar levels of income per capita.

³ He tested the impact of the per capita income differentials on Newly Industrialized Countries (NICs) trade patterns to revisits the Linder hypothesis. He applied a gravity-type trade model from the perspective of NICs for the period 1980-1999, focusing on Korea, Hong Kong, Singapore, and Taiwan

⁴ They used a dynamic panel data to test features and determinants of Portuguese intra-industry trade (IIT) during the period 1995-2003. They separated horizontal IIT from vertical III using data at the five-digit level. They considered that the per capita income difference is the proxy for demand structure and the factor endowments difference is the proxy for supply side structure. Therefore, per capita income difference is not an adequate proxy to measure differences in factor composition.

⁵ He tested model for China and 13 other developed and developing countries during 1981-2004. The 13 countries divided into three different groups according to their income levels. The model was tested for each group for both entire period and three sub-periods (1981-1992, 1993-2000 and 2001-2004).

Bohman and Nilsson¹ (2007) have introduced a new method of measuring the Linder effect. Results showed a positive and significant effect of the Linder variable on export intensity.

Bernasconi² (2009) has studied two extensive margins of international trade flows (product and country-level) by an application of the Linder hypothesis.

Rauh³ (2010) examined the empirical validity of the Linder hypothesis. The results confirmed the Linder hypothesis.

Niem⁴ (2012) has used one model to test validity of Linder theory. The results suggested that perhaps recent papers failed to derive any support for Linder Hypothesis because

¹ Their approach focused on the income distribution within a country. They identified the common market between trading partners by calculating the income overlap. The size of the common market is then related to the size of the home market to form the new Linder-variable. They also considered the scale effect of the common market

² She tested her model by using cross-section data between 151 countries on the 6-digit level during 1995 to 2004. Bernasconi asserted that individuals with different income levels tend to consume different bundles of goods. The more similar consumption bundles are the more trade there is potentially if consumption and domestic production are linked. She also found that the relationship between similarity in per capita income and the extensive margin is stronger when high-income economies are excluded from the analysis. Furthermore, she got strong supportive evidence that the diversification of bilaterally traded bundles of goods enlarges with increasing similarity in per capita income. In addition, her model implied that countries with a more uneven income distribution export in significantly more product varieties. If GDP levels are dropped from the specification, the skewness of the income distribution of both trading partners increases the extensive margin of trade. It is also found that countries with more similar demand structures do not only trade more along the product-level extensive margin but have also a higher probability to exhibit positive trade. Thus, the demand sided effects are at work at both extensive margins of trade.

³ He tested his model for Germany's international trade in the Europe .He performed time and country fixed-effects panel data. An estimation of Germany's exports shows the economy's orientation towards exports. The analysis of the EU-membership variable suggests that Germany primarily caters its exports towards European countries with similar demand structures. Results suggest that EU-membership greatly increases Germany's imports and exports, so a reduction of trade barriers increases potentially intra-industry trade. The results also showed that Germany trades more intensively with countries with similar per capita income levels.

⁴ Niem tested a model to see if country similarity positively affects the index of vertical intra-industry trade share (VIIT), given that the lower developed country is bigger in size. An increase in the relative country size carries the meaning that trading countries are more similar in size and an increase in the relative income means trading countries are more similar in level of development. Thus, VIIT is higher when we trade with a country of a similar size or a similar level of development. By using the trade data of the cosmetic industry in China, he found that VIIT is higher when China trades with a country similar in size or similar in level of economic development.

their model settings did not take the asymmetric impact of relative country size into account.

Bernasconi¹ (2013) investigated about existence of the Linder effect. Her model finding implied that the positive relationship between similarity of income distributions and bilateral trade margins is present at the aggregate and disaggregate level of trade flows.

3.4.2. Against Linder Hypothesis

Greytak and McHugh² (1977) examined the empirical validity of Linder's hypothesis that trade in manufacturing commodities is demand oriented. Results showed that the Linder hypothesis is not sufficiently strong enough to explain trade patterns among the regions. They asserted that the failure to find a strong relation between income differences and import intensities might simply reflect differences in the determinants of trade between nations and trade between regions within nations.

