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The Industry oriented Asian Tigers and the Natural Resource based Pacific Alliance Economic Growth Models

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THE INDUSTRY ORIENTED “ASIAN TIGERS” AND THE NATURAL RESOURCE BASED “PACIFIC ALLIANCE” ECONOMIC GROWTH MODELS

HERNAN RICARDO BRICEÑO AVALOS

Abstract:

The aim of this thesis has been to provide “Pacific Alliance” of Latin America with a bundle of recommendations to make a successful economic integration with “Asian Pacific” region. It seems that following the Comparative Advantage theory developed by David Ricardo (1772-1823), under the incipient technological progress has damaged some developing economies, to such an extent that their specialization on exploiting and exporting raw materials are condemned them to live in a *vicious circle*. This is a compelling situation between getting high rents from natural resource exports, low investment in Research & Development to innovation, reaching also poor Human Development Indexes (“*The Curse of Natural Resources*”). On the other hand, there is a *virtuous circle* between manufacture exports by developing high-tech industries, high investment in Research & Development to innovate, reaching also high Human Development Indexes; such as Asian Tigers in the last decades (“*Learning by Exporting*”).

These *two central hypotheses* have been testing under cross section econometric assessment, including more than one hundred countries for the three last decades (1981-2010). There are evidences to fulfilling both. The exports of Ores and Metals and other raw material oriented goods have negative impacts, while manufacture exports positive impact on the economic growth. Similarly, service exports have led the economic growth in the last decades due to Technology & Communication and International Commercial activities are increasing faster. They are significant and robust explanatory variables. Therefore, governments from raw material export oriented countries, like “Pacific Alliance”, should take into account Pragmatic Innovation Agenda and Technology Policies to get better sustainable living conditions. Otherwise, they will still suffering from the volatility of commodities demand and prices, low Research & Development investment, poor Human Development Index and social conflicts.

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THE INDUSTRY ORIENTED “ASIAN TIGERS” AND THE NATURAL RESOURCE BASED “PACIFIC ALLIANCE” ECONOMIC GROWTH MODELS

I.- INTRODUCTION

In the last decades, most of the developing countries and policymakers have focused their attention on the Southeast Asian socioeconomic progress, especially on the so-called “Asian Tigers”, based on their industrialization export oriented economic growth model. This Asian experience has been the focal attention of many theoretic and applied academic economists around the world, originating an important part of the endogenous economic growth theory. Therefore, this thesis will empirically and theoretically assess and compare the different factors that have been leading towards quick economic development of the Southeast Asian region; on the other hand, the less economic progress of the “Pacific Alliance” from Latin America. This assessment will be not only descriptive, but also quantitative.

There are different socioeconomic factors that can explain the development of Asian Tigers (South Korea, Hong Kong, Singapore and Taiwan) in the last decades, especially the quality of their educational system or human capital development, their rate of schooling, the economic openness, Foreign Direct Investment, process of industrialization and innovation and the active participation of their central governments. These factors in the long run are related with the diversification of high technological manufactured goods that are producing and exporting by a country, their socioeconomic development and the high quality and standards of life. Besides, it seems that in this Southeast Asian region have existed additional factors like geopolitics that can help us understand also this fast progress (Krugman, 1994), but this document will not take them into account.

The thesis’s aims is to explain how the industrial exports oriented economic growth model of Asian Tigers has been the main factor that explains their sustainable economic growth rates and Human Development Indexes in the last decades. In this way, they are different from Latin American countries (Chile, Peru and Colombia) which adopted the economic opening and trade liberalization models in the previous decades based on natural resources exports; as a result, they have basically reached considerable economic growth rates

in the last two decades. It is also fair to point out that in this thesis Latin America will be related basically with Mexico, Colombia, Peru and Chile, they have conformed the “Pacific Alliance” since June, 2012. After reaching macroeconomic stability by the end of 1980s or in the 1990s, they have been very dynamic reaching high economic growth rates. In accordance with the World Bank (2011) classification, they are considered upper middle (Peru, Mexico and Colombia) and high (Chile) income countries.

Undoubtedly, this research is very important for Pacific Alliance that currently intends to increase its economy links with East Asian countries. The author of this research thesis has studied (in-situ) previously not only the successful international development and public policies of Asian Tigers that allowed them to “catching up” socioeconomic indicators of traditional industrialized western countries, but also in Latin America. In this regard the thesis provides us with a thoroughly comparison assessment between the two regions. Additionally, it includes recommendation policies that Pacific Alliance should adopt with the aim to obtain sustainable economic growth based on the new Economy of Knowledge, Innovation and Research & Development, with the aims to get better quality of education and high Human Development Indexes in the next years. The basic Pragmatic Innovation Agenda contains the industrial policies that should be considered the *leader*, and other policies that should be considered such as *followers*, in accordance with the Theory of Game definitions.

Apart from the central research question that this thesis deals with, answering how the production and exports of manufacturing goods can be considered the main factors that led Asian Tigers to get high levels of per capita income and Human Development Indexes (“Learning by Exporting”). On the other hand, the natural resources export based economic growth models of Latin American countries that have led them still living with high poverty rates; in which they are trapped (“The Curse of Natural Resources”). Moreover, this thesis academically assesses whether it exists any possibility that the industrialization oriented export model adopted by Asian Tigers around sixty years ago, to be adopted pragmatically by Latin American countries, with the aim to reach socioeconomic development status quicker and fight better against poverty rates.

Other secondary related research questions can be expressed as: (i) How the opening oriented policies have influenced the economic growth of Asian Tigers and Latin American

countries in the last half century, after collapsing the Import Substitution Industrialization policies?, (ii) How have the industrial export goods been developing and leading to high rates of per capita income and development in East Asia?, (iii) Is there any significant and direct association between manufacture based exports with economy growth in countries that have opened their economies?, (iv) Are there any other public policies that have led East Asia to improve socioeconomic and development indexes regarding Latin America? (v) What has been the role of education and/or human capital development policies in East Asian countries to spurring the economic development, in contrast to Latin American countries?

It is not only important approaching the research question descriptively and/or qualitatively, to answer what has been happening in these different geographical regions and what variables have been influencing their performances, but also it is important to determine quantitatively the association and effects of the productive and export structures on their economic growth rates. In this regard, the thesis is finding the correlations, elasticities and size effects of the manufacture and raw material exports on the average economic growth rate, using econometric techniques as cross section estimation, including annual data for the three last decades (1981-2010) of the countries. This period is related with the changes of policymaker's vision, from government intervention (with ISI policies) toward less intervention (neoclassical). Indeed, these findings are supported and explained by some endogenous economic growth theories and previous empirical assessment from other authors.

The econometric technique for the empirical assessment that the thesis considers is the same utilized by most of the researchers, "cross section analysis (across entities)", that can provide us with an interesting approach of the variables that explain the economic growth process in a fixed point, not over time. However, this kind of technique can bring us some difficulties problems that this thesis will deal with appropriate corrections. This empirical assessment is based on the World Development Indicators (World Bank, 2013), because this multilateral institution has been publishing reliable statistics that most of the empirical economist researchers have also been using.

Technically speaking, a high economy growth rate or huge per capita Gross Domestic Product (GDP) are pro-poor sources for poverty reduction (Kraay, 2004), as well as indicators of increasing social wellbeing. Therefore, the thesis uses the first as a dependent variable to

assessing how it has been progressing around the world in the last three decades (annual average economic growth rate between 1981 and 2010), and also what are the fundamental economy factors that explain it. Furthermore, it is important to mention that, in spite of having some problems the per capita GDP as an indicator of wellbeing, it remains a rough and ready measure of the living standards (Weil, 2012).

As explanatory variables the thesis will statistically assess the production structure of the economies, considering the industry, manufacture, non-manufacture, primary agriculture, and service value added sectors. Furthermore, the export structure to test the “Learning by Exporting” hypothesis, using basically the manufacture and service exports to understand the successful performance of Asian Tigers. Other variables that are used on the right side of the econometric cross section model are the raw material exports, ores and metals and agriculture, to test the “Curse of Natural Resources” hypothesis, which has led to poor innovation, science and technological progress in Latin America. Furthermore, the regressions consider other fundamental explanatory variables to avoid omitted variable problems, such as Government Consumption, Gross Capital Formation and Human Capital (Schooling).

This thesis is organized in different sections. The next (section II) assesses the previous theoretic and empirical related literature, emphasizing the endogenous economic growth and technological progress theories. The third section describes the economic ISI model and the transition toward trade liberalization policies adopted by Latin American countries in the last half of the twenty century. The following section (IV) describes the industrial and developmental export oriented policies adopted by Asian Tigers in the last decades in the same period, which in turn allow them to improve notoriously their living conditions. The fifth section explains the quantitative and econometric assessment in order to determine which kind of produced and exported commodities have been influencing positively or negatively the economic growth process. The last section (VI) includes conclusions and sustainable policy recommendations for Latin American countries that are willing to correct their current economic growth models based on raw material exports. It is worth adopting innovation and technological policies based on Asian Tiger’s experiences with the aim to obtain a sustainable economic development in the next years.

II.- LITERATURE REVIEW

There are different theoretic and empirical working papers of economy researchers from renowned academic institutions that have been testing the factors that have bolstered the economic growth, poverty reduction and social development in the world. Some of them are human capital, including education, schooling and accumulated experiences, industrialization and innovation, technological progress and their diffusion, Research & Development activities, international spillovers knowledge, Learning by Doing and Learning by Exporting. On the other hand, some authors have focused on specific macroeconomic fundamental issues such as government expending, trade and financial liberalization, development and deepened on the domestic financial market, economic and trade openness, suitable Exchange Rate (Loayza and Soto, 2002). In this regard, it is important to take into account these theories and previous empirical academic researches presented in this section, especially with the aim to know how industrialization process, the manufacturing and high-tech oriented industrial goods production and their exports, have generated better human development conditions in the East Asian countries in the last decades.

For instance, one of the economic growth oriented factors studied by Barro and Sala-i-Martin (2004) is the economic OPENNESS indicator measured simply in gross terms of Exports (X) plus Imports (M) of goods and services, divided by the Gross Domestic Product (GDP), for whom this indicator is not statistical significant for the period 1960-2000. Meanwhile, other authors confirm that there is a positive correlation between this indicator with the economic growth for the period 1970 – 1990; but sensitive to the proxy variable used for openness in accordance with Vamvakidis (2002). This is why it is very important to consider the decomposition of this index $\{(X+M)/GDP\}$, not only the exports section but also the imports of goods and services. For example, selling abroad raw materials by developing countries of the “Pacific Alliance” (Latin America) is very different than export manufacture industrial products, as in the case of most Western developed and East Asian countries. Indeed, the high-tech oriented industrial products of these countries also contain more investment on Innovation, Research & Development and scientific knowledge.

In an open economy that produces and exports international competing goods and services, the local producers are learning the preferences of international clients, their

requirements and restrictions, their technological progress, in accordance with the “Learning by Exporting” hypothesis. Under this economic theory some authors pointed out that selling abroad allows local producers to enhance their productivity. Furthermore, the productivity of exporters can increase quicker than the productivity of no exporters (Saxa, 2008). Additionally, the local producers can gain economies of scale by producing more manufactures, not only for domestic, but also for international markets, reducing unit costs of production; especially, in the current context of more Free Trade Agreements that developing countries have been signing. Broad development is generally accompanied by bundles of new technologies, higher rates of schooling and new abilities (Levin and Jellema, 2007).

