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“Application of the Diamond Graph:
The Openness Growth Monitoring Model (OGM-Model)”

By

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Abstract

This research will present a new methodology on the study of openness or trade liberalization. This paper is divided into three parts. The first part reviews the literature on analytical methods evaluating Openness based on three different approaches focusing on political economy, economic theory, and trade policy. The second part will present a new model of analysis to evaluate the trend, vulnerability and harmonization of Openness Growth. The relationship between Openness Growth and Income Growth is based on a new group of indicators and a new type of graph (see graph 2). This new model of analysis is entitled “The Openness Growth Monitoring Model (OGM-Model)”

The OGM-Model is based on a series of steps/elements in its application to study Openness Growth and Income Growth: (i) Degree of Openness Growth Rate by Production Sectors (O_i), (ii) Vulnerability of Openness Growth Rate (OV), (iii) Harmonization of Openness Growth Rate (HO), (iv) Openness Growth Diamond Diagram, (v) Openness Growth Rate (OG), (vi) Per-capita Gross National Income (Y) and (vii) Income Growth Rate (ΔY), (viii) Openness/Income Growth Rate (O/Y) Diagram and (ix) Openness/Income Growth Rate (O/Y) Sensitivity Analysis (See Diagram 1). The objective of the OGM-Model is to offer policy-makers and researchers new analytical tools to study the impact and trend of openness in the economy of any country from a new perspective. The OGM-Model application is not limited to the study of a special group of countries or regions. It is not constrained by issues about the region or the development stages of any country. OGM-Model, in effect, is a simple and flexible scheme. The third part of this paper shows the results obtained in the application of OGM-Model in different countries and regions. The OGM-Model’s general objective is to measure the evolution, vulnerability, and openness growth of any country. The period of study is from 1995 to 2001 and the reason to select this short period is to observe the rapid changes in openness growth and income growth.

1. Openness or Trade Liberalization Measure Literature Review

Initially, this paper will demonstrate that the study of openness or trade liberalization can be studied from three different approaches: first, the political economy approach; second, the economic theory approach and the third, the trade policy approach.

1.1. Analysis of Openness Measure from Political Economy Approach

In this part of our research it is important to mention that work on openness or trade liberalization based on the political economy approach may be grouped into two large areas of study: free trade¹ under the laissez faire argument (outward oriented strategies or export orientation) and protectionism based on infant industry argument (inward oriented strategies or import substitution industrialization –ISI-).

Firstly, in the case of the literature on free trade, the idea receives support from *The Wealth of the Nations* by Adam Smith (1776) under the Laissez Fair argument. In the *Wealth of the Nations* framework, Adam Smith does not present some analytical method or model, his contribution is the introduction of a clear theoretical framework based on a system of clear ideas to generate trade policies to support the promotion of free trade. “According to Adam Smith, trade between two nations is based on absolute advantage. When one nation is more efficient than (or has an absolute advantage over) another in the production of one commodity but is less efficient than (or has an absolute disadvantage with respect to) the other nation in producing a second commodity, then both nations can gain by each specializing in the production of the commodity of its absolute advantage and exchanging part of its output with the other nation for the commodity of its absolute disadvantage (Salvatore, 2001)”.

Additionally, the free trade literature review in classical economics develop based on Smith’s ideas in terms of theoretical detail through to David Ricardo and its theory of comparative advantage. In this section of our research is considered that the introduction of the theory of comparative advantage as a strong analytical method to study and support the free trade literature. According to Haberker (1952), the theory of comparative advantage has a strong relationship with opportunity cost theory².

¹ The free trade is considered as an economic policy. In theoretical terms, free trade generally means that there are no artificial impediments (tariff) to the exchange of goods across national markets and that therefore the prices faced by domestic producer and consumers are the same as those determined by the world market (allowing for transportation and other transactions costs). These prices reflected the relative scarcity and abundance of goods around the world and constitute a relevant opportunity cost to domestic firms and households and hence to the country as a whole) because the world market is always available for trades at those prices). In reality, free trade describes a policy of the nation-state toward international commerce in which trade barriers (tariff barriers, quantitative restrictions, and other import barriers) are absent, implying no restrictions on the import of goods from other countries or restraints on the export of domestic goods to other markets. These trade interventions distort the prices faced by domestic producers and consumers away from those arising in the world market (Irwin, 1998).

² The opportunity cost theory can be illustrated with the production possibility frontier or transformation curve. It can show alternative combinations of the two commodities that a nation can produce by fully utilizing all of its resources with the best technology available to it. In the analysis of the comparative advantage is used a basic mathematics and graphs to explain the relationship between two nations and goods based on the absolute advantage that each one country present.

The comparative advantage theory is a simple and use the model to understand the behavior of trading between two countries (A,B) and two goods (X,Y), each good uses one production factor either labor, capital (L,K) or price (with a monetary value $-P$). Labor is represented by man-hours and the value of one unit represented by its price.

Secondly, in contrast to the idea about free trade is the protectionism literature that supports the idea regarding to the accumulation of treasure or bullion; the protection of national wealth; the achievement of a favorable balance of trade; the protection of domestic industry; and increase of the role of state in economic activity. Usually, protectionism literature follows the infant industry argument. At the same time, protectionism literature offers a variety of perspectives based on factors like the terms of trade argument by Torrens in 1808; Infant Industry Argument by J.S. Mill in 1848; Increasing Returns Argument by Graham in 1920; Wage Difference Argument in 1830 and the general theory of employment, interest, and Money by J.M. Keynes in 1936. The contribution of all these authors have a significant influence on the development of new theories and models of analysis until today supporting the protection of domestic industry.

Free trade literature and protectionism literature offer a general understanding about the trade policy orientation among different kinds of thinkers through its different ideas, concepts and theories that try to show the pros and cons of both sides (free trade and protectionism), At the same time, both literatures asses both strong and weak points. All of them played important roles in the development of new analytical methods and models to generate logical explanations about the impact of free trade. The difference between the political economy and economic theory approach, the trade policy approach is that the political economy approach creates criteria based on a general theoretical framework explaining two different sides of the trade orientation (free trade vs. Protectionism). The political economy approach takes the more qualitative analytical path.

1.2. Openness analysis from Economic Theory Approach

Openness or Trade Liberalization using the Economic Theory Approach is basically one that tries to explain the effect of openness from two angles of analysis: microeconomics and macroeconomics. Each focus also applies two types of methods: qualitative (arguments, theories, principles and concepts) and quantitative (econometrics or analytical methods based on mathematics and statistics methods). The studies can be classified by period of time (ex-ante and ex-post) and dimension of analysis: partial equilibrium or static and general equilibrium or dynamic.

This observation is drawn from approximate by 200 different papers from various journals³ related to trade liberalization, regional integration and international economics issues, from 1991 to 2001. Based on our analysis of the documents, several pertinent points may be noted: application of microeconomics (70% of cases), qualitative methods were observed in the application of common theoretical analytical issues: comparative advantage (30% of cases), H-O theory (25% of cases), trade restrictions: tariff and non-tariff barriers (40% of cases), and trade creating custom union (65% of cases). Quantitative methods were applied in 85% of cases our review, the common models used to measure trade liberalization are the elasticity approach (ex-ante), general equilibrium models (ex-ante), import demand regression approach (ex-ante), gravity model (ex-post), an import-growth simulation and other regression approaches (ex-post), import demand regression approach (ex-post). General equilibrium or dynamic models are applied in 80% of cases.

