A PRIMER ON EXPORT DIVERSIFICATION: KEY CONCEPTS, THEORETICAL UNDERPINNINGS AND EMPIRICAL EVIDENCE

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Introduction:

This paper provides a basic understanding of: (i) the concepts of Export Development and Export Diversification, (ii) what the theory says about Export Development and Diversification? and (iii) what empirical evidence shows on the links (correlates) between export diversification, exports growth, and overall growth.

The role of export development and diversification in growth in developing countries has received considerable attention in development literature over the last 50 years. During the 1950s, 1960s, and 1970s, and largely influenced by R. Presbish (1950) and H.W. Singer (1950), the prevailing development strategy in many developing countries and particularly in Latin America, Africa and South Asia, was in favor of import substitution and extensive use of restrictive trade polices for economic diversification. In the light of the success of China, India, and the East Asian "Tigers", this view of economic diversification through import substitution evolved considerably towards export promotion and outward orientation in the 1980s, 1990s, and early 2000s.

Because many developing countries are heavily dependant on commodity exports, making them extremely vulnerable to external shocks, a key challenge confronting policy makers in those countries is that of expanding export revenues, stabilizing export earnings, and upgrading value added in a changing North-South trading structure.

Although the prevailing view prior to the first world war was pro-free trade, premised on comparative advantage, specialization, and international labor division, inspired by classic trade theories developed since A. Smith (1776) and E. Ricardo (1817), this view has been challenged following the second world war by R. Presbish (1950) and H.W. Singer (1950) who argued that too much

specialization of developing countries implied trade patterns characterized by reliance on export of raw materials and agriculture commodities in exchange of consumer and investment goods manufactured in developed countries. Based on the Presbish-Singer hypothesis, free trade and its corollary specialization were to confine developing countries in the production of primary products which are subject to short and long term detrimental effects for developing countries. Hence, in order to stabilize export earnings, boost income growth, and upgrade value added, developing countries had to increase the variety of their export basket. In the light of the dismal economic performance of many developing countries that implemented trade restrictive protectionist policies in the 1960s, and 1970s, many policy makers have, since the 1980s, been seeking to expand their exports and have increasingly been recommending development strategies based on outward orientation including reduction of trade barriers and opening of international trade to foreign competition. Because export supply responses following first generations of outward oriented trade policy reforms have been mixed, expanding and diversifying exports remains a major concern for policy makers in many countries.

In many cases, diversification of export products and markets destination is viewed as means to meet the challenges of unemployment and lower growth in many developing countries. The success story of High performing Asian economies that experienced substantial increases in exports, and specially exports of manufactures goods, and high growth rates of their GDP over many decades has prompted many analysts to view export development and diversification as the new engine of growth. In the light of the experience of successful exporting countries, there is a growing consensus in economic literature that outward-oriented policies combined with selective market friendly interventions can help countries grow more, and reap the benefits of trade liberalization. There is also a growing consensus that patterns of economic development is associated with structural change in exports and increased export diversification. In virtually all regions of the world, the patterns of trade have changed from primary exports to manufactured exports of labor intensive types and subsequently to more resource intensive manufactures, but Africa is one of the rare regions where exports remain predominantly of primary nature.

Section I reviews key concepts. Section II assesses the theoretical underpinnings of Export development and Export Diversification. Section III surveys the literature on the linkages between export diversification, export growth, and overall growth.

SECTION I: KEY CONCEPTS (What ? Why ? How ?)

What is Export Diversification?

Export diversification is variously defined as the change in the composition of a country's existing export product mix or export destination (Ali, Alwang and Siegel, 1991), or as the spread of production over many sectors (Berthelemy and Chauvin, 2000). For many developing countries, and as part of an export led growth strategy, export diversification is conceived as the progression from traditional to non-traditional exports. By providing a broader base of exports, diversification can lower instability in export earnings, expand export revenues, upgrade value–added, and enhance growth through many channels. These include: improved technological capabilities via broad scientific and technical training as well as learning by doing, facilitation of forward and backward linkages within output of some activities which then become input of some other activities; increased sophistication of markets, scale economies and externalities, and substitution of commodities with positive price trends for those with declining price trends.