In this regard, according with Ito (2011) starting export activities does not only contributes to firms’ growth in terms of sales and employment as well as their development of innovative capabilities, gains of productivity and Research & Development activities. Furthermore, this author finds differences in exporting goods toward different geographic markets such as North America, Europe or Asia. For instance, exporting toward the first two regions are more demanding/challenging in terms of Research & Development and capital intensity products than exports to Asia; consequently, potentially innovative non exporters can be supported through export oriented promotion policies¹.

In the case of Chirinos (2006), who tested the “Learning by exporting” hypothesis using the per capita export (x) and imports (m) separately for the second half of the last century (period 1950-2000), both have positive and significant impact on the annual average rate of per capita income growth in different models. Moreover, the per capita service exports was considered also in his paper as a proxy variable of the “Learning by Exporting” hypothesis, having higher impact regarding the other both explanatory variables (x,m); almost three times the impact of good exports (x). These results are very different from Barro (2004) who considered simply the gross openness indicator $\{(X+M)/GDP\}$ as explanatory variable. The positive impact of the per capita exports and imports in the estimations of Chirinos, have been supporting by other authors like Alcalá and Siccone (2003), who found that trade and domestic markets are robust determinants of economic growth (period 1960-1996).

¹ This implication said that “Learning by exporting” hypothesis effects in accordance with the target market.

Beyond any reasonable doubt, in an open economy domestic clients can learn from the quality and characteristics of the import goods and services, and compare them with their similars domestically produced; also people can have access to a new bundle of goods from abroad. Therefore, local producers should be more competitive and efficient with the aim of not to lose local customers and reduce their profits. Indeed, imports of capital goods (K) like machinery is very important and beneficial for developing economies to improve their technological domestic procedures. At the same time domestic industries need especial inputs that most of the time they are not produced internally in developing countries, they are needed to be imported; which in turn will bolster the gains of efficiency. For all these reasons, we can obtain wrong predictions if we use a simple gross or broad economic/trade openness indicator $\{(X+M)/GDP\}$ as one of the explanatory variable in the process of economy growth.

Industrialization and innovation lead a country to improve its education quality at different levels, because of the fact that high quality oriented education and technology research are important to develop different high-tech oriented export goods domestically. At the same time, the process of industrialization requires people with a broad basic education and professionals with high level of training and specializations. This is exactly what was registering in East Asia, where the levels and quality of education have been increasing faster than Latin America. Chile, Colombia, Mexico and Peru remain very low in R&D performance, as they have been poorly concentrating in these activities in accordance with Fagerberg and Godinho (2004). For both authors most of the Asian New Industrialized Countries (NIC's) catching up in technology, have promoted high education in engineering and natural sciences by increasing resources on Innovation and Research & Development (R&D); while Latin American countries have failed to invest sufficiently in formalized skills and technological capabilities².

Education has been a critical factor to realizing the changes in the Taiwanese sectorial structure and other Asian NICs, rising human capital can be viewed simply as an increasing in the quality or effectiveness of labor, adding a third factor to the conventional production function; this has been explained by Nelson and Pack (1999). Both authors developed a special economic growth model to explain the occurrences in East Asia, the growth of human

² However, in spite of this progress some empirical studies have demonstrated that the technological gap between Asian NICs and Western traditional industrialized countries has not been vanishing so much.

capital is an enabling element, a high effectiveness of entrepreneurship resulting in a rapid growth of the intensive technological modern sector, which in turn causes a rapid increasing in the demand for more educated labor force. Indeed, this fact can be seen as a *virtuous circle*, in accordance with the “Learning by exporting” hypothesis, between educational and technological progresses due to manufacture goods and service exports, which has been explaining in some Peruvian newspapers (Briceño, 2013)³.

As explained by Hausman, Hwang and Rodrick (2005), the dynamic of a country depends on their production and export structures, the kind of good and/or service export is important to determine the economic growth and the quality of people’s life. The aforementioned authors built a productivity related index of the goods showing that some of them are associated with higher productivity levels regarding others, bolstering the specialization pattern, which in turn impacts on its socioeconomic development. In this vein, there are other authors such as Sachs and Warner (1995 & 2001) who also have focused on the “Curse of natural resource” hypothesis literature to help us understand why countries that are specialized in raw material exploitation and exports have poor performances and dark futures; including corruption (Den Berg, 2012). In this way the government has a positive role with the aim to redirect the structure of production and exports (Hausman, Hwang and Rodrick, 2005).

Besides, Romer (1994) assumed that new knowledge is the product of research technology; as well as the investment in knowledge suggests natural positive externalities because of the fact that knowledge creation generates positive externalities that affect other domestic firms in suitable ways. Furthermore, his key assumption is increasing rather than decreasing marginal productivity of the intangible capital good of “knowledge”. However, the investment in Research & Development (R&D) still being very low in Latin America, because these countries are not focusing on innovation and technological oriented export, as manufactures, but most of the time only on exploiting and exporting natural resources⁴; especially, minerals and energy. Consequently, they are not benefit of the *virtuoso circle* that the manufacturing and international commerce can provide us with; on the contrary, mining activities caused different social conflicts, environmental and labor related.

³ The Official Newspaper “El Peruano”, 11-02-2013. “La Primera”, 02-02-2013.

⁴ We can see on the communication means how Peru and Chile are fiercely competing by international investments on mining sector; as in cooper production, etc.

For instance, Krugman (1994) said that one of the factors that led the development of the New Industrialized Countries (NICs) in the East Asia was precisely the major technological diffusion toward this global geographic area; that at the same time implies that Western countries have been losing their traditional technology advantage. Let us not forget that technology nowadays can cross borders easier than in the past centuries, like capital flows, supported by the mass use of Internet and the globalization process increasing. In accordance with the Technology Progress Report of the World Bank (2008), technological progress plays a central role in spurring the income growth and reducing poverty rates. It explains more of the socioeconomic progress in the last centuries: “technological progress is what makes the difference between fast-growing developing economies and slow-growing ones”. The Report classifies Southeast Asian countries as those which have been experimenting faster economic growth based on technological development. On the other hand, we have Latin American countries as those which have slowly grown because of weak technology implementation⁵.

Additionally, for Levine & Jellema (2007), nations with tradition-based economies and little industrial development have low levels of per capita income and also poor education quality. This has been exactly the historical path of most of Latin American and African countries. In this way, arguably this thesis partially agrees with Zagha, Nankani and Gill (2006) when said that trade liberalization failed to produce positive economic benefits and poverty reduction in South America in the 1990s, because the appreciation of their Exchange Rates, which in turn has eroded export competitiveness, regarding some Asian countries (China and India). However, the other key issue is that Latin American countries⁶ have been exploiting and exporting raw materials⁷, not manufacture products⁸. Consequently, they did not get much socioeconomic benefits from the *virtuous circle* that brings innovation, high tech-products and industrialization, on the different Human Development Indexes.

⁵ The other group that has been slowly growing because of technology scarce is MENA Region, Middle East and North Africa countries (Technology & Development Report WB, 2008).

⁶ Especially, Chile, Peru and Colombia.

⁷ Like in the colonialism age; however, nowadays Mexico has maquiladora industry that has helped them to support its economic growth process in the last decades.

⁸ The participation of the traditional exports products in the total exports has been increasing in the last decades in South Pacific Latin American countries.

For the case of Peru Hausmann and Klinger (2008) found that its recovery in 2000s has bolstered by high capital-intensive exports as mining and energy outputs whose origins are Foreign Direct Investments (FDI). The benefits produced for these activities are limiting the Peruvian impact on national income, due to these benefits return their foreign owners later. Moreover, this kind of FDI did not cause high benefit in the employment generation in terms of quantity and quality. The authors have recommended the intervention of the government “public sector must act to encourage the development of new export activities that better utilize the human resources of the country, being important programs that stimulate investment in new tradable activities”. Indeed, these public policies are related with the production and exports of manufactures with high content of Research & Development.

Different from Latin American countries that have a lot and diversified natural resources, Asian Tigers do not have the same; however, these countries have been developing better based on industrialization and technology activities, even though its per capita GDP was lower than Peru, Colombia, Chile and Mexico in the 1960s. As Sachs and Warner (1995) pointed out, in the past decades the world’s stars performers have been the resource-poor New Industrialized Economies of East Asia, while many resource-rich economies such as the oil-rich countries Mexico, Nigeria and Venezuela have gone bankrupt. Industrialization and high-tech goods production allow and also requires developing of knowledge, innovation and technology. Let us not forget that the increasing of output per unit of inputs can be the result of better economy policies and management, but in the long run it is based on knowledge (Krugman, 1994).

The author Den Berg (2012) explained the case of Asian Tigers based on a technological change model, showing how these countries during the transition towards their new steady states (the long run) their saving rates were raised; therefore, their rates of growth were sharply higher. Undoubtedly, countries can get different steady states with different rates of technological accumulation and also better public policies as promotion of Innovation, Research & Development, stimulating creativity and promoting entrepreneurship activities (conditional convergence). However, for Verspagen (1991) there is a technologic pre-catching up phase where countries should build their intrinsic learning capability by trying to achieve better education and infrastructure, most of them under public investment; otherwise, with

very high backwardness economies cannot automatically assumed that technologic “catching up” will occur (falling behind).

Conversely Krugman’s (1994) predictions and comparison of Southeast Asian countries with former Soviet planned economies of the 1950s, this thesis attempts to demonstrate that there has been technological and efficiency gains in the NICs, based on Innovation, Research & Development investments to produce and export manufacturing products. This has been centrally and actively promoting by their governments, as well as stable and good market oriented public policies established for a large length of time, especially in South Korea, the biggest of the Asian Tigers⁹, and Taiwan, that allowed them to reduce partially the technological gap with Western countries; according with the Technological Progress Report of the World Bank (2008). This is not only a simple result from the movements of economic resources and rewarding compensation of the current consumption sacrifice (and increasing of the saving rates) toward future wellbeing, but also this is part of a well long run economic development strategy based on market principles, better organizations and institutions that allowed these Asian region gains efficiency.

It is also fair to point out that Asian Tigers were leading by better educated people regarding most of Latin American countries, they accounted for Western professional formations and also market oriented mentality; not socialist as in the Soviet economy of the 1960s. On the other hand, there were failing intentions to establish the socialist system in Chile (1970-73) and Peru (1968-1975) that ended in Populism policies (1985-1989), well described by Dornbusch and Edwards (1991). Finally, different from ex-Soviet economies, the per capita income rates and Total Factor Productivity of the Asian Tigers currently still increasing in spite of the international financial crisis adversities¹⁰, based on the adoption of the knowledge economy and innovation, science and technology policies. Indeed, their Research & Development investments have been increasing up to 3.50 per cent of the GDP. The next section reviews the evolution of the *Pacific Alliance* of Latin America in the second half of the last XX century.

⁹ Currently, South Korea is considered the third biggest Asian economy; after Japan and China.

¹⁰ For instance, the annual average growth rates of the real per capita GDP in the last 30 years are positive: Taiwan (8.5%), Korea (4.12%), Singapore (3.73%) and Hong Kong (2.71%).

III.- IMPORT-SUBSTITUTION-INDUSTRIALIZATION, POPULISM AND LIBERALIZATION POLICIES IN LATIN AMERICA

In the twenty century, most of Latin American countries introduced a new economic development model so-called Import-Substitution-Industrialization (1940 – 1950). It was leading by the United Nations Economic Commission for Latin America (ECLA) and Raul Prebisch, with the aim to reach the industrial development, high economic growth rates and escape from their colonial historical periphery status by “promoting their own agglomerating industrialization and completing the shift from the traditional (mining and agriculture sectors) to modern economic activities” (Den Berg, 2012). Some authors called this policy the “state led industrialization” (Ocampo, 1998). For Franko (2007) the goal of this policy was to create industries capable of producing substitutes for expensive import goods while simultaneously promoting industrial growth and the expansion of internal economies¹¹.