All the above-mentioned economic models of analysis persist in measuring changes in welfare based on cost/benefit consideration. This research paper, on the other hand, asserts that the study of trade liberalization should not focus merely on the cost/benefit analysis; instead it should take into consideration a series of favorable conditions that the Trade Liberalization presents in each country in the same region. The difference in the economic theory approach from that of the political economy and trade policy approaches is that economic theory will offer the basic analytical tools to observe the impact of free trade using either qualitative methods (theoretical framework) or quantitative methods (statistics and mathematical methods). The economic theory approach is therefore necessary it provides as important tools to understand free trade and protectionism.

1.3. Trade Policy Approach

The last past 25 years, many economists have tried to build alternative indicators to measure openness or trade orientation. It is important to mention that these different indicators have significant contribution in the study of openness until today. Usually, a major part of this type of work applied cross-country comparative studies to explain the link between openness and growth, productivity or income distribution. These indicators are trade dependency ratios and rate of growth exports (Balassa, 1982); the heritage foundation index (Edwards, 1998); Sachs and Warner Openness Index (1995); Leamer's Openness Index (Barro, 1991); Trade Liberalization Index (Lopez, 1990); Average Coverage of NTB –QR- (Edwards, 1998); black market premium (Harrison, 1996); Index of real exchange rate variability and index of real exchange rate distortion (Dollar, 1992).

³ American Economic Review, Journal of Policy Modeling, Economic Literature, Economic Development, International Economics Review, World Bank Economic Review, Economic Integration Journal, Econometrica, Cambridge Journal of Economics, Journal of Economic Development, Journal of Economic Integration, Oxford Review of Economic Policy, Quarterly Journal of Economics.

After discussing the different indices, the next step is to present a new model. It is entitled “Openness Growth Monitoring Model (OGM-Model)”. This OGM-Model will study the link between openness growth and income growth. It incorporates a comparison of two growth rates (openness and income). The OGM-Model offers to policy makers and researchers a new set of indicators to measure openness vulnerability, harmonization of openness and openness/income sensibility analysis.

Sebastian Edwards (1997) presented an interesting paper entitled “Trade Policy, Growth and Income Distribution.” This paper applied different trade policy indices (e.g. Deviation from Actual Trade Shares; Trade Liberalization Index; Sachs and Warner Openness Index; QR; Deviation of the black market rate; black market exchange rate premium and real exchange distortions and variation) and the coefficient of GINI to prove the link between openness and income distribution. Edwards concluded that there is no evidence linking openness or trade liberalization to increases in inequality. In the case of the OGM-Model, it is concluded that there exists evidence that openness and income have a link but only in the case of U.S.

There are differences between the methodology applied by Sebastian Edwards (1997) and the OGM-Model. Edwards used different trade policy indices and income distribution (GINI coefficient) to prove the link between openness and income, but the OGM-Model uses the openness growth rate and income growth rate to prove the relationship between openness and income from a different angle. Our method of analysis will show different and new types of indicators and methodology to analyze openness and income as opposed to the traditional indices in the study of trade policy.

2. The Openness Growth Monitoring Model (OGM-Model)

2.1. Introduction

The Openness Growth Monitoring Model (OGM-Model) is a new analytical model for studying various aspects of the Openness Growth and the impact of Openness Growth on the Income Growth in any country or region. Its application is not constrained with respect to the development stage of the relevant country or region, whether it is a developed, developing Country or a less developed country (LDC). This model applies new types of indicators to show the evolution, vulnerability, sensitivity and harmonization of Openness Growth, as well as, the effect of Openness Growth on the Income Growth in any type of country. It is generally a simple and flexible model.

There are two general objectives for the proposal of the Openness Growth Monitoring Model (OGM-Model): (i) to quantify and analyze Openness Growth; (ii) to measure the impact of Openness Growth on Income Growth (ΔY) in a specific period of time (in the short run). The OGM-Model will test prove the following two hypotheses:

- 1.) High openness growth does not necessarily generate income growth in any country in the short run
- 2.) The Customs Union Scheme (Closed Regionalism) performs better than Free Trade Areas Scheme (Open Regionalism) in terms of income growth

The OGM-Model is based on a series of steps/elements in its application to study Openness Growth and Income Growth: (i) Degree of Openness Growth Rate by Production Sectors (O_i), (ii) Vulnerability of Openness Growth Rate (OV), (iii) Harmonization of Openness Growth Rate (HO), (iv) Openness Growth Diamond Diagram, (v) Openness Growth Rate (OG), (vi) Per-capita Gross National Income (Y) and (vii) Income Growth Rate (ΔY), (viii) Openness/Income Growth Rate (O/Y) Diagram and (ix) Openness/Income Growth Rate (O/Y) Sensitivity Analysis (See Diagram 1).

2.2. Elements of Openness Growth Monitoring Model (OGM-Model)

2.2.1. Degree of Openness Growth Rate by Production Sectors (O_i)

The Degree of Openness Growth Rate by Production Sectors (O_i) will present the degree of Openness Growth in four different production sectors, namely agriculture, manufacturing, energy (fuel) and services sectors. This indicator can also show the comparative Openness Growth Rate of the different production sectors (e.g. better Openness Growth in agriculture sector than the manufacturing sector). As such, this indicator can be used by policy makers to formulate measures to improve the relative Openness Growth Rate of the different production sectors in any country.

2.2.2. Openness Growth Vulnerability Rate (OV)

OV is an indicator of the level of risk experienced by any country in the event of collapse of the international trade system following a world recession or crisis.

2.2.3. Harmonization of Openness Growth Rate (HO)

HO measures the trend of the trade policy in the following four production sectors: agriculture (Oa), manufacturing (Om), energy (Oe) and services (Os). This indicator also shows the trend of the liberalization process of any country from a global perspective. HO is useful in the making of policies that help to improve the harmonization of different production sectors (See Diagram 1).

2.2.4. Openness Growth Diamond Graph

The Openness Growth Diamond Graph (See Diagram 1) presents a general idea about the current global development of trade liberalization based on a new concept of graphic representation (See Figure 2). This new concept of graphic representation consists of six axes, each of which has a positive value. In the case of this research, the value in four of the axes is represented by the Degrees of Openness Growth by Production Sectors, O_i indexes (Agriculture Sector, Industrial Sector, Energy Sector, and Services Sector). These O_i indexes are independent variables (See Figure 2). They can be joined together to create a general area. This general area is called “Area of Coverage of Openness Growth –ACO-”. This area shows the dimension of Openness Growth Rate from a global perspective. For comparison purposes, ACO can be applied to different years for one country or two countries. The fifth and sixth axes are represented by the dependent variables Y1 (OV) and Y2 (HO) respectively (where OV and HO are Openness Growth Vulnerability Rate and Harmonization of Openness Growth Rate respectively). They are positioned in the center of the graph which is the meeting point of the other four axes.