What are the different dimensions of export diversification?

In the trade literature, export diversification can take several dimensions and can be analyzed at different levels. There are two well known forms of export diversification: horizontal and vertical. **Horizontal diversification** takes place within the same sector (primary, secondary or tertiary), and entails adjustment in the country's export mix by adding new products on existing export baskets within the same sector, with the hope to mitigate adverse economic (to counter international price instability or decline) and political risks.

Vertical diversification into processing of domestic manufactured goods entails a shift from the primary to the secondary or tertiary sector. It entails contriving further uses for existing products by means of increased value added activities such as processing, marketing or other services. Vertical diversification can expand market opportunities for raw material and help enhance growth and stability since processed goods generally have greater price stability than raw commodities.

Diagonal diversification is also sometimes referred to in the literature. It entails a shift from imported input into secondary and tertiary sector.

Requirements for successful horizontal, vertical or diagonal diversification can vary considerably in terms of skills and capital investments, technology, managerial competences and marketing skills. Sustainable long term export growth requires both horizontal (e.g. adding new products on existing ones), and vertical (e.g. move from commodity to higher value added manufactures), diversification. This can be achieved either by adjusting shares of commodities in the existing export mix or by adding new products to the export mix.

Levels of Diversification. Export diversification can also be analyzed at many levels (farm, plant, region, country, or regional level). At each level, a focus can be put on different forms of diversifications (horizontal, vertical, or diagonal).

Why Export Growth?

As recognized since the mercantilist era, export growth is critical for any country for a variety of reasons. At the macro level: (i) exports help generate foreign exchange; (ii) Export receipts are vital to finance import and exports; (iii) the small size of many developing countries and their negligible purchasing power call for the need to explore larger market scales; (iii) exports contribute to employment and growth of national product. At the micro level, it is now well established that: (i) exporting firms are more efficient than their counterparts selling primarily on domestic markets; and exporting firms serve as conduit for technology transfer and in generating technological spillovers with positive backward and forward linkages to domestic economy. Manufactured exports are particularly highly employment intensive, especially when inputs (Capital and raw materials, labor) are sourced locally. Exporting firms are more productive than domestically oriented firms and help achieve higher growth.

Diversification versus Specialization. Despite the well known efficiency benefits expected from specialization, the risks of too little specialization have been long acknowledged in development literature. Export diversification concept may seem to be in contradiction with the concept of comparative advantage which posits that the more a country becomes open and involved in international trade, the more specialized it becomes. Because countries specializing in commodities where they have comparative advantage may achieve better resource allocation efficiency, some economists argue that better international competitiveness would require more specialization in exports rather than better diversification. In line with the Presbisch-Singer hypothesis, it is widely recognized that specialization in a narrow group of export products exposes a country to increased instability in export earnings which can be made worse when concerned products are subject to secular declining terms of trade. This volatility exposure can be mitigated, through diversification, by expanding

production and trade of a variety of commodities with different price trends, which can potentially help achieve some stability in economic performance. While specialization related potential benefits in terms of resource allocation efficiency should be acknowledged, cost associated with greater specialization into a narrow range of vulnerable products (in terms of increased volatility of export earnings) should be kept in mind. It should also be acknowledged that for a country to specialize successfully, it must adjust and restructure its economy. Such adjustment or restructuring can entail a range of short term financial, personal and social costs including: loss of Government revenue, decline of some industries unable to face increased competition from imports and rise of others, elimination of some sectors and devastation of some regions, relocation of employment, family disruption, and loss of industry skills in declining sectors. These short term adjustment costs can be mitigated with a range of accompanying, compensatory or complementary policy measures.

Why Export Diversification?