One of the central assumptions of the ISI model was that “as a consequence of the historical colonialism (path dependence forces), the current international markets led Latin American countries specialized on exploiting and exporting raw materials (the curse of natural resources) and import manufacture goods with technological content; consequently, condemned them to continued living on high poverty rates” (Prebich, 1940). Furthermore, most of these domestic markets were small in population and low per capita income; therefore, underdeveloped to be reliable mechanism to improve this situation only by themselves. In this way, Latin American governments should regulate local markets including foreign trade activities with commercial barriers: high tariffs, import quotes, licensing, devaluations, multiple and subsidized exchange rates, subsidized credits and special strategic investments to support infant industries¹². They led to close the commercial borders and prevent far from competing with international goods.

For instance, Brazilian government passed a “law of similar”, banned imports of similar goods as soon as domestic firms showed they were capable to produce and supply any

¹¹ These ideas were supported by Keynesian theories established after the world economic recession (1930-World War II); especially, in industrialized economies. In this time the external markets were constrained with poor Terms of Reference to support the development based on exports. The export value of Argentina, Brazil, Chile, Colombia and Mexico fallen about 50 per cent (Harper and Alfred, 1997).

¹² This argument for trade protection was detailed back in 1791 by Alexander Hamilton, the first U.S.A. Secretary of the Treasury, in his Report on Manufactures, which supported these policies with the aim to protect U.S.A. infant industry from British competition (cited op. Den Berg, 2012).

specific product in the domestic market (Den Berg, 2012). Moreover, this kind of thesis included the necessity of investing in public infrastructure and intermediate production industry, included steel and energy (ECLA, 1970), to promote industrial development. In most of the cases after implementing the ISI model, the industrial sectors performance were acceptable in the first years; especially, in the most populated markets with higher per capita GDP (Brazil, Mexico and Argentina). However, this intervention to such an extent created Populism in Latin America caused macroeconomic imbalances: Fiscal Deficit, hyperinflation and Deficit on the Current Account (Balance of Payments), along with subsidies to public enterprises to produce intermediary inputs¹³ triggered the compelling “Public Debt” financial crisis in 1980s.

The relative successful of the ISI model in Brazil, after its implementation in the military government (1964), supported by some developed countries, put attention not only in the promotion of industrialization exports, but also in the administrative organizational efficiency and income redistribution. Brazil, Argentina and Mexico reached better results by 1970s and even in 1980s, with higher PPP Gross National Income (GNI) per capita regarding other Latin American countries. The relative successful of Mexican industrialization was based on maquiladora activities. This performance was also supported by European and Asian migrants, especially toward Brazil and Argentina, including businessmen, professionals and technicians (Ocampo, 1998).

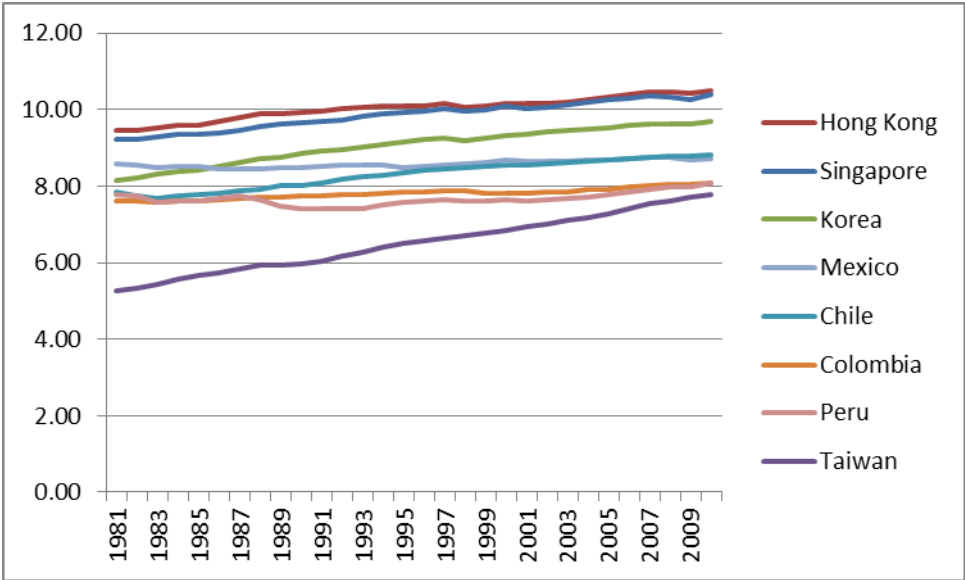
Brazil, Mexico and Argentina accounted for successful in the carmaker sector; they considered it as a vital industry to spur their economies because around it there are other related intermediary industries. Ford was the first Multinational Corporation that established an assembly plant in Argentina in 1916, in the follow years other firms were established in Brazil, Mexico and Chile (Franko, 2007). This sector was supported by the governments not only with policies against imports and local manufacturing content requirements, but also with public subsidies up to 1980s, when financial crisis forced to reduce the intervention and got rid of them. Indeed, in this period carmakers also were searching and finding other markets in developed countries because of the stagnation in the developing world.

One of the main short run results of this ISI model said that the average industrial

¹³ In steel, electrical energy, and telecommunication, state-owned firms were formed after private sector failure, in accordance with Franko (2007).

growth was reaching unprecedented rates between 1950s and mid-1970s, the annual rate of manufacturing growth in Latin America was 6,9 per cent, higher than European Economy Community (6.4 per cent), United States (4,8 per cent), Canada, Australia and New Zealand (5.4 per cent). In the case of Brazil the participation increase 7,7 per cent, Peru 7,8 per cent, Argentina 9 per cent. In Argentina, after 20 years that military government adopted the ISI model since 1955, the manufacturing GDP increased more than double, with particular dynamism in vehicles, basic metals, petroleum refining and electrical appliances; additionally, some social indicators improved (Ocampo, 2002).

Graph No 1: GDP per capita (constant 2000 US\$, in Log.)



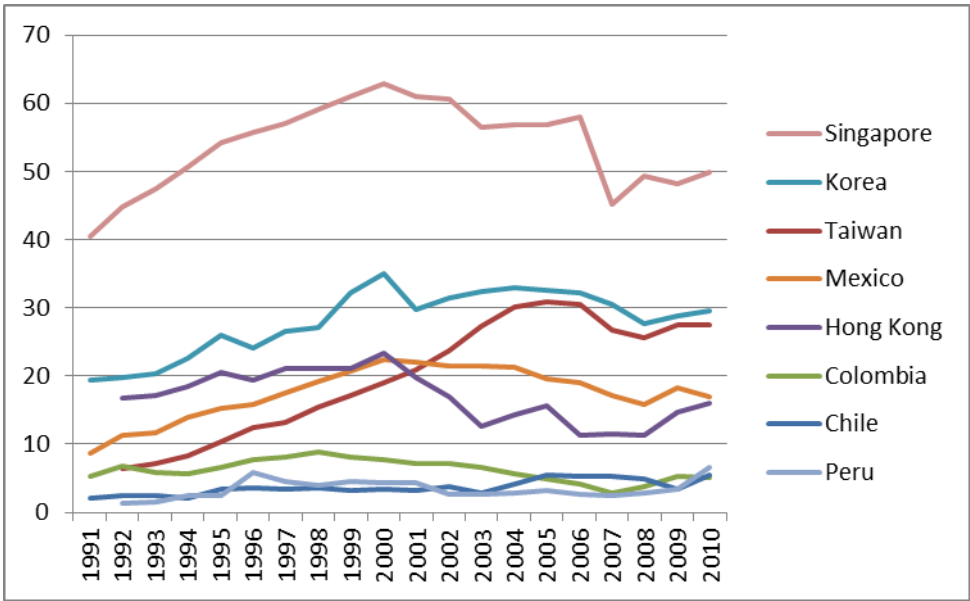
Source: World Development Indicators-World Bank

On the other hand, there was a failure in some Latin American countries (Ocampo, 1998), such as Peru, Chile, Colombia and other smaller. They ended up with less GDP per capita than Southeast Asian countries (Korea, Singapore and Hong Kong) in the 1980s (Graph No 1) and in a profound stagnation, increasing poverty rates. Elias (1992) showed that the Total Factor Productivity (TFP) is varied across countries and through the time; some registered positive rates, other negative. For instance, while Argentina, Brazil, Chile, Mexico and Peru accounted for positive TFP gains in the 1960s, starting ISI policies, they registered negative TFP gains in the 1980s, when abandoned the ISI model. Additionally, the

performances of the high-tech exports (as a share of manufactured exports) were better in Brazil, Mexico and Argentina than the aforementioned Latin American countries, but lower than Asian Tigers (Graph No 2).

In the case of Medium and Small Enterprises (MSE), they did not show active participation on export activities; however, they accounted for important participation on employing, total production and manufacturing activities. The export participation of the MSE (as a share of total exports) in Peru, Chile and Colombia historically has been very small, less than 5 per cent, respectively. This as a consequence of raw material oriented exports that are high capital intensive, needing big investments. There are other factors such as low labour productivity because poor quality of education, scarce competitiveness and high informality in the Latin American MSE. In the case of Mexico the share is higher based on maquiladora activities, about 20 per cent.

Graph No 2: High-technology export products (% Manufacture Export)



Source: World Development Indicators – World Bank

Similarly the quality of the basic education in these countries has been very poor, they have been intended adopting some education reforms, especially in the basic system; however, the results have not been good. Let us not forget that in Latin America the education is concentrating on literature courses, far from Science and Technology, to such an extent that

this region has been getting Nobel Prizes in Literature, but not in science and new technologies creation. Last but not least, the implementation of this ISI-model was partially supported with Foreign Investment, because most of the time this foreign funds have been destined to finance natural resources exploitation. Let shed some lights about the four Latin American countries that conform the “Pacific Alliance”, since the implementation of the ISI-model up to escaping, the histories are different.

3.1.- Chile

This small Latin American economy in 1939 established the Chilean Production Development Corporation¹⁴ (CORFO), with the aim to implement Import Substitution Industrialization policies, promote investment, innovation and new businesses. This institution has accounted for the former Chilean industrial growth (1940 - 1974). For instance, in the early 1960s the government decided promoting the automobiles sector by importing some components and encouraged producers to use domestic inputs, setting up the plant in Arica, north region (borders with Bolivia and Peru) with political and geopolitics aims, and also with the intention of creating employment. The needs to import kits of automobile and different auto-parts were along with the necessity to regulate the Foreign Exchange Market, with different official exchange rates to stimulate the local assembly industry. The unit cost of car in Chile was three times higher than in the USA, the volume of production was too small to gain scale economies, and to generate “learning by doing” and “spillover” effects in other related industries (Den Berg, 2012).

Later, the government of Allende (1970-1973) intended to establish the socialism system, ending up implemented populism policies with the aim to improve the national income redistribution in a short run¹⁵. In this period, the government was interested in growing the social property, some private enterprises were purchasing by the State while other only expropriated from their private owners, without economy compensation. In this way, the socialist government carried out the nationalization of cooper and other mining companies,

¹⁴ From the Spanish Corporación de Fomento de la Producción (CORFO), founded by President Aguirre Cerda.

¹⁵ It is also fair to point out that the former Chilean President Frei Montalvo (1964 - 1970) was concentrated in social issues: Agrarian and Education reforms, participation of wages in the GDP increased around 10 per cent during this period, schooling rates and social houses increased. Moreover, implemented progressive reform tax and introduced the wealth and property taxes.

intensification of the land reform process, the statization of private banks. By September 1973, CORFO controlled or had the most participation in 505 firms (Larrain, 1991). In this period subsidies toward public enterprises highly increased that along with the reduction of the tax revenue and hyperinflation accounted for a huge Fiscal Deficit.