2.2.5. Openness Growth Rate (OG)

The Openness Growth Rate (OG) is an approximation of the changes that a country may experience in the evolution of its economic liberalization. The Openness Growth Rate (OG) is measured based on the results of the Openness Growth Vulnerability Rate (OV) (See Expression 4.) OG shows the change in the Openness Growth Rate between the years. It can demonstrate strong or weak Openness Growth in a specific period of time (See Diagram 1). With this indicator it is possible to observe the pattern of Openness Growth for any country from alternative perspective.

2.2.6. Per-Capita Gross National Income (Y) Database

This database is based on the current per-capita Gross National Income (Y). It is to measure the Income Growth Rate (ΔY) (Refer to sections 6.3.6. and 6.3.7.). The data is recorded in US\$ per year.

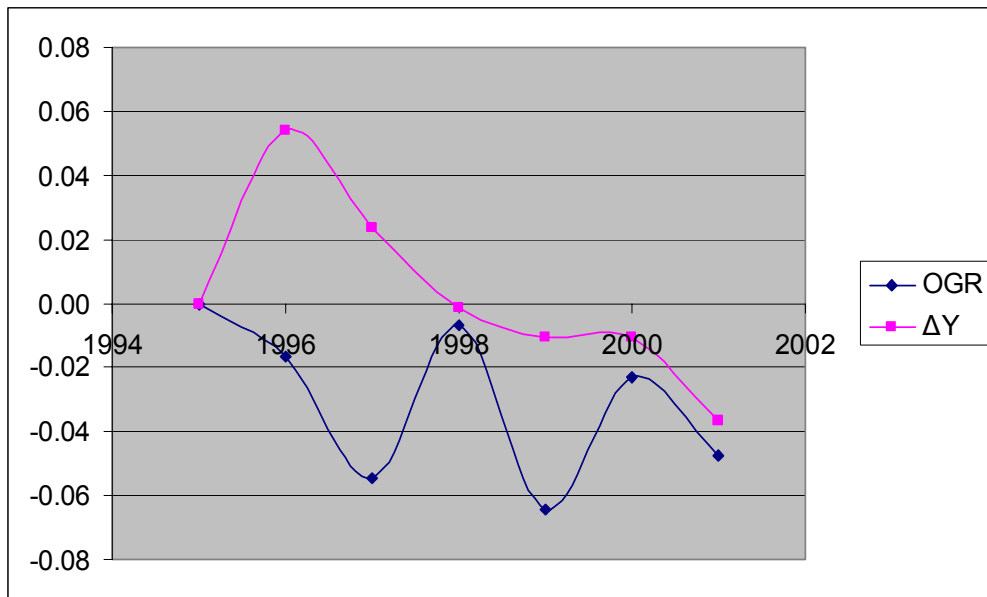
2.2.7. Income Growth Rate

The Income Growth Rate (ΔY) measures the level of Income Growth. In other words it quantifies the changes of income between the years (See Diagram 1).

2.2.8. Openness/Income Growth Rate (O/Y) Chart

The O/Y chart compares the trend of the Openness Growth Rate (OG) with the trend of the Income Growth Rate (ΔY). (See Figure 1)

Figure 1: Openness/Income Growth Rate (O/Y) Chart (Fictitious data)



2.2.9. Openness/Income Growth Rate (O/Y) Sensitivity Analysis

This Indicator measures how sensitive an economy is to changes in its Openness Growth (See Diagram 1). Specifically, it measures the relationship between the Openness Growth Rate (OG) and the Income Growth Rate (ΔY). Hence, it can be used to test if Openness Growth influences Income Growth in the country under study. This indicator can be applied to any of the developed, developing and less developed countries. It compares simultaneously the trend of Openness Growth Rate (OG) and trends Income Growth Rate (ΔY) by the years for the same country or between different countries.

2.3. Steps to Apply OGM-Model

2.3.1. Step-1: Measurement of Degree of Openness Growth Rate by Production Sectors (Oi)

The first step in the application of the OGM-Model is to measure the Degree of Openness Growth Rate by Production Sectors (Oi) (See Diagram 1). The Oi is equal to the sum of real Exports –FOB- (X) by production sectors and the real Imports –CIF- (M) by production sectors divided by the real Gross Domestic Product value (real GDP). (See Expression 1).

4

$$(1.) \sum_{x=1}^4 O_i = (\text{real } X_{i-\text{fob}} \text{ by production sector} + \text{real } M_{i-\text{cif}} \text{ by production sector}) / \text{real GDP}$$

Degree of Openness Growth Rate in the Agriculture Sector (Oa)

$$(1.1) \quad O_a = (\text{real } X_a + \text{real } M_a) / \text{real GDP}$$

Degree of Openness Growth Rate in the Manufacturing Sector (Om)

$$(1.2) \quad O_m = (\text{real } X_m + \text{real } M_m) / \text{real GDP}$$

Degree of Openness Growth Rate in the Energy (Fuel) Sector (Oe)

$$(1.3) \quad O_e = (\text{real } X_e + \text{real } M_e) / \text{real GDP}$$

Degree of Openness Growth Rate in the Service Sector (Os)

$$(1.4) \quad Os = (Xs + Ms) / \text{real GDP}$$

2.3.2. Step-2: Measurement of Openness Growth Vulnerability Rate (OV)

OV is equal to the sum of the degrees of Openness Growth of all the production sectors (See Expressions 1.1, 1.2, 1.3 and 1.4) divided by four (i.e. number of production sectors under analysis) (See Expression 2).

$$(2) \quad OV = (Oa + Om + Oe + Os)/4$$

Analysis of OV Results

- (i) If OV Rate is high, then the country experiences high risk
- (ii) If OV Rate is low, then the country experiences low risk

2.3.3. Step-3: Measurement of Harmonization of Openness Growth Rate (HO)

HO is equal to the Maximum Openness Growth by Production Sectors minus the Minimum Openness Growth Rate by Production Sectors in the same year divided by the Openness Growth Vulnerability Rate (OV). (See Expression 3)

$$(3) \quad HO (i) = \text{Max} (Oi) - \text{Min} (Oi) / OV$$
$$(i = 1, 2, 3, 4)$$