Although exports are important for growth and development for macroeconomic and microeconomic reasons previously highlighted, developing countries have been struggling with the challenge of expanding and diversifying their export baskets for a long time. When export is concentrated in a few primary commodities, there can be serious economic and political risks. Export diversification aims at mitigating these economic and political risks. **Economic risks** to be mitigated include: in *the short term,* volatility and instability in foreign exchange earning which have adverse macroeconomic effects (on growth, employment, investment planning, import and export capacity, foreign exchange cash flow, inflation, capital flight an undersupply of investments by risk averse investors, debt repayment); and in *the long term*, secular and unpredictable declining terms of trade trends which exacerbate short run effects. **Political risks** include worsened governance and risk of civil war in fragile states; as recent research (Collier, 2002) shows that primary commodity dependence is associated with various dimensions of poor governance; and the risk of conflict is strongly related to the level and growth of income, and to its structure as reflected in the dependence upon a few primary commodity exports.

Another objective of diversification is to reduce dependence upon one or a limited number of **geographical** destinations for its exports. Diversification can also aim at expanding opportunities for export and improvement of backward and forward linkages to domestic inputs and services.

Heavy dependence on a small number of primary commodity products exposes a country to the negative effects of unfavorable characteristics of world demand and negative supply side features of these primary products. On *the demand side,* the low income elasticity of world demand of primary commodities can lead to falling export revenues which can be exacerbated by historically downward trends in primary commodities relative to manufactures. Although, according to Cashin and Mc. Dermott (2002), real commodity prices have declined by about 1% per year over the last 140 years, volatility and persistence of commodity price shocks can have more dramatic consequences than the long term downward trend of commodity prices. *On the supply side*, the combined effect of lower skills and technology content of commodity production and its negligible backward and forward linkages with the rest of the economy usually lead to little growth spillovers. Hence the need for diversification, as a diversified portfolio could help minimize volatility in export earnings and boost overall growth by replacing commodities with positive price trends products and adding value through additional processing or marketing. Diversifying away from traditional exports is supposed to raise growth rates as traditional exports face limited demand due to their low income elasticity and declining terms of trade, and to lower variability of growth rates as traditional exports are particularly vulnerable to exogenous shocks.

How to diversify?

There is no simple and unique response to this challenging question. Building on the experience of several countries in Asia and Latin America, it is now clear that when appropriate policies are in place, low skills manufacturing can be viable options in countries where human capital is not the major driver of comparative advantage. However, diversifying towards manufacturing may not necessarily be the only alternative for developing countries. Despite impressive increases of manufactured export goods in successful developing countries in recent decades (shares of world manufacturing exports from developing countries increased from 10.6% in 1980 to 26.5% in 1998), the value added in manufacturing from developing countries did not increase as much (from 16.6% in 1980 to 23.8% in 1998), possibly due to the fallacy of composition "What may be good and possible for one exporting country may be less attractive when done by all countries". Also, there is growing evidence that most dynamic agricultural commodities have outperformed most manufactured goods in terms of export volumes and values (e.g. silk, beverage, cereals preparation, preserved food, sugar preparation, manufactured tobacco, chocolate, fish and sea food).

On the basis of the above, rather than following the exclusive route of low skills manufacturing based on relocative FDI and exports relying on labor intensive parts of wider manufacturing processes which may not necessarily

yield sustained benefits in the long term (" fallacy of composition"), pursuing different alternatives combining resource based manufacturing and commodity processing should be vigorously explored. Expanding non-traditional primary exports can be achieved for example by increasing efficiency of firms operating in the agriculture and natural resources sectors; building on recent technological advance in food packaging and transportation; producing new types of commodities such as off season specialty, fresh vegetables or cut flowers), as well as trade in services. Although service trade is the fastest growing segment of the global economy and an important component of many developing countries exports, business services exports (R&D, IT, health services), there is an interplay between technology, endowments, institutions, and infrastructure in determining the pattern of trade in services; and opportunities in the neglected services of insurance, water, electricity, management, retail and wholesale trade should also be explored. Hence, for a country to achieve sustainable long-term growth, it should not only diversify from the primary sector into high value-added manufactured goods, but combine wherever possible actions to expand the manufacturing sector with measures to strengthen the primary sector (as Chile did) and the service sector.