After the socialization intention that left Chile in an economy disaster, under the neoliberal government of General Pinochet (1973-1988), the ISI model was partially abandoned, by the end of 1973 started a process of liberalization. Thus, inspired in Friedman theories and supported by “Chicago boys”, the government decided getting rid of different custom barriers and high tariffs that were adopted since the past decades in order to incentive the industrial development. Some enterprises were re-privatized and/or returned to their former owners, eliminated multiple especial Exchange Rates. The Real Exchange Rate suffered competitive periodical devaluations with the aim to promote exports up to 1982, when Chilean Central Bank established a Floating Band with sterilizations.

Between 1974 and 1981, the average import tariff fell down drastically from 105 to 10 per cent (Hachette, 2000), Chile abandoned the Andean commercial block (Pacto Andino), to allow them made their own commercial policies unilaterally, because this Regional Trade Agreement¹⁶ had been keeping other goal¹⁷, including high tariffs and other commercial barriers to protect against overseas goods, as a part of the ISI model. Later, since the 1970s Chile established some commercial multilateral compromises, while the bilateral negotiations (Free Trade Agreements) were kept at second level. It seems that this decision was thoughtfully important to implement its own international commerce policies.

In accordance with Hachette (2000) between 1982 and 1984, there was stagnation in the application of neoliberal and opening commercial and financial policies, because of starting the Financial Crisis in Latin American. In this period Chile suffered a compelling recession, high unemployment rates, huge Commercial Deficit, the Real Exchange Rate fell down roughly 50 per cent, and finally the Pinochet’s government decided to increase the average level of tariffs up to 35 per cent (Hachette, 2000). After finishing this compelling

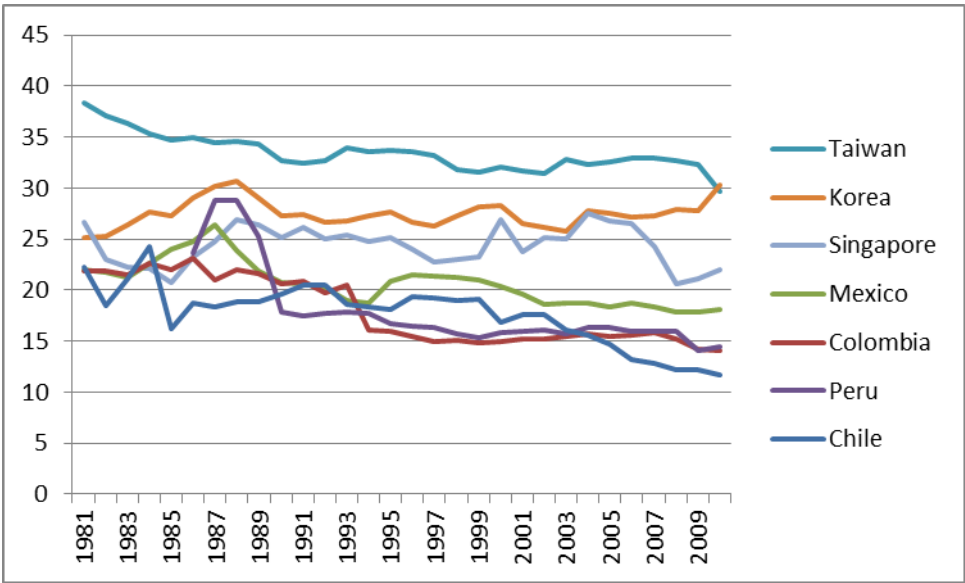
¹⁶ Integrated additionally by Bolivia, Colombia, Ecuador and Peru, which in 1969 signed an agreement, it is known also with the name of “Grupo Andino” or “Acuerdo de Cartagena” (in Spanish). After that, in February 1973, Venezuela joined; and finally, in October 1976, Chile dropped it, because of the fact that this country started its own unilateral commercial openness.

¹⁷ It is not wonder that later Peru in the 1990 years, partially also quit from this commercial block.

episode for Latin America, Chile followed its unilateral commercial opening by reducing tariffs at 15 per cent in 1989, the depreciation of the Real Exchange Rate to gain competitiveness and other measures that allowed exports quickly increased and unemployment went down.

Finally, it is also fair to point out that under Pinochet regimen CORFO was said did not function well; however, it was very active funding the development of new resource sector firms and innovation activities (1982 and 1985). It supported the forestry sector, fishing industry, fresh products and processed foods. Overall, when private sector failure, CORFO intervened with technology, financial, logistic and other supporting. In the last years this public agency still working with new and additional innovation aims, with suitable results.

Graph No 3: Manufacture, value added (% of GDP)



Source: World Development Indicators-World Bank

3.2.- Peru

In the case of Peru, under the military government of General Odria (1948-1956) on contrary the Import Substitution Industrialization model implemented by other Latin American countries, the economic policy changed the vision toward less state regulation/intervention. For the liberal military government these ISI policies searched

reducing imports and consumption that benefited few intermediaries (BCRP, 1948). Consequently, Peru changed the Exchange Rate control regimen, got rid of some commercial restrictions and re-established the complete commercial freedom. This government said that ISI policies damaged population with higher prices and black informal markets. These liberal policies were in the period 1948-1968, including the democratic government of president Belaunde (1965-68), who later was overthrown by a new military coup in 1968.

The new government of General Velasco (1968-1975) adopted not only ISI policies but also socialist-oriented with the aim to improve the income redistribution and help poor people, including land property redistribution and expropriations in the natural resources exploitation sector (oil and mining companies). Furthermore, with the aim to improve the Balance of Payments (BOP) it was prohibited the imports of not necessary goods and those that can be produced domestically in Peru, by implementing an additional 10 per cent tariff of the CIF value. To promote the export of no traditional goods the government exempted tariffs of inputs and intermediate goods to produce manufacture export goods; additionally, it was allowed to reinvest utilities under free of taxes. As a result, this year the CIF value of imports reduced 23 per cent respect to 1967, included consumption goods (BCRP, 1969).

After the adoption of ISI oriented policies, Peru reached better results in the Balance of Payments, increased their industrial exports and the Exchange Reserve of the Central Bank. For example, in 1970 and 1971 the real GDP increased 7.5 and 5.9 per cent, respectively, because of the reactivation of industrial sectors. Furthermore, GDP per capita and some social indicators improved. However, the imports of inputs and capital goods decreased 15.1 and 30.1 per cent, respectively. In the case of Central Bank International Exchange Reserves, the reduction was 12.9 per cent regarding the previous year. These controversial results showed compelling structural problems. Later, in 1975, appeared another military government with neoliberal policies, but the economic growth still based on natural resources exploitation.

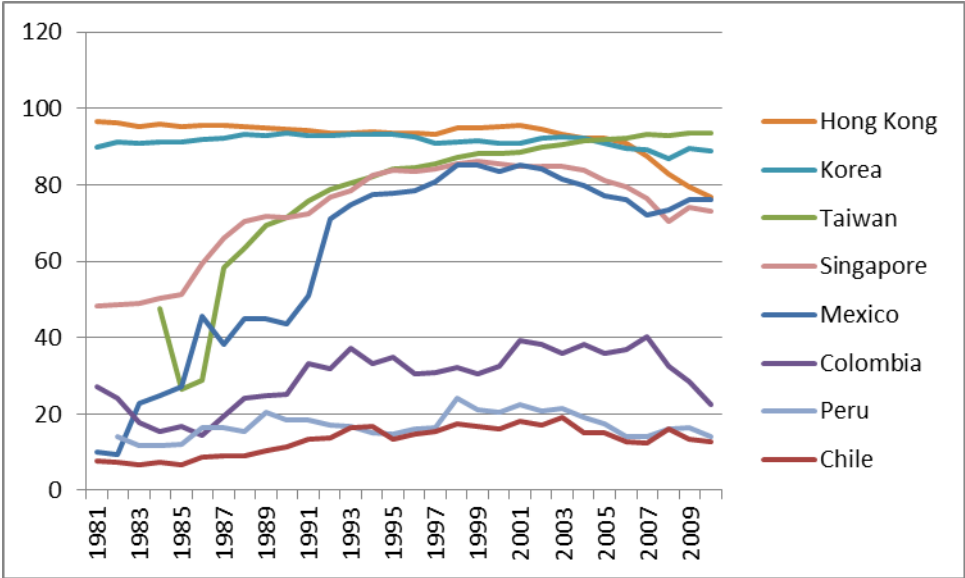
The negative consequences of the ISI failure still up 1980s, which in combination with the increasing of international interest rate (FED), Terms of Reference reduction, Balance of Payments crisis and adoption of populist policies in the first government of President Garcia (1985-1990), left Peru in an economy disaster: stagnation, hyperinflation, negative International Exchange Reserves in 1990. Then, the new government elected in 1990 got rid of all the ISI measures and changed toward neoliberal policies, under Washington Consensus

(Williamson, 2004). Peru abandoned industrialization policies and adopted orthodox measures, liberalizing their economy based on private investment (national and international); especially, to exploit and export natural resources, far from manufacturing industries.

3.3.- Colombia

Colombia is another case where the natural resources -agriculture, mining and energetic- exploitation and exports spurring economic growth; at the same time, the Terms of Reference (ToR) has accounted for their economy cycle. One of the successful commodities has been coffee, which supported its initial economic growth (Ocampo, 2000); later, in the last decades mining and energetic products. Colombia implemented the Import Substitution Industrialization model in the two first decades of the second part of the twenty century, relatively better than Peru and Chile; which explains the initial industrial export development of this country. This relative successful was supported by shortcuts production of other coffee exporters, its high price in international markets; furthermore, with more stable democratic political system and the absence of populism policies (Urrutia, 1991).

Graph No 4: Manufacture exports (% of merchandise exports)



Source: World Development Indicators-World Bank

The boom of some export products like coffee, oil and coal helped Colombia Central Bank to storage Foreign Exchange Reserves (1970s and 1980s), which in turn allowed dealt better against international financial crisis in the Lost Decade episode. They avoid default their External Debt services with foreign creditors in the 1980s, contrary the behaviour of the first two countries. At the same time, Colombia developed appropriate macroeconomic policies, far from populism, establishing an suitable Exchange Rate to gain competitiveness against redistributive purposes (Urrutia, 1991), and utilizing some commercial barriers (tariffs) with the aim to protect their local industry from adverse shocks and external competence, these kinds of policies included subsidies to bolster export activities.

In this way, the ISI policies in Colombia accounted for the increasing of manufacture production and the improving of living conditions in the first years of their implementation. However, this intervention, along with social problems such as drug traffic, crime groups, social conflicts, guerrillas (financed by drug dealers) with paramilitary group confrontations led Colombia loose efficiency and competitiveness. Later, the government of Uribe in the 1990s started the process of liberalization and other reforms to deal better against inflation and the Exchange Rate flotation (Reina and Zuluaga, 2012). But in the last decade its economic growth still based on natural resources exploitation and exports (mining, energetic and agriculture), enjoying their high international prices. Recently, Colombia has started innovation policies such as Chile and Uruguay to support the creation of new manufacture industries.

3.4.- Mexico

The Mexican economy history is almost similar the aforementioned Latin American countries in terms of adaptation and leaving from the Import Substitution Industrialization policies (1940 – 1970), supported by the increasing of the oil international price and other commodities, and also maquiladora activities. They showed relatively successful such as Brazil and Argentina. The tariff system was established to support industrial development, including different subsidies and especial Exchange Rates. Furthermore, they established especial public pro export institutions and organizations (Licona, 2011). The average economic growth rate of Mexico was higher after the ISI introduction, the industrial product

and employment growth at 6.7 and 4.7 per cent, respectively, between 1950s and 1970s. See the Graphs Nos 1, 2, 3 and 4.