Analysis of HO Results

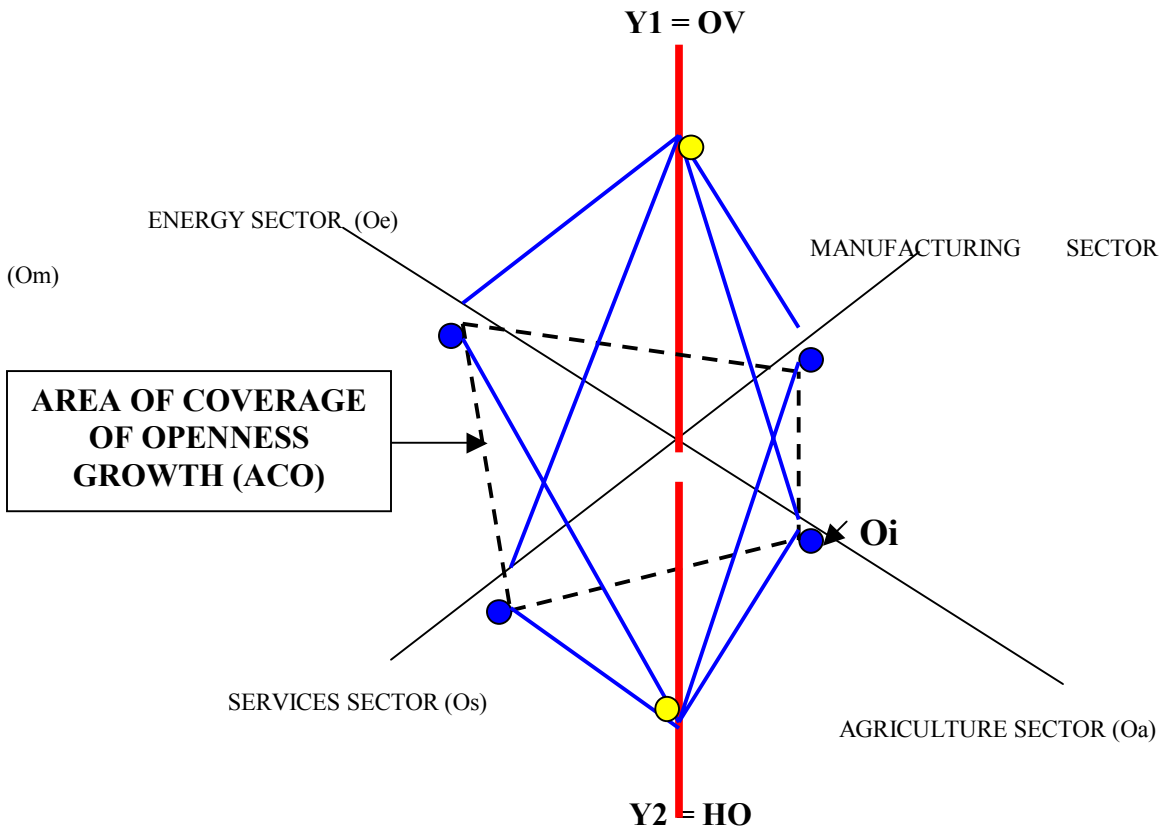
- (i) If HO is equal to 3, then its Openness Growth is proportional
- (ii) If HO is equal to 2, then its Openness Growth is satisfactory
- (iii) If HO is equal to 1, then its Openness Growth is non-proportional.

The analysis of HO Rate can provide a general idea about the orientation of the trade policy in the trade liberalization process of any economy.

2.3.4. Step-4: Plotting of Openness Growth Diamond Graph

Upon computation of all the O_i indexes (Agriculture Sector - O_a -, Manufacturing Sector - O_m -, Energy Sector - O_e -, Services Sector - O_s -), O_V and O_H . The fourth step of the OGM-Model is to plot the openness Growth Diamond Graph (Refer to Figure 2)

**Figure 2:
THE OPENNESS GROWTH DIAMOND GRAPH**



2.3.5. Step-5: Measurement of Openness Growth Rate (OG)

OG is equal to the Openness Growth Vulnerability Rate in a given period (OV') minus the Openness Growth Vulnerability Rate of the previous period (OV_0) divided by the Openness Growth Vulnerability Rate of the previous period (OV_0) (See Expression 4).

$$(4) \quad OG = \frac{OV' - OV_0}{OV_0}$$

Analysis of OG Rate Results

The results of OG reflect two possible scenarios:

- (i) If OG is positive (+), then the country experiences strong Openness Growth
- (ii) If OG is negative (-), then the country experiences weak Openness Growth

2.3.6. Step-6: Creation of Per-capita Gross National Income (Y)

Consisting of (Y) of several years, the data is used in the next step (step-7) of the OGM-Model. While the creation of this database is identified as the sixth step in the OGM-Model, the data and database naturally can be built at an earlier stage.

6.3.7. Step-7: Measurement of the Income Growth Rate (ΔY)

ΔY is equal to the Per-capita GNI in a given period ($\Delta Y'$) minus the Per-capita GNI of the previous period (ΔY_0) divided by the Per-capita GNI of the previous period (ΔY_0) (See Expression 5).

$$(5) \quad \Delta Y = \frac{(\Delta Y)' - (\Delta Y_0)}{(\Delta Y_0)}$$

Analysis of ΔY Rate Results

The results of ΔY reflect two possible scenarios:

- (i) If ΔY , then there is growth in income
- (ii) If ∇Y , then income level remains unchanged

2.3.8. Step-8: Creation Openness/Income Growth Rate (O/Y) Chart

Based on all the results of Openness Growth Rate (OG) and Income Growth Rate (ΔY) obtained from step-6 and step-7 respectively, a chart showing the trends of both openness growth and income growth is drawn. This chart serves the purposes in the next step (step-9).

2.3.9. Step-9: Measurement of the Openness/Income Growth Rate (O/Y) Sensitivity Analysis

The Openness/Income Growth Rate (O/Y) Sensitivity Analysis compares the trend of Openness Growth and the Income Growth (See Expression 6) based on the Openness/Income Growth Rate (O/Y) Chart (See Figure 1).

(6) Openness/Income Growth Sensitivity Analysis Rate (O/Y) = $\Delta OG : \Delta Y$

Results of (O/Y) Sensitivity Analysis

The (O/Y) Sensitivity Analysis reflects several possible scenarios:

- (i) If $\Delta OG \equiv \Delta Y$, then economy has high sensitivity to OG
- (ii) If $\nabla OG \equiv \nabla Y$, then economy has high sensitivity to OG
- (iii) If $\Delta OG \equiv \nabla Y$, then economy has low sensitivity to OG
- (iv) If $\nabla OG \equiv \Delta Y$ then economy has low sensitivity to OG