Overall, for policy makers seeking good practice and guidance for diversification of their economies, the policy package should be multifaceted and comprehensive (covering constraints at the borders, behind the borders (supply side), and beyond the borders (market access issues). **Addressing constraints at the borders** implies a focus on tariff and non-tariff barriers to imports and exports, as well as better customs facilitation; against a background of appropriate macroeconomic framework (including low inflation, realistic exchange rate, low fiscal and external deficits), anti-export bias policies, and measures to mitigate adverse social consequences of reforms needed to align domestic to international prices. **Addressing constraints behind the borders** implies addressing supply side constraints (Infrastructure, Institutions (trade related), policy constraints (including adequate business regulatory framework, and investment policy regime), competitiveness constraints (standards, packaging, quality, and delivery in time), and needed support incentives (fiscal incentives and credit incentives). **Addressing constraints beyond the borders** implies addressing market access barriers to export growth. Effective negotiations skills can be useful in this context to enhance the benefits of bilateral, regional, and multilateral negotiations. By and large, expanding exports to respond to increased regional and global market demands requires increased production (supply) of goods and services in many sectors (agriculture, industry, services). This in turn, requires not only adequate infrastructure (telephone, services, electricity, water), but also adequate trade related institutions, good policies, and the ability to deliver quality products in needed quantity and in a

timely manner. Hence, a multi-faceted approach is essential for a successful export development strategy.

A successful export development and diversification strategy should also build on the lessons of experience of successful exporting countries. From these experiences, it is now increasingly well recognized that:

(i) Trade reform will not by itself be sufficient to deliver large supply responses in terms of expanding trade volumes, increasing export varieties, and attracting FDI inflows, as other considerations including lack of adequate infrastructure and institutions can prevent local farmers or producers from expanding production of raw material materials for export, and the lack of an enabling environment can stifle entrepreneurship and innovation.

(ii) Besides "getting fundamentals right", it is now recognized that successful countries did adopt a wide range of selective measures [e.g. fiscal and direct credit incentives, selective subsidies, local content requirements]. These selective interventions can under right conditions help firms improve their export competitiveness by solving coordination failures and providing services which have the nature of public goods.

(iii) Reducing transaction costs and improving local business conditions can help firms expand more quickly to emerging opportunities and challenges coming from ongoing policy reforms.

(iv) International trade negotiations at the bilateral, regional, and multilateral levels could help reduce market access constraints, and open opportunities to tap into regional and global production and distribution chains.

How to measure Export Diversification?

There are various ways to measure export diversification. In the literature, the choice of a measure usually corresponds to different definitions, dimensions, forms, and levels of diversification. The most commonly used measure of diversification is the Concentration Ratio (product or geographic concentration). Other measures used are: the Commodity-Specific Cumulative Export Experience Function (CSCEEF), the Absolute Deviation of the Country Commodity Shares, the Commodity Specific Traditionalist Index (CSTI), and the Variance of the CSTI. (Details on the various indices and measures are provided in Annex A).

SECTION II: Theoretical underpinnings

This section provides a literature survey of a few theories explaining why economies expand and diversify their exports. What do these theories say about export diversification? What relevant conclusions can be derived from theoretical approaches to explain export development and diversification?

(i) Traditional trade Theory. The idea that exports stimulate the economy has been around for a very long time. The key question here is how traditional trade theories explain export diversification and growth. Overall, the earlier trade interventionists' theories, the mercantilists, strongly argued for the need to expand and promote exports, induce trade surpluses by minimizing imports as a way to accumulate bullions (precious metal), wealth, and national mercantile power. Beginning with classical trade theories pioneered by A. Smith (1776) and D. Ricardo (1817), it is widely held that each country has a "comparative advantage" in producing something, in exporting certain products, and that specialization in those export lines will generate "gains from trade". The traditional comparative advantage theory (absolute or relative) overall posits that what essentially counts is how good a country is at producing one good compared with another good.