The ISI led Mexico to change their productive structure, increasing the participation of industrial productivity, manufacture exports and the urban social sectors, because of maquiladora activities were established near the city to complete industrial final goods from its neighbour country (USA). See Graph No 4. Therefore, ISI policies worked partially, but also they accumulated inefficiencies to such an extent that the cost of the auto parts production was higher than in the USA, because lack of competitiveness and innovation introduction (Licona, 2011). Nowadays, Mexico remains being very dependent from USA and Canada, even though it has been signing different Free Trade Agreements with European and Asian countries. It is also fair to point out that the increasing participation of Mexican manufacture sector and the SMEs in export activities¹⁸ are higher than the participations in Peru, Chile and Colombia. SMEs participate not only directly in the export chain by producing some intermediate goods or inputs or providing services, but also in the related export activities.

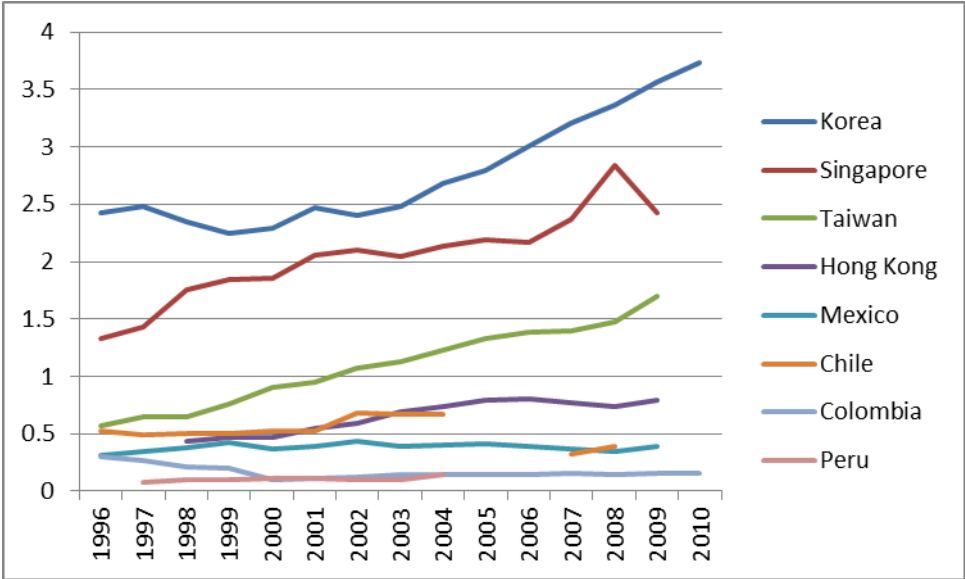
Some problems in its productive structure under ISI model made Mexico to accumulate different inefficiencies, later it was stricken by the Latin American financial crisis, turned into liberalization policies since the second part of 1980s, under Washington Consensus (Williamson, 1990). They accounted for devaluations/depreciations (high Exchange Rate), commercial and financial liberalizations, abolishing of ISI barriers to gain competitiveness, signing Free Trade Agreements (NAFTA) and promote Foreign Direct Investment, to diversify their export products and markets. In this way, Mexico became less dependent of primary products (oil and agriculture or vegetables). As pointed out by Gereffi and Martinez (2005), from being in the top ten primary product exporters in the 1980s, Mexico disappeared from this ranking in the 2000s, and turns into industrial exports.

Another partial positive result by finishing 1980s and starting 1990s was the high economy growth rate; however, the over economic liberalization process without suitable regulations on their financial market (Briceño, 2012), led Mexico toward financial crisis between 1994 and 1995, devaluated its domestic currency and increasing its Public Debt with international creditors as the International Monetary Fund; later growth back on track. In

¹⁸ More than 40 per cent of total SME are participating in export activities.

accordance with Licona (2012), in the last three decades the average economy growth rate has been poor to support net welfare gains of all Mexicans, less than 2.5 per cent, regarding the rate of 6 per cent in 1970s. In the 2000s, Mexico has surpassed the per capita GDP of some Latin American countries, as a result of market export oriented policies adopted in the 1980s, the well performance of the macroeconomic policies, but still lower than Asian Tigers (See Graph No 1).

Graph No 5: Research & Development Expenditure (% of GDP)



Source: World Development Indicators-World Bank

IV.- THE INDUSTRIALIZED EXPORT ORIENTED MODEL OF “ASIAN TIGERS”

The experience of Asian Tigers is different from Latin America. They have showed continuity in their policies, a long run socioeconomic development model, efficient institutions to promote exports, innovation and industrial policies, sustainable economic growth rates, concentration on strengthen their human resources by providing them with better educational quality, based on science and technology. In East Asia has existed a very close coordination between public sector and private enterprises as a part of a developmental state model; while the first was the benevolent social planner of the export and industrial

policies, the enterprises were the executors of the plan. All these public and economic policies are considered very important to spur their economic development in the last decades, reaching the status of advanced industrialized economies. South Korea, Taiwan, Singapore and Hong Kong are example of successful “Learning by Exporting”, “Human Capital” and “Competitive Advantages” theories that allow them develop innovative capabilities.

The adoption of industrialization and export promotion policies since the 1960s in the Asian countries were under implicit, flexible and adaptability Pragmatic Innovation Agendas, in accordance with their own available resources and constraints (World Bank, 2013). They did not only allow them reaching a high growth rate of the production and per capita income, but also “as time goes by” the participation of the salaries (for labour force) in the national income has increased. For instance, according with Korean official statistics, while by the end of the 1960s the participation of the salaries was only 30 per cent, leading by agriculture sector; since 1980s in the process of industrialization period, this participation had been reached 50 per cent of the national income. After that, since 2000s the participation of the salaries in the National Income has doubled and surpassed the 60 per cent¹⁹.

The behaviour of the salaries in the National Income is because businesses have been adopting modern technologies, new productive processes and/or starting manufacture export activities that allowed them gain efficiency and increase their labour productivity. In the case of Taiwan the history is almost similar; however, Kokko (2002) said that the scarcity of unskilled labour pressured on domestic wages to increase, “the new low-wage exporter countries competitors along with the international oil crisis undermined the Taiwanese export success around 1970s, the economic growth rate slowing down and the inflation rate rose”. In the case of Singapore, in order to avoid this bottleneck and other restrictions due to constrained labour market size, they allowed and promoted the participation of skilled foreign workers, like in Hong Kong, with more flexible labour regulation. Indeed, this especial China State resulted benefited from the massive migration-in from China mainland people since started its industrialization process.

It is also fair to point out that in general labour unions have not taken influence in the salary behaviour in these Asian countries. Undoubtedly, it has been the technological catching

¹⁹ “Korean Economy Lectures”. Hankuk University of Foreign Studies. Seoul. Spring semester, 2012.

up process that helped workers to increase their productivities and their salaries; this process includes the adaptation of technology from Western countries toward East Asian demand. In accordance with Fagerber (2004) the successful experience of Japan influenced positively in the innovation and catching up processes of Taiwan, Singapore and South Korea, reaching also Western countries. For Riedel (1973), Hong Kong represents one of the successful cases of industrialization and developmental policies. In the next subsections we can see the key factors that bolstered the success of these economies, such as education, manufacture exports and industrialization promotion policies. Lastly, the main changes of the Asian Developmental State model after Asian Financial Crisis 1997-98.

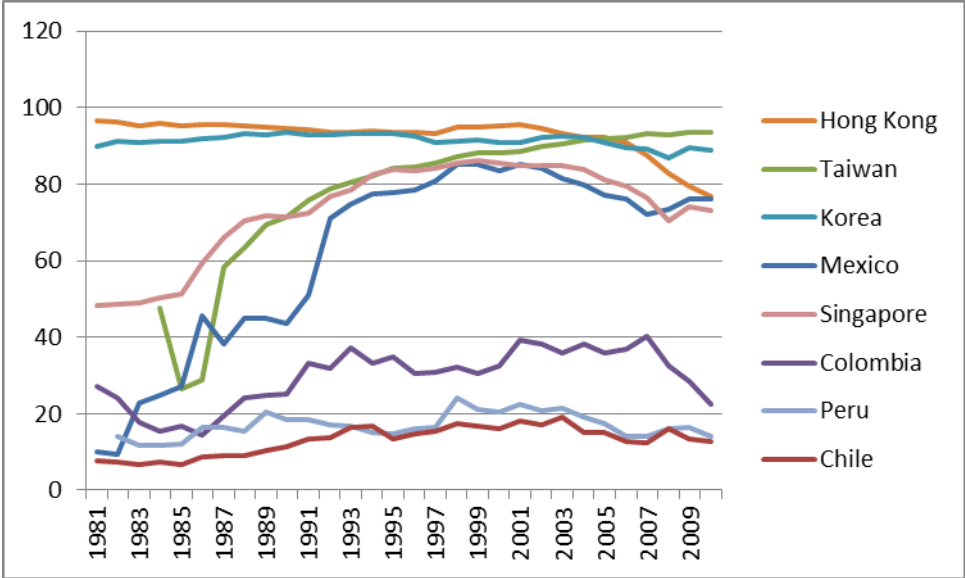
4.1.- The Education in the Asian Tigers

Education has been considering as the core factor that explains the development of Southeast Asian countries, it has been obligatory and universalized, modern, bilingual and westernized, the quality of education has been protruding. The basic education was conceptualized as the right way of producing human resources as an essential factor to reach the socioeconomic and technological developments. In the case of South Korea, this has been a historical way that this society has preserved, unless the episodes of Japan dominance and the Korean War (1950-1953). In the case of Taiwan this has developed under Japan, China and American influences. In all cases, including Singapore and Hong Kong, the education accounted for early Western influences, especially English roots.

One of the first aspects is the bilingual education system, where the learning process of the English language in the education system starts since the primary and/or elementary levels. This English teaching is oriented with the aim that students get training to take later an international examination like TOEFL (Teaching of English as Foreign Language) or IELTS (International English Language Testing System); this makes students can speak English very well by the end of the basic education levels. In this way, Asian educational system is taking advantage of the optimal age for kids to learn the most globalized language related with the most recently technological, scientific and commercial progresses. Let us not forget that United States of America is the highest productive country in the world, which more science and technology has been creating, based on Research and Development (R&D) activities.

Furthermore, a fundamental part of the Industrial Revolution started in Great Britain in the XVIII century; in both the mother and official language is the English.

Graph No 6: Manufacture exports (% of merchandise exports)



Source: World Development Indicators-World Bank

Likewise, most of the official international commercial transactions are in English and in the USA Dollar, including the writing contracts. For instance, in the case of Singapore the English is considered the official primary language, not the “mother language” of the citizens, who in great share have accounted for abroad origins. In South Korea, Taiwan and Hong Kong, the English is the second official language, apart from the official mother tongue. This is another important factor for a modern and Western education that allows Southeast Asian students get in touch with globalization and get a position in the most renowned and top universities in the USA and Europe, where the classes are in English, for furthering postgraduate university studies such as Technological and Science oriented Masters and PhD.

The using of Information and Communication Technology (ICT) to impart education in the different levels is another characteristic. The educational system of South Korea is considered one of the most technological advanced. For instance, Korean government has provided all primary and secondary schools with Internet; which in turn allows students developing and using digital texts in their mother tongue and English. Furthermore, Asian

educational system is exposed to international competence. In this way, nowadays the Korean and Singaporean governments are awarding scholarships for international students to go Korea and Singapore to study, stimulating the competence and gains of competitiveness.