Qureshi, et al.³ (1980) studied the Linder hypothesis. No empirical evidence was found to support the proposition that regional trade in manufactured goods is determined by the similarity of demand patterns. However, substantial evidence was found to conclude that

¹ In a sample of 102 countries, she tested how similarity of demand structures affects trade patterns (along both the extensive and intensive margin). According to her finding, bilateral trade volumes are increasing in the overlap of two countries income distributions. This effect is driven by both the extensive and intensive margin. She established two novel measures of income similarity; the average income level of the overlap area and the range of incomes for which two distributions overlap.

² They used data set different from that used by Linder in his analysis and their analysis was limited to manufactured commodities rather than all products. Moreover, their analysis was focused on trade between regions within a single country rather than trade between nations. To test the hypothesis, the average propensities to import of manufactured goods for each of seven single or multi state regions from each other were calculated, and ranked (from highest to lowest) for each region, and the absolute values of the differences in per capita income between regions were calculated, and then ranked (from lowest to highest) for each region. Finally, two sets of ranks were correlated. Significant positive Spearman rank correlation can be interpreted as supportive of the Linder hypothesis. Furthermore, to test a second hypothesis that the "distance factor", representing transportation costs and market horizons, is an important determinant of trade patterns in manufacturing commodities, the distances between regions were ranked for each of the regions and these ranks correlated with trade intensities.

³ They used interstate commodity trade data for 1963. The availability of this data allowed the authors to calculate average import propensities for manufactured commodities for ten regions in the United States. The empirical content of the Linder thesis was examined by using Rank correlations (suggested by Greytak and McHugh) to test two hypotheses; 1) the intensity of trade in manufactured products among regions, measured by import propensities, varies directly with the similarity of the structure of demand, measured by per capita personal Income, and 2) the intensity of trade in manufactured products varies inversely with the geographic distance between regions.

transport costs and market horizons are important determinants of regional trade in manufactured products.

Lan, et al.¹ (2007) have estimated a gravity model. The significant and positive sign of the per capita GDP difference variable (PGDPdiff) does not support the hypothesis (that China- ASEAN FTA exhibits will trade based on similar demand patterns). Their results are same as the World Bank's classification of China as a low-income economy; Indonesia, Thailand, and Philippines as low middle-income economies; Malaysia as a middle-income economy; and Singapore as a high-income economy. In addition, this imply that there is no the Linder effect for the entire region.

Haq and Meilke² (2008) investigated the role of the Linder effect. Estimation results did not support the Linder effect in the trade of differentiated agri-food products.

Dakal, et al.³ (2011) have tested the Linder hypothesis. The overall results of estimations are quite robust. The estimated results do not provide support for Linder's hypothesis.

¹ They tested a model for China-ASEAN trade by using the Gravity model. Their model results also implied that the coefficient for transportation cost and Real GDP is statistically significant; showing that trade distance remains an important obstacle for China-ASEAN trade. Moreover, the higher economic size of a country positively influences bilateral trade flows. There must be positive relationship between the per capita GDP and trade.

² They tested Linder effect through using the trade of 37 differentiated agri-food and beverage products categorized into eight product groups: cereals; fresh fish; frozen fish; vegetables; fresh fruit; processed fruit; tea and coffee; and alcoholic beverages. They used a generalized gravity equation and trade data across 52 developed and developing countries from 1990 to 2000. Two proxies of demand structure, the Balassa index and the absolute value of the difference in per capita GDPs of trading partners, are used to capture the Linder effect. In addition, two measures of bilateral trade, the Grubel and Lloyed index, and the value of bilateral trade are used as the dependent variable. The type of proxy used for the Linder effect and the way in which bilateral trade is measured, influences the outcome of the statistical tests for the Linder effect. The Linder effect for cereals, frozen fish, vegetables, processed fruits, tea and coffee, using the value of trade as the dependent variable, is often accepted but it is generally rejected when the GL index is used as the measure of trade intensity.

³ They tested a modified gravity model for five East Asian countries: Indonesia, Malaysia, the Philippines, South Korea and Thailand .they applied panel data for 1997, 1999, 2001, 2003, and 2005. They also included counties' bilateral trade data with their other major trading partners. They estimated model for each year in the sample.

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