Following J. S. Mill (1848), and as the industrial revolution expanded production and export volumes, most classical theorists confined the debate to the **sources of comparative advantage**; with Hechscher and Ohlin (HO), who pioneered the most debated theory of comparative advantage in the 1930s, focusing on relative resource or factor abundance to explain trade, exports, and its evolution. Because the Hechscher and Ohlin theory over the years has been particularly useful in explaining some trade of developing countries, but NOT all trade, other theories of comparative advantage have emerged to explain trade based on other considerations (e.g. increasing returns, economies of scale, etc… as developed below).

It is now generally held that comparative advantage is natural and fairly static for natural resources and agricultural products, but can be induced and dynamic for most industrial, technological, and services sectors. It is also generally admitted that countries' patterns of specialization vary considerably.
Because comparative advantage changes over time, the gains from trade in mainstream trade literature are maximized when: (i) a country specializes in products for which it has a comparative advantage rather than trying to produce everything, and then (ii) exports the surplus of its specialization in exchange of imports, with greater efficiency of resource use. It is also understood that when a country specializes to seek "gains from trade", it must restructure and adjusts its economy, and this restructuring can entail short term financial, personal and

social costs. These short term costs should be subtracted from overall long term gains from trade, but could be mitigated with appropriate accompanying, complementary and compensatory policies.

Compensatory policies could take the forms of: lump sum budget transfers, retraining, relocation assistance, temporary income support, assistance for loss jobs with redundancy payments, targeted safety nets, if trade liberalization causes poverty among certain groups. **Complementary policies** could include: improvement of utilities and infrastructure support, better market institutions, improved credit markets, better labor markets and labor mobility, simplified requirement for business establishment, improved information to all stakeholders and clarification of expectations. **Accompanying policies** could include careful design and implementation of trade liberalization, taking into lessons learned from the experience of successful exporting countries. These lessons include: consideration of gradual liberalization while gradually reforming existing institutions and reorienting them to serve modernization; announcing liberalization in advance and provide firms with time to adjust; avoiding policy reversals by ensuring credibility of reforms, and minimizing negative impact on people, as people matter in reforms; considering careful experimentation, first going through a process of trial and error on a small scale, and move elsewhere only when they are shown to work; fostering national consensus on modernization and ensuring overall political and macroeconomic stability in which to pursue wide-ranging domestic reforms; Correct sequencing and priorities starting with easy reforms first, and difficult ones second, with the experiences gained in the first stage used for the next stage.

As conventional trade theories based on comparative advantage have proved unable to explain the causes of trade and key trends such as intra-industry, developing countries' trade and underdevelopment), new theories taking into account various considerations (e.g. increasing returns, externalities and economies of scale, demand and tastes, product cycles) have emerged to better explain technology intensive trade and ITT, than the traditional comparative advantage theory. Based on a Ricardian model with a continuum of goods, **R. Dornbusch, D. Fischer, and P.A. Samuelson (1977)** predict that countries diversify their exports (i.e. expand the range of their tradable) as they increase trade. They determine the competitive margin in production between imported and exported goods, and show how tariffs and transport costs establish a range of commodities that are not traded. **Acemoglu, D and Zilibotti (1997)** show that at early stages of development, the presence of indivisible projects limits the degree of diversification, and that development goes hand in hand with expansion of markets, and with better diversification. They stress that better diversification opportunities enable a gradual allocation of resources to their most productive uses and reduce the variability of growth. **Koren, M. and**

Tenreyro, S. (2004) show that because the productive structure of a country tends to be volatile when the country specializes in highly volatile sectors or has high concentration, and specializes in sectors highly affected by country-specific fluctuations; as countries develop, their productive structures moves from more volatile to less volatile sectors, and country specific fluctuations tend to fall with development**.** There is also growing interest in the role of extensive and intensive margins in export growth. **Besedes and Prusa (2006**) investigate and compare countries based on their extensive and intensive margins in export growth, and conclude that the key factor to achieving higher aggregate export growth are longer relationships at the firm level. The extensive margin refers to the breadth of international trade capturing the number of trade partners a country has. The intensive margin refers to the depth of international trade capturing the value of trade. Based on a dynamic industry model with heterogenous firms, **Melitz (2002)** shows why international trade leads to reallocation of resources among firms, with exposure to trade inducing the more productive firms to enter export markets, while some other less productive firms continue to produce only for the domestic market. **Other key trade** theories explaining exports include: Samuelson's specific factors model (multiple factors with mobile labor), Linder's theorem based on demand and tastes; Vernon's product cycles model with phase of innovation, production, exports; technology based trade theories; role of externalities, and economies of scale trade models.