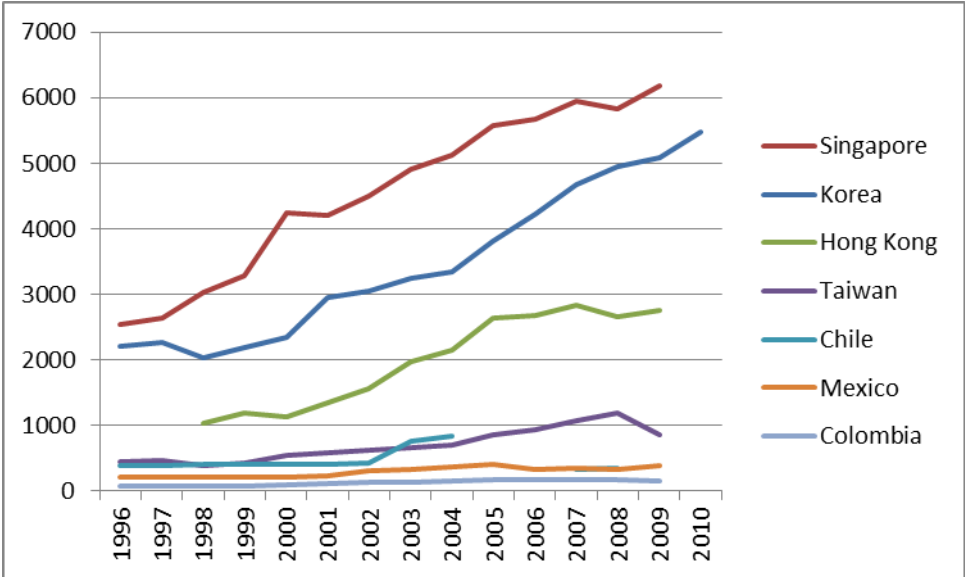
Another key educational factor is the importance that Mathematics, Sciences (biology, physics, chemistry and earth science) and Technology courses are teaching in the primary level rigorously, because this not only allows students later choose a technological or science oriented university carriers, but also to resolve better the daily problems. In the case of the artistic education, it has been available different specializations such as music, drama, sculpture and other fine arts with the aim that the students can choose (self-selection) one of them, in accordance with their preferences, skills and abilities.

In all these four Asian economies there is a rigorous and centralized national control of the student academic progress in all schools, without exception, as well as to pass toward further levels, vocational, secondary, high or senior schools, including university admissions. For instance, in Singapore there is a standardized national exam by the end of the primary education; in accordance with the results the student will be positioned in a determined following level. In the same way, there is another national standardized exam by finishing the secondary level in order to assess if the student pass or not toward the pre-university level. In South Korea there is the same, as well as a specialization since the secondary.

It is not true that all students are passing toward the same higher or further level of education. The system allows know who are the students that have gotten excellent academic results during the primary and/or secondary levels; on the other hand, other students could have developed other kind of abilities and aptitudes that society can take advantage from their specializations. This is not a discriminatory education system; on the contrary, this is selective and beneficial for the same students in order to get the optimization of human resources and exploit their comparative and competitive advantages. Later, they can have better performance in their university education level, whose main choices are often scientific-oriented carriers like engineering. Universities can be private or public, both can receive subsidies from the central government; in the case of public the subsidy is more, at the same time public universities have been internationally better ranked and their tuitions are less expensive. In the case of Hong Kong this education level has been available most of the time only for rich people.

In these Asian economies the responsible of the educational system are the central governments; they elaborate the education policy and supervise the quality. Also the educational public budget is managed centrally and it is higher that Latin American countries. The educational public system includes since the elementary school till university or third level, students upgrading each superior level through rigorous national examinations. Furthermore, the compulsory schooling time is higher not only during the year but also each day, regarding the Latin America. Indeed, in the examination periods the study time is even higher in this Asian region because of fiercely competition between students in order to get better grades and preparation for passing toward furthering levels.

Graph No 7: Researchers in R&D (per million people)



Source: World Development Indicators-World Bank

Finally, after reaching the universalization and better quality of basic education, they have strengthened their superior or higher education level. Skills and knowledge accumulation are other important factors to build blocks for these societies; they have been the key components of a Pragmatic Innovation Agenda (World Bank, 2013). The knowledge accumulation has been through Research & Development (Basic Research, Applied Research and Market links) and the skills accumulation through the different levels of education (Basic,

Higher, Retraining and Vocational). Therefore, nowadays the number of Researchers in R&D activities is higher in East Asian countries regarding Latin America (see Graph No 7).

4.2.- Export and Industrialization Promotion

Because of land restrictions and scarce raw materials resources, Hong Kong started its industrialization process with labour intensive industrial sectors such as textiles and plastics, in 1920s and 1947, respectively; they moved to electronics with transistor radio assembly plant in the 1960s (Riedel, 1974). In the case of Taiwan (Miracle), they started Import Substitution Industrialization model since the 1950s, elaborating manufacture goods to export. South Korea (Miracle of Han River) started a prevailed lead market economy and export oriented industrialization policies in the 1960s. The Singaporean industrialization case has its origins in the Industrial Survey Mission of 1963 headed by Albert Winsemius (Yue, 2005), who recommended to develop industries in ship-building and ship-repairing, metal engineering, chemicals and electrical equipment and appliances.

In the cases of Korea and Taiwan, firstly one of the traditional sectors that improved quickly was agriculture, which is labour intensive, with the social aim to support especially poor people to get an income. Later, they gradually changed into industry and manufacture labour intensive sectors as textiles. It is also fair to point out that all Asian Tigers started their industrialization process with basic standardized manufacture products, which needed less Research and Development (R&D). They did not start with especial and sophisticated manufactures, neither with high-tech industry goods that need high qualified human resources as Scientifics. Another important sector that they developed later was the heavy chemical industry, also with geopolitical strategic aims, to support eventual military confrontations²⁰.

The Taiwan economy has been dominating by industrial Small and Medium Enterprises (SME)²¹, different from South Korea that developed big enterprises and conglomerates (chaebols)²², they have been export-oriented, their technologic and industrial

²⁰ “Korean Economy Lectures”. Hankuk University of Foreign Studies. Seoul. Spring semester, 2012.

²¹ Furthermore, they are producing manufacture goods. In contrast, Latin American SME are producing domestic substituting goods (Kuwayama, 2001).

²² They were risky over financed by foreign loans and implicitly guaranteed by the government (Sachs and Radelt, 1998).

development were supported by the governments, in coordination with the entrepreneur sector; under the philosophy of *infant industry* support. The case of Singapore is slightly different because this geographic small State started ISI policies in the 1960s in order to create jobs by promoting Foreign Investment and developing some service industries (Yue, 2005). Then, in the 1970s and 1980s, these Asian economies changed their export structure, from one intensive labour-based toward other high-technology-based industrial goods.

The policies implemented to support industrial development included pro-export high Exchange Rates (US\$), increasing of the domestic saving rates, good macroeconomic stability, technological policies along with improving of public infrastructure services, to catching up advanced Western countries and promoting Foreign Direct Investment. At the same time they created special financial institutions, research institutes and other public organizations in order to manage and promote directly export industry policies²³. All of them are basically part of industrialization policies, but not only with the intention to substitute import of industrial goods. Indeed, the most important here is that they adopted export oriented policies to encourage industrialization, as in the case of Korea (World Bank, 2013); they did not close the possibility of competence with overseas.

Let us not forget that these Asian countries opened their economies, dealing with external competence by exporting manufacture industrial products with added value since the decade of 1960s, which in turn allowed them also to exploit the “learning by exporting” theories, introducing new products into the international markets, getting scale economies (decreasing unit costs of production). Furthermore, the East Asian industrialization export experiences said that the other economy and public policies adopted, such as labor, training, exchange rate and monetary, have been the followers; in accordance with the Game Theory terminologies (Nash, 1994), which study the strategic behavior and interdependence of economy agents. Undoubtedly, these cases were part of the developmental state policies, against simple neoclassical free market point of views.

²³ For instance, the Korea Trade Promotion Corporation (KOTRA) was established in 1962 to do market research and promote exports for Small and Medium sized Enterprises. The Korean Institute was created for Science and Technology to foster imports and adoption of new technologies. The Korean Trader’s Association was established to support logistic activities of exporters; and the Special Fund for Exports Promotion to financial support. China External Trade Association (CETRA) was setup in 1960s to provide producer with export oriented marketing services in Taiwan.

A slightly difference between Taiwanese and Korean industrial policies is that in the first was more possible to develop experimental pilot projects in especial economic zones, which to such an extent was less possible for Korea (Lim, 2013). The cases of Hong Kong and Singapore did not account for pilot projects, because of geographic area restrictions. But in all cases since intensive labour and standardized industrial products, they were moving toward more sophisticated and differentiated industrial products (high-tech), at the same time that they were getting more sophisticated human resources on science and technology.

Regarding the promotion of capital goods acquisition for the export industrial sector, exporters were receiving an implicit subsidy, allowing constant modernization of their machinery and equipment and the adoption of new technological processes. Other measures were the tariff exception for capital and intermediate import goods in the export industries, the adoption of accelerated depreciation accountability, tax benefits (tax holidays) and cheap loans to get capital and technological goods from abroad. Sometimes these loans were explicit subsidized by the governments that additionally to a high Exchange Rate accounted for a complete export promotion policy²⁴. These benefits were extended for the local producer of intermediate or input goods for final export industries. Undoubtedly, these policies had a fiscal cost in the short run term; however, in the medium and long run terms they reversed in high economy benefits for Asian Tigers. In the case of Real Exchange Rate, this was established at high and stable levels, depreciating their local currency to make cheaper their exports and less desirable the imports.

In the case of Singapore, after getting independence from Great Britain, in the middle of 1960s started the industrialization policies (ISI), supported by Foreign Direct Investment (Yue, 2005). About one fourth of the Singaporean GDP is manufacturing, they have been specializing in high-tech refining of manufacture import goods to re-export, repairing shipping services in accordance with its geographic position (comparative advantage) and as a financial services center. Singapore nowadays is one of the highest financial and business centers in the world, like Hong Kong.

In the last years some East Asian countries have adopted new policies with the aim to still promoting simultaneously the development of industry and export sectors, for instance in

²⁴ “Korean Economy Lectures”. Hankuk University of Foreign Studies. Seoul. Spring semester, 2012.

South Korea foreigners can buy some manufactured domestic goods in some shopping stores, and by showing their passport they can get a discount of 10 per cent of the final price. This rate is equivalent to the Value Added Tax (VAT). Then, when the foreigners left Seoul, they can recover the VAT in an especial outlet of the Korean Tax Collecting Office located inside the airport; especially created for that purpose. The importance of this policy is that a foreign tourist buys industrial goods that contain local value added, participating in the productive chain, generating more jobs and human development capabilities, as well as allowed government getting foreign currency to strengthen their Foreign Exchange Reserves.