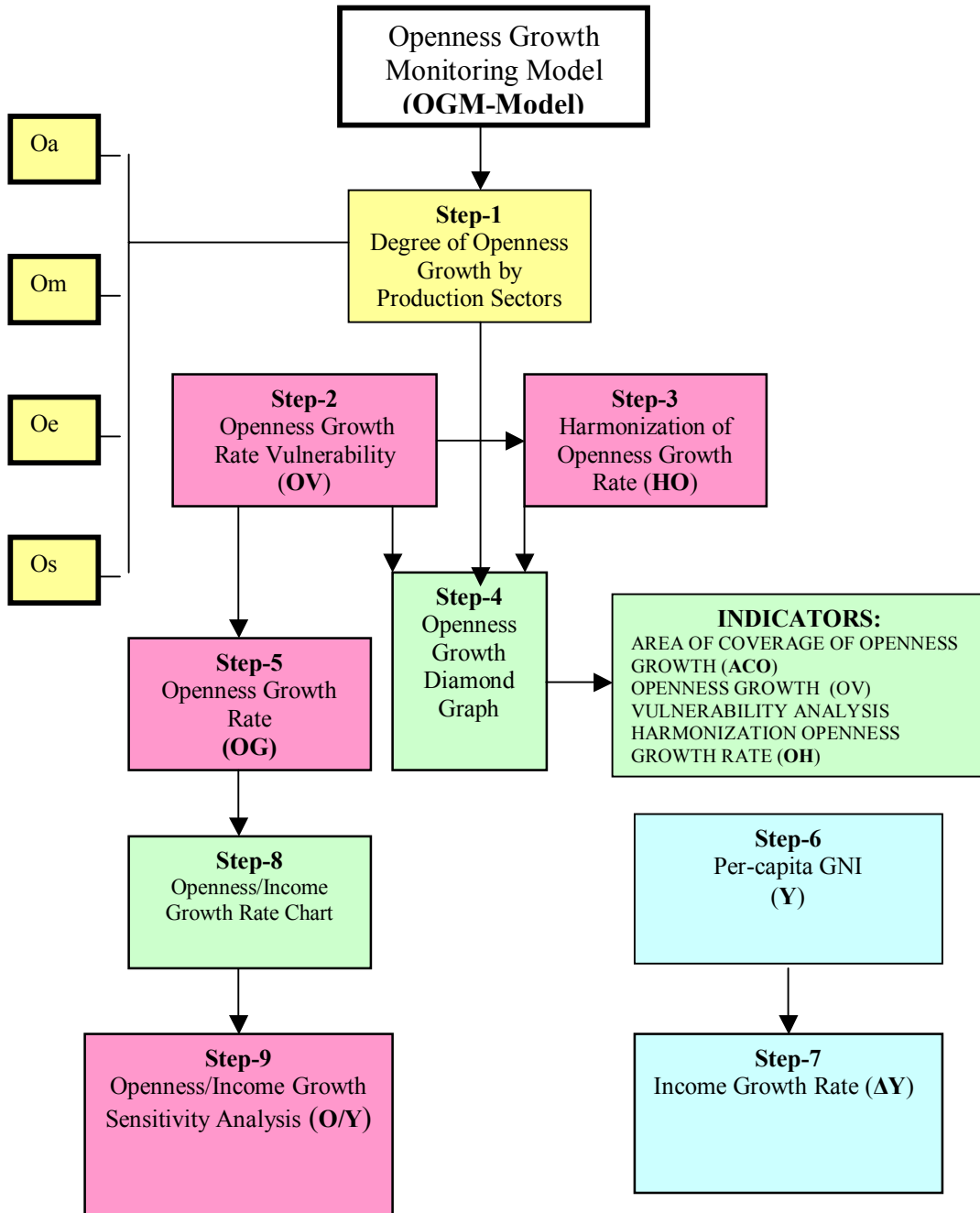
(OG) : Openness Growth Rate

Y Δ : Increase

(ΔY) : Income Growth Rate

Y ∇ : Decrease

Diagram 1:
Steps to apply Openness Growth Monitoring Model (OGM-Model)



2.4. Application of OGM-Model and Findings

For the research in this thesis, the OGM-Model was applied to 40 different countries in 7 different trading blocs between 1995 and 2001 (See Table 1). This period of time was chosen because the general objectives of the OGM-Model is to observe the correlation between Openness Growth and Income Growth in the short run.

2.4.1. Findings Pertaining to Correlation between Openness Growth and Income Growth

The result of the Openness/Income Growth (O/Y) Sensitivity Analysis of the OGM-Model shows that only one country's (United States of America -U.S.A's-) Income Growth was highly dependent on Openness Growth between 1995 and 2001. (See Table 1). For the rest of the countries in the analysis, there was no correlation between Openness Growth and Income Growth between 1995 and 2001. Even countries such as Singapore (See Table 1), Hong Kong (See Table 1), El Salvador (See Table 1), Chile (See Table 1), Israel (See Table 1), Honduras (See Table 1) and Nicaragua (See Table 1) whose levels of Openness Growth were high, did not show any correlation between Openness Growth and Income Growth. These results suggest that, for developed countries, developing countries and less developed countries (LDC's). Openness Growth cannot create Income Growth in the short run.

In terms of the Degree of Openness Growth Rate by Production Sectors (O_i), it is observed that for U.S.A., Openness Growth in the agriculture (O_a) and energy (O_e) sectors was low in the period 1995-2001. Such low level of Openness Growth can be attributed to the high level of trade protectionism in the form of non-tariff barriers that the U.S.A. government imposes on foreign trading partners. The U.S.A., however, showed high a level of Openness Growth in the manufacturing (O_m) and services (O_s) sectors during the same period. It is concluded here that the low level of Openness Growth in the agriculture and energy sectors was the contributory factor for the low Openness Growth vulnerability of the American economy in the period 1995-2001 (See Figure 3). During the same period, the Harmonization of Openness Growth Rate (HO) for the U.S.A. was satisfactory: HO shows that the U.S.A. had more Openness Growth in the manufacturing and services sectors was higher than that in the agriculture and energy sectors (See Table 1). It can be observed that Singapore (See Table 1) and Hong Kong (See Table 1) had a high level of Openness Growth between 1995 and 2001. However, during this period, these two countries saw negative values in the Income Growth. The same situation – high level of Openness Growth but low level of Income Growth -- is observed in the cases of developing countries (e.g. Malaysia, Chile, Mexico, Brazil, Argentina, Venezuela, El Salvador) and less developed countries (LDC's) (e.g. Honduras, Nicaragua, Vietnam, Laos, Cambodia) (See various Tables).

The Application of the OGM-Model to most developed countries (e.g. European Union, Japan, Singapore, Australia, Canada, Hong Kong) shows that these countries had high level of Openness Growth in the manufacturing and energy sectors. It is understood that their agriculture and services sectors were under high level of trade protectionism. Compared with developing and less developed countries, developed countries' Openness Growth Vulnerability Rate (OV) and Harmonization of Openness Growth Rate (HO) were high and satisfactory respectively (refer to Section 2.3.3. for analysis of HO results). As mentioned earlier, in terms of correlation between Openness Growth and Income Growth, only one country (i.e. U.S.A.) among the developed countries experienced such a correlation in its economy.

During the same period, developing countries (e.g. Malaysia, Thailand, China, Mexico, Brazil and Chile) presented different results of Openness Growth by production sectors from those of developed countries. In developing countries, the agriculture and energy sectors had high level of Openness Growth, but the manufacturing and services sectors maintain a high level of trade protectionism. These countries saw increasing Openness Growth Vulnerability Rate (OV) but proportional growth across production sectors in their Harmonization of Openness Growth Rate (HO). The growth of these two indicators in developing countries originates from the growth of their shares in the world trade. Among developing countries, none experienced correlation between openness growth and income growth.