Despite the proliferation of trade theories, not a single trade model provides a complete explanation of the causes of trade and specialization.

(ii) Portfolio theory. The concept of diversification gained importance with the modern theory of portfolio management developed by Nobel price winner Professor **Harry Markowitz**. Based on the common adage that "Don't put all your eggs in the same basket" and inspired by modern portfolio selection theory, diversification has come to be regarded as a means of reducing a country's dependence on a particular product or a very restricted range of primary products generally exported before processing. Many developing countries with low economic growth and relying heavily on a handful of commodities for trade, income and employment would benefit from diversifying their economies by selecting export portfolios that optimize market risks against anticipated returns. The portfolio theory can be used to quantify diversification benefits for a country **(Love, J. (1979).** Based on the portfolio theory approach, **Eric Strobl (2002)** finds considerable welfare gains from moving towards a more "optimal" export structure on the mean-variance efficient frontier.

(iii) Economic geography. The divergent export performance of East Asian countries since the 1970s (800% growth of exports versus only 70% for Africa) has raised concerns that while some countries are benefiting from

globalization, others are at best passed by. Are certain countries excluded from major markets by virtue of their geography, their commodity specialization, or because of discriminatory practices? The economic geography approach contends that export performance is influenced in a number of ways through external geography [country location, proximity to rapidly expanding export markets; and internal supply capacity]. The determinants of each country's internal supply capacity are internal geography (such as access to ports), and business environment (institutions quality) (**Redding S. and Venables A. (2003**)).

(iv) Self discovery. Recent economic literature has linked export diversification to the process of "self discovery" or innovation which implies the discovery of new export products by firms/farms or the Government; emphasizing the role of externalities related to the process of discovering new exports **(Hausmann and Rodrik (2002)**; Klinger and **Lederman (2005))** or those associated with coordination failures in taking the necessary steps to increase sector-wide productivity **(Rodriguez-Clare, 2005)**. It appears from self discovery literature that export diversification can be shaped by Government policies, and that an appropriate mix of microeconomic interventions in specifically addressing the market failures is important in the development process at different levels of development.

SECTION 3: Empirical Correlates

There are many reasons to believe that export diversification, export growth, and overall growth may be linked.

Relationships between Export Diversification and overall Growth: The quantitative assessment of the relationship between export diversification and growth can be done in two stages. ***In the first stage,*** the linkages between exports diversification (horizontal and vertical) and export growth, can be identified using traditional simple econometric regression models. ***In the second stage***, the long run impact of export growth on the country' s real growth can be assessed using recent econometric models (Granger standard causality test) for testing long-run relationships and the direction of causality between export growth and overall growth . Focusing on Bangladesh, Myanmar, and Nepal, and Malaysia, and using long term data (1973-2001), the **ESCAP (2004)** used this approach to establish that: (i) in Malaysia both vertical and horizontal diversification variables have a statistically significant impact on total export; and in Bangladesh and Nepal, only vertical diversification variable has a statistically significant impact on total exports, while in Myanmar, neither vertical nor horizontal export diversification produced any statistically significant impact on total export

growth; and (ii) there was a causality from export growth to real economic growth for all four countries.