4.3.- Other factors

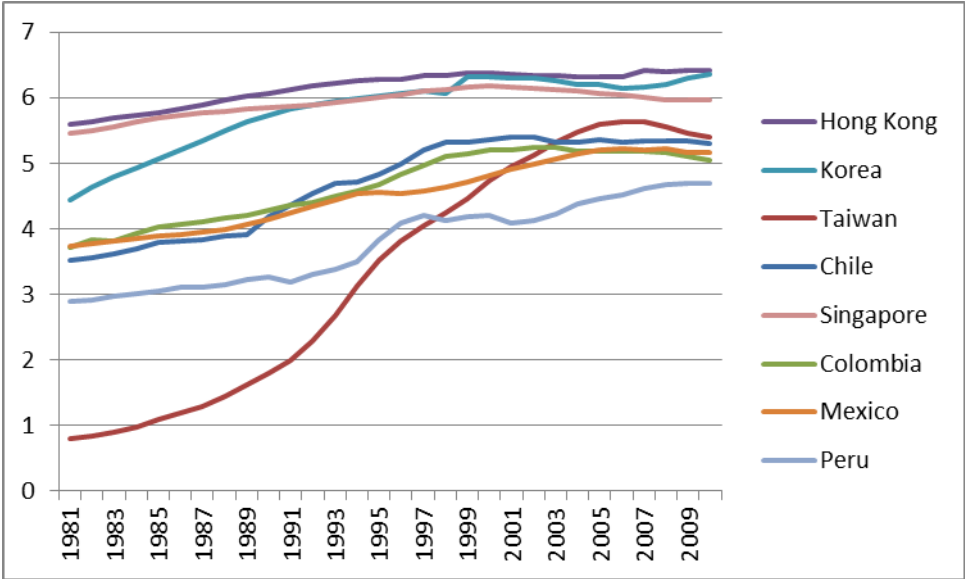
As a part of the industrial oriented export growth model, Korea, Singapore and Taiwan actively developed innovation and technology policies to stimulate technological change to such an extent that the investment in Research & Development, the main input of innovation, reaches 3.5 per cent of the GDP nowadays. Other important factors and initial economic policies that explained the development of these Asian economies was the restructuring of the agriculture sector, including the redistribution of the land property, the increasing of the social spends in health, education and housing and other social issues to improve redistribution income.

The building of modern public infrastructure as transport network, highways, freeways, airports, ports, tramway systems are very complete, the development of Information and Communication Technologies (ICT) infrastructure, increasing its massive access, and others (See Graph No 8). For instance, the condition and access of the public infrastructure services have been one of the central factors that explain the attraction of foreign investors in Singapore. Undoubtedly, the Hong Kong skyscrapers make this island to become one of the most attractive businesses and financial centres in the world; all of them are also touristic attractiveness. The participation to build modern infrastructure has not been coming only from public sector, but also from private national and international investors (Public-Private Partnership).

There is active participation of Small and Medium Enterprises (SMEs) in the chain of export activities based on industrial goods, their participation is higher than 50 per cent in the

total exports, supported by the Internet access to develop e-commerce (Kuwayama, 2001). Another important issue is the promotion of Foreign Direct Investment especially in Singapore, where Multinational firms dominated the scene. In Korea the Foreign Direct Investment were also a key focus through the 1970s and 1980s (World Bank, 2013), while for Ziya Onis (1991) the strong private sector, the outward oriented model along with the market incentives are the key elements that explain the development of this Asian region.

Graph No 8: Fixed Telephone Lines (Log. of thousand lines per population)



Source: World Development Indicators-World Bank

Last but not least, these countries strengthen their bureaucracy, because the state power was concentrated on the elite bureaucracy that became more multidisciplinary, globalized and economy oriented (Chang, 2002). There is a flexible market regulation, to such an extent that Singapore does not have Minimum Wage. All these economies created special institutions to support the modernisation of productive structure. For instance, another important development in terms of education is the support of the economic culture and vocational commerce education to such an extent that South Korea and Taiwan prominently have promoted the development of economic culture, which was freely affordable for their citizens through the massive communication means, as radio.

4.4.- Asian Financial Crisis and the Adjustment of the Economic Development Model

It seems that the adoption of some ISI policies and the export oriented intervention of the government caused the accumulation of inefficiencies in some East Asian countries, ending up with Asian Financial Crisis in 1997/98. These economies were highly indebted, implicitly guaranteed by their governments, to such an extent that South Korea used a mismatching maturity method, getting foreign loans with short run maturity to reinvest them in unsustainable businesses in the Association of South East Asian Nations (ASEAN), such as Indonesia and Thailand (Kiong-ju Kim, 2006). In this way, after the Asian Financial Crisis, these economies made some structural and institutional reforms, promoting more market oriented policies and also enter in advance into Knowledge Based Economy, intense on innovation, science and technology activities with the aim to still reaching high economic growth rates and better economic development. In this way, they have been strengthening the quality of its higher and scientific education and improving the quality of research institutes and universities (World Bank, 2013).

They have been deepening their Bilateral Commercial opening policies by signing Free Trade Agreements with different economies; especially, Korea and Taiwan (China). Not only with the aim to diversify their markets, but also in order to diversify their high-tech export supply. The case of Singaporean cluster promotions of high-tech industries, present more rewarding lesson, because they have been promoting especial clusters such as electronics, chemical (including petroleum refining), ship-building, ship-repairing and oil rig, biomedical science (Yue, 2005).

The changes toward less state-lead-development were in accordance with their necessities and new international context promoted also by the World Trade Organization (WTO). This multilateral agreement proposed less government intervention such as subsidies and tariffs in the international commerce. Asian Tigers entered into knowledge based economies, becoming active by promoting innovation and technologic policies, new starting up based on technologies, expanding connectivity, more diversifying clusters, develop oversee industrial parks, attracting more talent foreigners, creating a business environment, and other. To such an extent that nowadays these economies have one of the best business friendly environments in the world to invest; especially, Singapore and Hong Kong according with the World Bank (Doing Business Report, different years).

Lastly, it is also fair to point out that after regional financial crisis, Asian Tigers deepened their commercial and financial liberalizations, getting rid of different import restrictions and export promotion instruments, including the reduction of tariffs and elimination of nontariff barriers, some of the initial export promotion institutions were eliminated to reduce intervention. On the other hand, they strengthen their institutions and regulatory policies like more independent Central Banks, Financial Supervisors; furthermore, they still promoting the development of knowledge economy.

V.- THE EMPIRICAL AND QUANTITATIVE ASSESSMENT

This part of the thesis considers a cross section econometric assessment of the welfare evolution of the countries in the last thirty years (1981-2010), having as explained variable the annual average economic growth rates, like other authors. The assessment considers all countries around the world. Surely, it could be some omitted variables that are changed over time, because cross sectional data of countries included observations for a single (fixed) time. Consequently, we can learn only about the relationships among variables by studying differences across countries but not dynamically. Cross section (across entities) approach provides us with the breadth of experience needed to assess government policies and other determinants of long term economic growth (Barro, 1996). However, this kind of technique can bring us some difficulties because of we cannot control for variables that vary on the time, but only through entities. In other words, this technique allows us to control only for unobserved variables that change from one country to another, but do not change over time.

5.1.- Explained and explanatory variables and the econometric model

The dependent or explained variable is the annual average growth rate of the Real GDP per capita, which represents the welfare evolution of the society. Mathematically it can be represented as²⁵:

$$Annual\ real\ gdp\% = \left(\frac{\ln Y_{2010} - \ln Y_{1981}}{29} \right) * 100$$

²⁵ Let us not forget that between the whole 1981- 2010 period, there are 29 annual rates of growth.

This formula has been using by Barro (1990), Alcalá and Siccone (2003), Loayza and Soto (2002) and others, to estimate the behavior of this dependent variable across countries, as a proxy of the economic welfare. Based on this formulation and the economy performance of the countries, we can make a preliminary classification (ad-hoc) of the average per capita economic growth rate of these 157 economies in the period 1981-2010, joined them in six (6) subgroups, showed in the Table No 1.

Table No 1: Economic Growth Rate Classification

7 Categories	157 Countries	7 Ranges
Negative growth (20 countries)	Brunei Darussalam, Burundi, Cameroon, Central African Republic, Comoros, Cote De I'voire, Gabon, Georgia, Kyrgyz Republic, Madagascar, Moldova, Nicaragua, Niger, Saudi Arabia, Togo, Ukraine, United Arab Emirate, Venezuela, Zambia and Zimbabwe	$\%gdp < 0$
Lowest growth (31 countries)	Algeria, Bahamas, Bahrian, Barbados, Benin, Bolivia, Republic of Congo, Ecuador, Fiji, The Gambia, Greenland, Guatemala, Guinea, Honduras, Jordan, Kenya, Kuwait, Macedonia, Malawi, <u>Mexico</u> , Namibia, Papua New Guinea, Paraguay, Philippines, Qatar, Russia, Rwanda, Senegal, South Africa, Suriname and Switzerland	$0 \leq \%gdp < 1.0$
Low growth (49 countries)	Albania, Andorra, Argentina, Australia, Austria, Belgium, Brazil, Canada, <u>Colombia</u> , Costa Rica, Cuba, Czech Republic, Denmark, El Salvador, Ethiopia, Finland, France, French Polinesia, Germany, Ghana, Greece, Guyana, Hungary, Iceland, Iran, Israel, Italy, Jamaica, Japan, Latvia, Lesotho, Lithuania, Mali, Netherland, New Caledonia, New Zealand, Nigeria, Norway, <u>Peru</u> , Rumania, Samoa, Spain, Sweden, Syrian, Tanzania, Trinidad y Tobago, United States, Uruguay, Yemen	$1 \leq \%gdp < 2.0$
Middle growth (29 countries)	Armenia, Bangladesh, Belize, Bulgaria, Burkina Faso, Cyprus, Dominican Republic, Egypt, Kazakhstan, Lebanon, Malta, Mongolia, Morocco, Mozambique, Nepal, Oman, Pakistan, Panama, Portugal, Seychelles, Slovak Republic, Slovenia, Santa Lucia, Sudan, Swazilan, Tunisia, Turkey, Uganda and United Kingdom	$2.0 \leq \%gdp < 3.0$
Upper Middle growth (16 countries)	Azerbaijan, Belarus, <u>Chile</u> , Croatia, Dominica, Grenada, <u>Hong Kong SAR</u> , Indonesia, Ireland, Luxembourg, Malaysia, Mauritius, Poland, Sri Lanka, St. Kitts and Nevis, and St. Vincent and the Grenadines	$3.0 \leq \%gdp < 4.0$
High growth (12 countries)	Buthan, Botswana, Bosnia and Herzegovina, Cambodia, <u>China</u> , Estonia, India, <u>Republic of Korea</u> , Macao SAR, <u>Singapore</u> , Thailand and Vietnam	$\%gdp \geq 4.0$

Source: World Development Indicators – World Bank, 2013

In this way, (i) twenty (20) countries registered a compelling negative economy growth rate, (ii) thirty one (31) countries increased a little more of 0 but less than 1 percent, (iii) forty-nine (49) countries among 1 and less than 2 percent, (iv) twenty nine (29) between 2 and 3 percent, (v) sixteen (16) countries between 3 and 4 percent; and only (vi) twelve (12) countries more than 4 percent per year. These results show us the poor performance of the World Economy in this period, 83 percent of the economies registered less than 3 percent of annual per capita economy growth rate, which will be reflected in the econometric estimation. Except Chile, all the Latin American countries that conforms the “Pacific Alliance” registered less than 2 per cent of annual economic growth between 1981 and 2010. On the other hand, Southeast Asian countries have located in the top position of the Table No 1. Korea, Singapore and Taiwan grew annually in average more than 4 per cent in the 30-year period.