In less developed countries (LDC's) (Honduras, Nicaragua, Vietnam, Cambodia, Myammar, Laos and Guatemala) between 1995 and 2001, the agriculture sector was under high level of trade protectionism, but the manufacturing, energy and services sectors (See Figure 6) presented a higher level of Openness Growth compared with developed and developing countries (See Figures 4 and 5). On the other hand, both their Openness Growth Vulnerability Rate (OV) and Harmonization of Openness Growth Rate (HO) appeared to be low. The low level of OV and HO in LDC's was due to a low level of participation in world trade on the part of these countries. Amongst less developed countries (LDC's) none shows correlation between Openness Growth and Income Growth in its economy between 1995 and 2001.

2.4.2. Findings pertaining to Regional Integration

The results of Openness/Income Growth Sensitivity Analysis in Table 23 provide a means for comparing the performance of the Customs Unions and the Free Trade Area in terms of Openness/Income Growth. The results provide a good indication of whether Openness Growth under a certain regional integration scheme generate desirable Income Growth which determine the success if the scheme.

The application of the OGM-Model to the European Union (EU) – under the Customs Union (CU) Scheme – reveals a negative Openness Growth Rate of -2 and a positive Income Growth Rate of 0.07. For the Free Trade Area (FTA) Scheme, North America Free Trade Areas (NAFTA's) recorded an Openness Growth Rate of 1 -- the highest among all trade blocs under the same scheme – and an Income Growth Rate of 0.04. These two results show that NAFTA had a higher level of Openness Growth but lower level of Income Growth compared to the EU. In other words, the results indicate that FTA of open regionalism cannot yield as much Income Growth as CU under the closed regionalism – even with their higher level of Openness Growth. More precisely, the Customs Union under closed regionalism (intra-regional integration) is a more suitable regional integration scheme than the Free Trade Area of open regionalism (inter-regional integration).

The rest of the trading blocs analyzed were Association of South East Nations (ASEAN), Australia-New Zealand Free Trade Area (ANZFTA) (FTA), MERCOSUR and Central America Common Market (CACM), all of which are under the FTA scheme. ASEAN had the highest Openness Growth Rate of 4 and negative Income Growth Rate of -0.03. ANZFTA, with its Income Growth Rate of -0.004, showed the same high Openness Growth Rate of 4 as that of ASEAN. MERCOSUR's Income Growth Rate was as low as -0.01. However, it held the second highest level of Openness Growth Rate among all trading blocs analyzed: an Openness Growth Rate of 3. The last case is CACM with a low Openness Growth Rate of 1, and a low Income Growth Rate of 0.04 (See Table 1).

Contrasting against With reference to the results obtained for EU (under the Customs Union scheme – closed regionalism), the results for ASEAN, ANZFTA, MERCOSUR and CACM (under the FTA – open regionalism) constitute yet another ground for the claim in this thesis that the Customs Union is a better scheme for regional integration compared to the FTA. Equally important, all the above results testify the viability of the OGM-Model as an alternative analytical tool to analyze regional integration.

FIGURE 3: THE OPENNESS GROWTH DIAMOND DIAGRAM OF U.S.A.