In recent years, the links between aggregate exports and growth has been examined by many analysts and continue to be very controversial. Although it has been difficult to empirically isolate the effects of trade liberalization on economic growth, the prevailing view in the literature is that, there is a positive and strong relationship between Trade openness and growth **(Dollar, 1992, Sachs-Warner, 1995, Edwards 1998)**, and empirical work (cross country, panel regression) over the last 15 years concludes that openness to trade is a significant explanatory variable for the level or growth rate of real GDP per capita.(e.g. China, India). There is also evidence of absolute convergence (i.e. poor regions tend to grow faster than rich regions if they are sufficiently integrated with each others i.e. open to trade) **(Barro &Sala-i-Martin,1995; Ben-David,1993**). The view of a strong correlation between trade liberalization (export growth) and overall growth performance has been questioned by authors such as **Rodriguez and Rodrik (2001); and Slaughter (2001)** who argue with justification that empirical links between trade and growth are weak for several reasons including: use of **s**imple linear regression models can not capture complex growth process, measurement of openness are flawed and measurement of other variables difficult, particularly across countries, and when endogenous, causality versus correlation question, deep co linearity with trade policy and outcomes highly correlated with other determinants of growth, difficulty to dissociate trade from other policies (macro, FDI, liberal domestic market rule of law etc..). Although the existence of an unambiguous relationship between trade and openness has been questioned in recent years, with empirical evidence of a link between export and growth receiving rough treatment by **Rodriguez and Rodrik (2001)**, they do not argue that trade liberalization is harmful to growth, and recognize that no country has developed successfully by turning its back on international trade, and no country has developed over long periods without experiencing an increase in their exports.

Earlier theoretical literature started with development models based on industrialization and implied a link between export diversification and growth/development **(Roseinstein Rodam(1943), Presbish (1950), and Singer (1950)).** From this earlier literature, it appears that because export instability entails substantial costs including unstable demand and more risky investments, sustained economic growth requires a shift from dependence on a limited number of export products towards a diversified export portfolio; and infant industries encouraged by protection would increase diversification. Externalities associated with export diversification, spillover effects, acquisition of new organizational and entrepreneurial skills, learning by doing associated with

exports provide opportunities to develop better ways of production, and can help countries with diverse structures grow rapidly.

Most Recent economic literature provides prediction of a link between export diversification, export growth, and overall growth. Recent models highlighting a link between export diversification and growth include **Vernon (1966)**, **Krugman (1979**), **Grossman and Helpman (1991)**, **Piñeres & Ferrantino (1997)**. The relationships between export growth, export diversification, country growth and world growth was tested on a few countries using disaggregate (**Piñeres & Ferrantino (1997)**, for Chile and 1999 for Columbia, using data over 30 years). Using different measures of export diversification, on a cross country sample of 91 countries using data for the 1961-88 period, **Fahim Al-Marhubi (1998)** presents empirical evidence that export diversification promotes economic growth. In sum, a cursory analysis of data where GDP and exports grew simultaneously indicates that successful countries have significantly diversified their exports towards manufacturing products.

Annex A

EXPORT DIVERSIFICATION MEASURES

In the literature, there are various ways to measure export diversification. The most commonly used measure of diversification is the Concentration Ratio (product or geographic concentration). Other measures frequently used are: the Commodity-Specific Cumulative Export Experience Function (CSCEEF), the Absolute Deviation of the Country Commodity Shares, the Commodity Specific Traditionalist Index

The Concentration Ratio. Several measures have been developed to estimate concentration ratios (Attaran, M and Zwick, M, 1987; ECA, 2006). These include: the Hirschman index, the Ogive index, the entropy index, the Herfindahl index, the Aggregate Specialization Index. These measures are conceptually quite similar, and their approaches, which compare actual distributions to a hypothetical uniform distribution, have been proven to provide quite comparable ranking.

The Hirschman Index is the most widely used measure of trade and commodity concentration. It is the index that would result if a country's export receipts were divided evenly among different commodities. It may be written as follows:

$$H1 = \sqrt{\sum_{i=1}^{N} \left[\frac{xi}{X} \right]^2}$$

Where xi is the export value of a specific commodity i, X the country's total export. A higher H1 indicates greater concentration of exports on a few commodities.

The Ogive (OGV) index measures the deviation from an equal distribution of export shares among commodities.

The index may be expressed as follows:

$$OGV = N\sum_{i=1}^{N}\left(Pi - 1/N\right)^2$$

Where Pi =(xi/Xi) is the actual share of the ith commodity (xi) in total exports ($X=\sum xi$), N is the total number of export commodities in the export portfolio and 1/N is assumed to be the " ideal " share of export earnings for each commodity.

When the OGV index approaches 0, it means the economy is highly diversified. A larger OGV index indicates less diversification**.**

The Entropy (ENT) Index traditionally used in sciences, communication, business, finances, and economics represent the diversity or spread of a distribution, and indicates extreme specialization or concentration in one commodity.

The index is expressed as follows

$$ENT = \sum_{i=1}^{N}\left(Pi \log_2(1/Pi)\right)$$

Where N and P are defined as previously. The maximum is attained when all Pi are equal.

The Herfindahl index, commonly used for measuring industrial concentration is a method of summarizing the degree to which an industry is oligopolistic and the concentration of market control held by the largest firm in the industry. The formula used is the following:

$$H2 = \sum_{i=1}^{N}\left(Si^2\right)$$

Where Si is the market share of the ith. firm. The Herfindahl index is quite similar to the Hirschman index except for the square root, and is sometimes referred in some modified forms as the Hl index.

The Aggregate Specialization Index is a modified version of the Herfindahl index of industrial concentration, and can be expressed as follows:

$$\textbf{SPE=} \sum_{i=1}^{N}\left(\frac{xi}{X}\right)^2$$

Where xi is the export of commodity i, and X the country's total exports, and N the number of export commodities. A value of SPE approaching 0 indicates a high degree of export diversification. A value approaching 1 implies a high degree of specialization.

The Commodity-Specific Cumulative Export Experience Function (CSCEEF) provides an indication of structural changes or the traditionality of specific exports for a given industry. The CSCEEF has properties analogous to a cumulative distribution function, as it may take a very small value in the initial period and subsequently rise in subsequent periods. The CSCEEF for each commodity can be obtained by the following formula:

$$\text{CSCEEFi},\tau = \frac{\sum_{=t=to}^{t} xit}{\sum_{t=to}^{T} xi}$$

Where xit is the value of export of commodity i in year t, expressed in constant prices, t0, τ and T represent the initial , current, and terminal periods of the sample (see Gutierrez de Pineres and Ferrantini 1997, and ESCAP). On the plots, and for a more traditional commodity, one would expect to see the plot shifted to the left, whereas for a non-traditional commodity, one would expect to see the plot shifted more towards the right.

The Commodity Specific Traditionality Index (CSTI), is an alternative way of ranking exports by the traditionality attribute. It is obtained by computing the mean of the cumulative export experience index for each ith. Commodity for the entire sample. The formula is the following:

$$\text{CSTIi} = \frac{\sum_{t=to}^{T} CSCEEFi}{T - to + 1}$$

A higher value of the CSTI indicates a more traditional commodity.

The Variance of the CSTI provides on a sample period, the variance of the CSTI using the following formula:

$$\text{VCSTIi}= \frac{\sum_{t=to}^{T}\left(Ti-\overline{Ti}\right)}{T-to+1}$$

Where $\overline{Ti}$ is the mean value of CSTI on the period. A low value of VCSTI implies the composition of traditionality for a specific commodity has been stable over the sample period.

The Absolute deviation of the country commodity shares, which is widely used by UNCTAD measures the extent of the difference between the structures of trade of a particular country and the world average. It can be obtained from the following formula:

$$\text{Sj} = \frac{\sum_{i}|hij|-|hi|}{2}$$

Where hij is the share of commodity i in total exports of a country j, and hi is the share of commodity i in the world exports. The value of this index ranges from 0 [less diversified exports]to 1 [more diversified exports].

The Export Similarity Index, mainly in the comparison of countries pattern of export specialization provides useful information on distinctive export patterns from country to country. It can be written as follows:

XS(j,k)= $\sum$ [min(Xij, Xik)*100]

Where Xij and Xik are industry I' s export shares in country j's and country k's exports, usually including a group of competitor countries. The index varies between zero and 100, with zero indicating complete dissimilarity, and 100 full similarity.

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