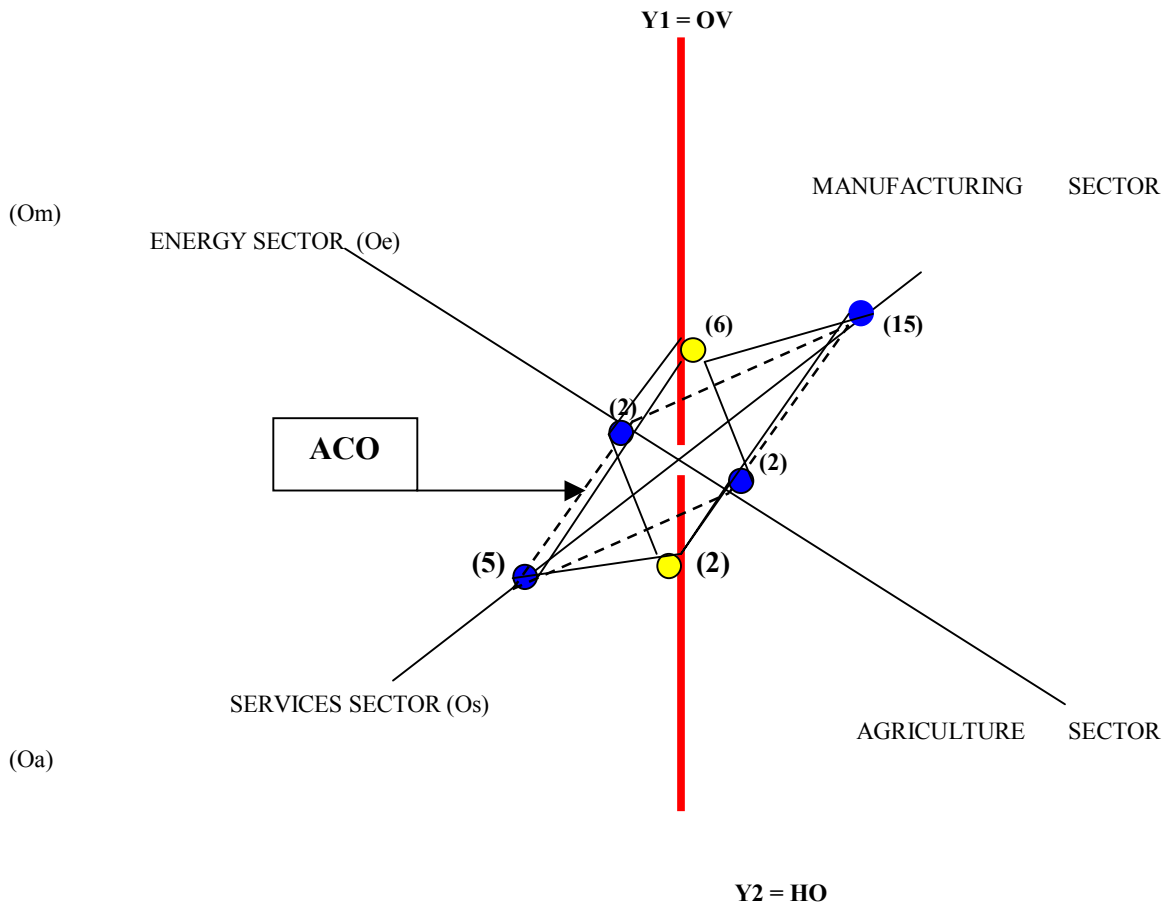


FIGURE 4: THE OPENNESS GROWTH DIAMOND DIAGRAM FOR DEVELOPED COUNTRIES

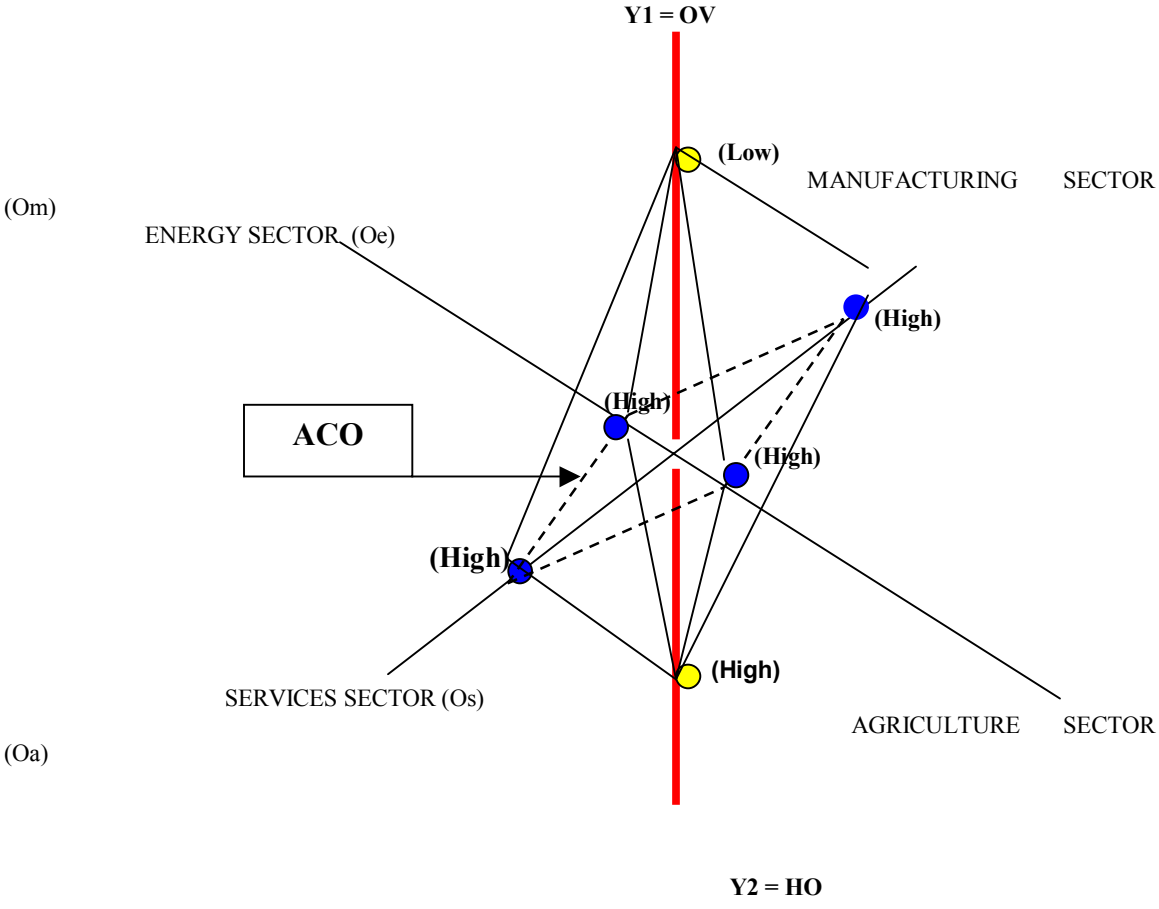


FIGURE 5: THE OPENNESS GROWTH DIAMOND DIAGRAM FOR DEVELOPING COUNTRIES

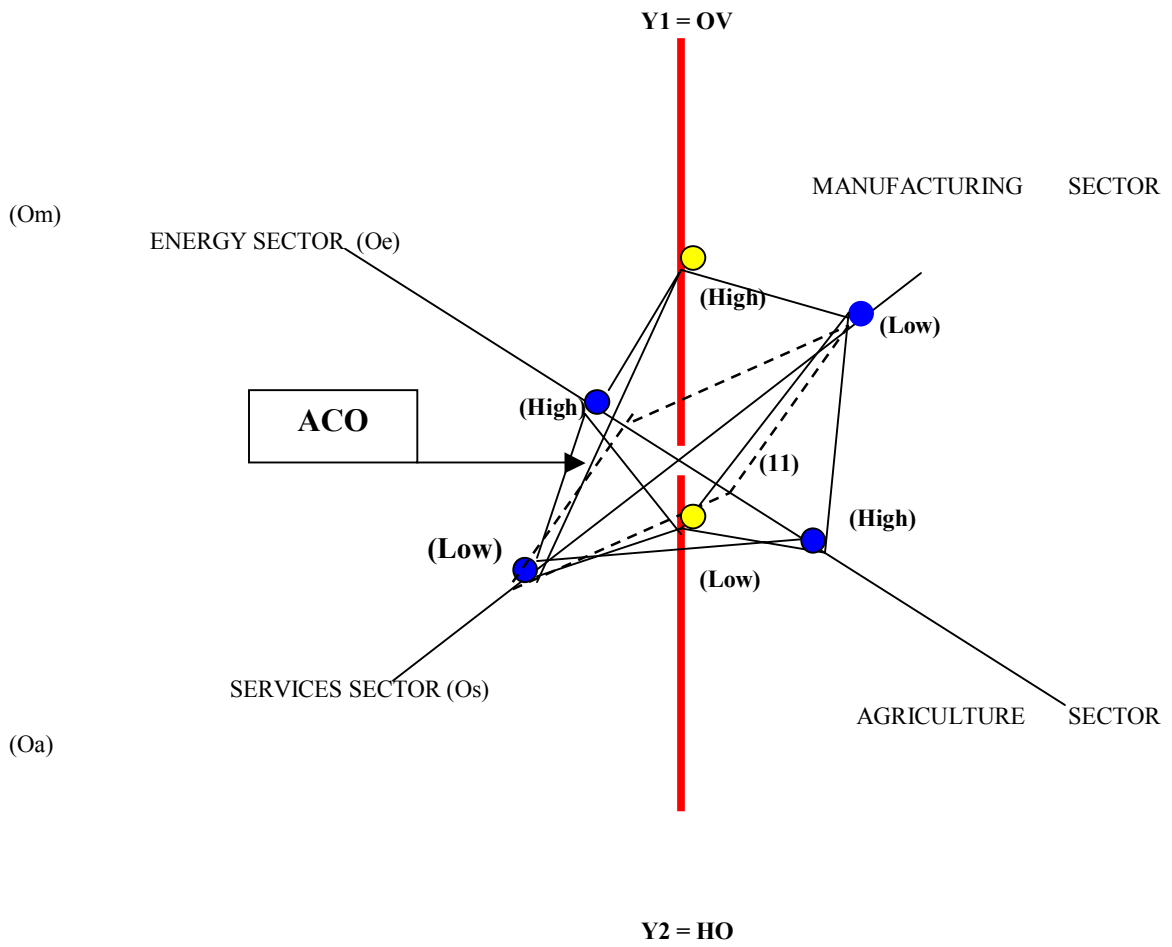
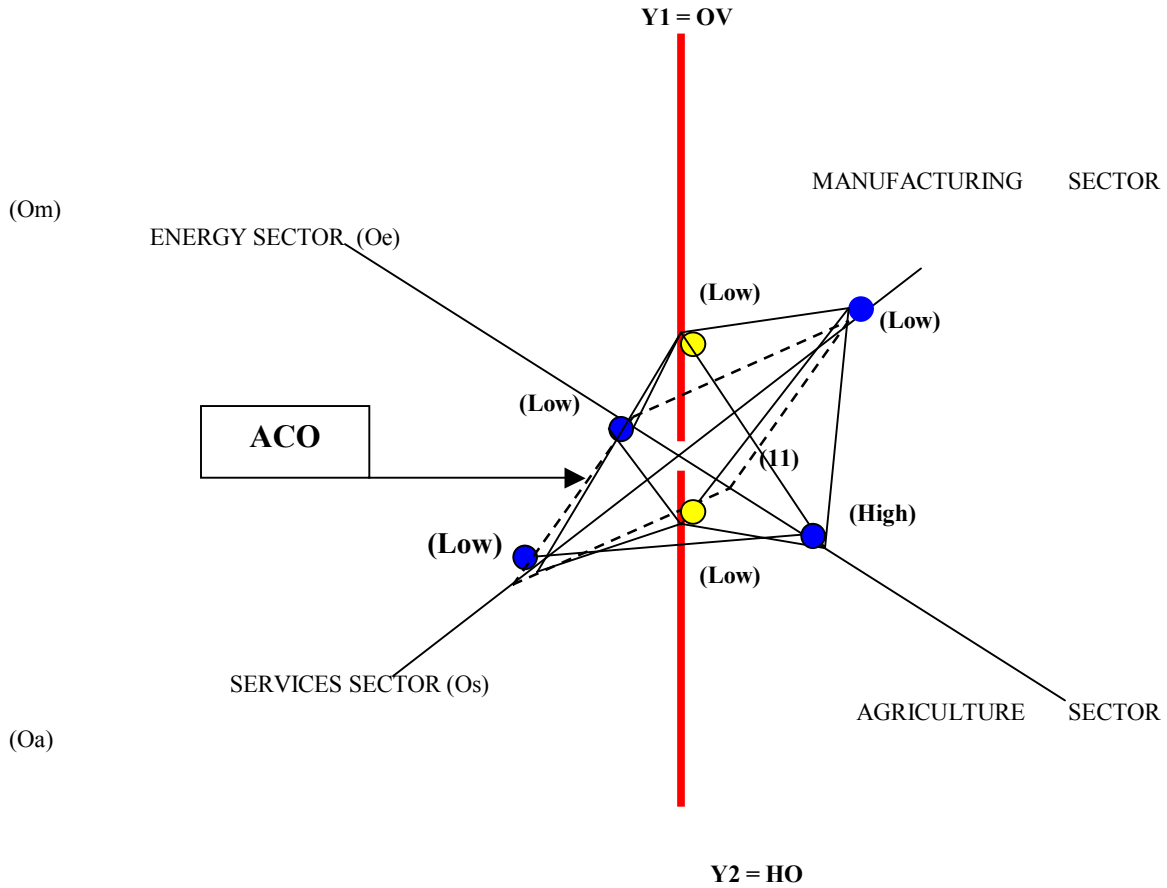


FIGURE 6: THE OPENNESS GROWTH DIAMOND DIAGRAM FOR LESS DEVELOPED COUNTRIES (LDC's)



3. CONCLUSION

This research paper concludes that growth in Openness cannot generate income growth. Only U.S. shows a strong link between openness growth and income growth. The OGM-Model also shows that the best regionalism scheme is the Custom Union (CU) scheme compared to the Free Trade Areas (FTA) scheme. These results of OGM-Model can help policy makers and researchers in trade issues to visualize the trend of trade liberalization and trade policy in any country or region.

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TABLE 1
REGIONAL BLOCS: OV, OG, ΔY,
O/Y and HO

ASEAN	OV	OG	Level	ΔY	O/Y	Level	HO
INDONESIA	15	7	Strong	-0.04	2	Middle	1
MALAYSIA	52	2	Strong	-0.03	2	Middle	3
PHILIPINES	25	8	Strong	0.002	3	Middle	2
SINGAPORE	81	-1	Weak	-0.008	1	Low	3
THAILAND	27	6	Strong	-0.05	1	Low	2
Regional	40	4	Strong	-0.03	2	0	2
East-Asia	OV	OG	Level	ΔY	O/Y	Level	HO
JAPAN	5	0.02	Strong	0.01	2	Middle	2
CHINA	11	2	Strong	0.1	2	Middle	3
HONG-KONG	70	-1	Weak	0.02	3	Middle	3
NAFTA	OV	OG	Level	ΔY	O/Y	Level	HO
CANADA	19	2	Strong	0.02	2	Middle	2
MEXICO	15	-0.8	Weak	0.07	1	Low	3
USA	6	0.36	Strong	0.03	1	Low	2
Regional	13	1	Strong	0.04	1	0	2
CACM	OV	OG	Level	ΔY	O/Y	Level	HO
COSTA RICA	23	3	Strong	0.04	1	Low	1
EL SALVADOR	16	3	Strong	0.04	4	High	3
GUATEMALA	11	1	Strong	0.03	3	Middle	2
HONDURAS	22	-1	Weak	0.06	1	Low	1
NICARAGUA	9	1	Strong	0.02	1	Low	1
PANAMA	20	-1	Weak	0.02	1	Low	1
Regional	17	1	Strong	0.04	2	0	2
MERCOSUR	OV	OG	Level	ΔY	O/Y	Level	HO
ARGENTINA	6	2	Strong	-0.01	2	Middle	2
BRAZIL	5	10	Strong	-0.02	1	Low	2
PARAGUAY	14	-0.07	Weak	-0.04	3	Middle	1
URUGUAY	10	-0.47	Weak	0.02	1	Low	1
Regional	9	3	Strong	-0.01	2	0	2
Rest of South America	OV	OG	Level	ΔY	O/Y	Level	HO
CHILE	15	1	Strong	0.02	1	Low	2
ANZFTA	OV	OG	Level	ΔY	O/Y	Level	HO
AUSTRALIA	30	4	Strong	0.003	3	Middle	2
NEW ZEALAND	16	3	Strong	-0.01	1	Low	1
Regional	23	4	Strong	-0.004	2	0	2
EU	OV	OG	Level	ΔY	O/Y	Level	HO
AUSTRIA	7	-4	Weak	-0.02	2	Middle	1
BELGIUM	46	-1	Weak	-0.01	2	Middle	2
DENMARK	19	5	Strong	0.01	1	Low	1
FINLAND	20	-5	Weak	0.02	0	Low	2
FRANCE	15	-2	Weak	-0.01	3	Middle	2
GERMANY	15	-2	Weak	-0.03	4	High	2
GREECE	14	-4	Weak	0.01	2	Middle	1
HOLLAND	36	-3	Weak	-0.01	2	Middle	2
IRELAND	42	-0.17	Weak	0.06	2	Middle	2
ITALY	13	-4	Weak	0.003	0	Low	2
PORTUGAL	17	-4	Weak	0.02	0	Low	2
SPAIN	15	-3	Weak	-0.0003	4	High	2
SWEDEN	17	2	Strong	0.002	1	Low	3
UK	88	-2	Weak	0.05	0	Low	2
Regional	26	-2	Weak	0.07	2	Middle	0

OG: Openness Growth Rate

ΔY: Income Growth Rate

O/Y: Openness/Income Growth Sensitivity Analysis

HO: Harmonization of Openness