It is also fair to point out that the explanatory variables will be represented by the Geometric Average of the sectorial share value added regarding the Gross Domestic Product (the structural model of the economy) and the share of the different export products and services of the countries. This Geometric Average indicates the central tendency of a set of numbers by using the product of their values. Furthermore, the thesis is comparing different countries in a fixed point of time; consequently, it is necessary to use the Geometric Mean to explain the average participation of the explanatory variables and not a simple arithmetic mean. The explanatory variable can be represented as:

$$\textit{Geometric Average: } GA_i = \sqrt[30]{\%X_{i,t=1}^j * \%X_{i,t=2}^j * \%X_{i,t=3}^j * \dots * \%X_{i,t=30}^j}$$

Where the sub index “i” represents the country (from 1 to 157), “j” supra-index the share of value added in the GDP or the shared of exports products in the export merchandise or total exports. The sub index “t” represents the year, since 1 (=1981) up to 30 (=2010). Therefore, the GA_i is for each country in average (for the thirty years).

The preliminary statistic assessment of the data finds that there is a negative correlation between the shared of natural resource exports, such as minerals and agriculture, and the average annual economic growth rate of the economies for the period 1981-2010s. On the other hand, manufacture exports share are positively correlated with the average annual

economy growth rate of the 157 countries. These previous findings can give us a first impression about the possible impact that raw materials and manufacture exports could have on the economic growth. However, the correlations in each case are not very strong; furthermore, correlation does not mean causality. Consequently, following the principle of parsimony and considering the linearity of the parameters the thesis specifies some econometric models to obtain the best adjustments in order to explain what kind of export product and/or added value supported the economic growth in the last decades; and understand better the two economic hypothesis of “Learning by Exporting” and the “Curse of Natural Resources”.

With the aim to find the existence of conditional convergence as Barro and Sala-i-Martin (1996, 2004), and other authors, all the regressions include as one of the explanatory variables the Logarithm of real GDP per capita level for 1981, the initial observation in the sample. Another classical explanatory variable is the Gross Capital Formation (GKF), it is expected to have a positive impact on the economic growth rate. Other important variables to explain the performance of the economies are Human Capital (HK) and Government Consumption (GC), it is expected to find a positive and negative impact, respectively. In this way, the thesis is running the following general regression equation:

$$\Delta\%y_i = c + \text{Log}Y_{81} + \text{GKF}_{i,t} + \text{HK}_{i,t} + \text{GC}_{i,t} + \sum_j \text{VAX}_j + \sum_j \text{ExZ}_j$$

Apart from the aforementioned explanatory variables used most of the time for other authors, in this equation we have two more subgroups of explanatory variables. The first subgroup are the value added of the different products created in the economies (VAX_j), such manufacture, no manufacture, agriculture and services as a share of the Gross Domestic Product (GDP) that are expected to have some of them a positive impact (+) on the economy growth rate. This part has so-called the structural model. In the case of exports as explanatory variables (ExZ_j), the thesis includes manufacture and service²⁶, agricultural and ores and metals as a share (%) of merchandise exports²⁷. The first two export products (manufacture and service) in order to test the hypothesis “Learning by Exporting” and the two last (agriculture and metals) to test the hypothesis “The Curse of Natural Resources”.

²⁶ This has estimated as a share of total good and service exports.

²⁷ It is also fair to point out that Merchandise exports show the F.O.B. value of goods (not services) provided to the rest of the world valued in current U.S. Dollars (WDI).

5.2.- Main econometric results for the whole 30-years (1981-2010)

The first explanatory variable of the economy growth rate is the initial per capita GDP (Logarithm of its level), the first year of the assessment period (GDP81), its coefficient shows that there is conditional convergence like Barro (1996), Barro and X. Sala-i-Martin (2004), Loayza and Soto (2002), Mankiw, Romer and Weil (1992) and Barro (1991). Therefore, the economic growth in the last three decades depends significantly on the initial position of the economy as a result of *conditional convergence*, which predicts that countries that had lower per capita GDP in their initial stages have been growing faster than countries that started with a higher level, keeping constant the other growth determinants. In accordance with this theory there are different steady states explained by the quality of domestic policies, such as different Savings and Gross Capital Formation rates, Human Capital investment and Government Expenses (Rosende, 2000); they are making further the steady state of the economies.

In other words, the model predicts that poorer countries have been growing annually in average 0.9 per cent higher than richer ones between 1981 and 2010, holding constant the other explanatory variables (regressions i-v of Table No 2). This speed of convergence is lesser than others estimated for earlier periods, because this period is one of the most compelling in the world economy history. For instance, there are twenty countries that registered negative economy growth rates (Table No 1), and different regional financial crises. Latin America “Lost Decade” (1980s), where the world growth slowdown, then Mexican and Asian Financial Crises, in 1994-95 and 1997-98, respectively; as well as North American and European Financial Crises, in the second half of the last decade of the assessment (2000s)²⁸. Therefore, considering that the speed of convergence in this period (0.9 per cent annually), and following the methodology of Loayza and Soto (2002), it will take poorer countries about 65 years to catch up richer ones because the convergence process²⁹.

²⁸ There are other financial crises: Argentinean, Russian and Brazilian, ending 1990s and starting 2000s.

²⁹ Linearizing the neoclassical growth model around the steady state, the annual speed of convergence is given by the formula $(-1/T)*\ln(1 + Ta)$, where T represents the length of each time period (thirty years in the sample) and “a” is the estimated coefficient on initial per capita GDP (Loayza and Soto, 2002).

Taking into account the productive structure of the economies, another explanatory variable in the econometric model is the Industrial Value Added (INDVA)³⁰, which includes no manufacture and manufacture goods in accordance with the Industry Standardized Commercial Identifier (ISCI). Even though its impact is positive, it is statistically not significant controlling by other explanatory variables (regression i of the Table No 2). If we disaggregate the Industrial Value Added creation in two subgroups, manufacturing (MANVA) and not manufacturing (NOMANVA)³¹, the sub-impacts still being positive but both are also not significant. Surely, the Industrial Manufacturing Value Added (MANVA) is considered only in the regression ii of the Table No 2, because the main interest of this thesis is assessing the effects of Manufacture Exports on the economy growth. Additionally, in order to avoid multicollinearity³² because Manufacture Value Added and Manufacture Exports are undoubtedly correlated. Lastly, the impact of these exports can be more important for the economies because they have productivity content (Hausmann, Hwan and Rodrick, 2005).

In this vein, according with the output of the regression, we can see that the industrialization based on primary sectors such as mining and quarrying, construction, electricity, water, and gas (NOMANVA) can have a significant and positive impact in the economic growth at 5 per cent of significance (two stars), as we can see in the regressions iv and v of the Table No 2. However, the agriculture activities (AGRIVA)³³ do not have any significant impact on the economy growth rate in the different specifications.

On the other hand, it is clear that Service activities in the last thirty years (1981-2010) have a significant and positive influence in the economic growth, not only in the case of total Service Value Added (SERVA)³⁴, as a share of the GDP (regressions ii – v)³⁵, but also their

³⁰ Industry corresponds to ISIC divisions 10-45 and includes manufacturing (ISIC divisions 15-37). It comprises value added in mining, manufacturing, construction, electricity, water, and gas.

³¹ MANVA includes the Industrial Manufacturing Value Added (ISIC division 15-37, all manufactures, tanning and dresser of leather, publishing, printing and recycling). NOMANVA includes the Industrial No Manufacturing Value Added, corresponds to ISIC divisions 10-45, excepting the manufacturing (ISIC divisions 15-37). Therefore, NOMANVA comprises only value added in mining, construction, electricity, water, and gas.

³² The regressors are said to be perfectly multicollinear (or to exhibit perfect multicollinearity) if one of the regressors is a perfect linear function of the other regressors (Stock and Watson, 2007).

³³ Agriculture corresponds to ISIC divisions 1-5 and includes forestry, hunting, and fishing, as well as cultivation of crops and livestock production.

³⁴ Services correspond to ISIC divisions 50-99 and they include value added in wholesale and retail trade (including hotels and restaurants), transport, and government, financial, professional, and personal services such as education, health care, and real estate services.

exports (SERVEX), see regressions vi and vii (Table No 2)³⁶. These results strongly supported the hypothesis of service activities (SERVA) led to spur economy growth in the last decades formerly developed by Lavopa and Szirmai (2012). It is also fair to point out that while other academic papers are concentrated on manufacture production as the engine of the economic growth in the last centuries, like Szirmai (2011) and Fagerberg and Verspagen (2012), this research expands their assessments by considering also the service exports as the engine of the economy growth in the last decades³⁷.

In this way, this thesis finds that the service related activities have a positive and significant impact on the per capita economic growth rate in the last decades, because of the so-called Information and Communication Technology (ICT) revolution has conferred a renewed importance to certain industries within the service sector, as the major drivers of economic growth in the last decades (Lavopa and Szirmai, 2012). Furthermore, due to the increase of commerce, e-business, tourism and other international related activities are leading the economic growth in the world, after getting rid of different barriers. Consequently, the service exports as a share of total exports of goods and services³⁸ (SERVEX) have a significant and positive influence on the economic growth rate (regressions vi and vii), which increases between 0.016 and 0.012 per cent if the share of service exports increases in 1 per cent. These results also coincide with Chirinos (2006), who includes as explanatory variable of the economy growth rate the simple per capita service exports to test the hypothesis of “Learning by exporting”.

In the case of manufacture exports (MANEX) the regressions said that they have been also the engine of the economy growth in the last thirty-years (1981-2010), the coefficient of

³⁵ To avoid multicollinearity problems, again SERVA and SERVEX are not considered explanatory variables at the same time.

³⁶ It has not been considered both at the same time SERVA and SERVEX as explanatory variables to avoid multicollinearity. Similarly, before introducing their manufacture exports it is considered only the manufacture value added. Later, after introducing the export of agriculture goods (AGREX), it is not considered the agriculture valued added (AGRIVA).

³⁷ SERVEX: Services (previously nonfactor services) refer to economic output of intangible commodities that may be produced, transferred, and consumed at the same time. International transactions in services are defined by the IMF's Balance of Payments Manual (1993).

³⁸ Exports of goods and services comprise all transactions between residents of a country and the rest of the world involving a change of ownership from residents to nonresidents of general merchandise, goods sent for processing and repairs, nonmonetary gold, and services. Data are in current U.S. Dollars.

MANEX is positive and significant (regressions iii - vi)³⁹. Indeed, this is one of the central hypotheses of this thesis that is intending to be suitable proving. If the share of manufacture exports regarding the merchandise exports increases in 1 per cent, the average economy growth rate also increases between 0.02 and 0.017 per cent. On the other hand, the exports of raw materials such as Ores and Metals (METALEX)⁴⁰ have a negative and significant impact on the economy growth in this period (regressions iv - vii), which in turn shows that the “curse of natural resource” hypothesis is fulfilling. If the Ores and Metals exports increase as a share of Merchandise exports in 1 per cent, the average per capita economic growth rate reduces between 0.03 and 0.04 per cent. The exports of the primary agriculture products (AGREX) do not have any statistic and significant influence on the economic growth process in this period (regressions v - vii)⁴¹; like in the previous Sachs and Warner (2001) assessment, the inclusion or exclusion of agriculture does much not alter the basic empirical results.

Last but not least, the thesis finds that exports of fuels (FUELEX)⁴² and food (FOODEX)⁴³ have a negative and significant impact in the economic growth process. If the shares of Food and Fuels exports increase regarding the total Merchandise exports in one percent point respectively, the average per capita economic growth rate decreases in 0.014 and 0.017 per cent, respectively. All these results confirm the previous findings of Sachs and Warner (2001), they have not seen that export-led growth in the resource abundant developing economies.

To explain partially the influence of the Human Capital (investment on education) in the economic growth process, as a part of the structural model it has considered the rate of secondary schooling (net), because this education level is more complete than the primary education. According to the World Bank (2012) definition, the secondary level completes the provision of basic education that began at primary level, having as the aims at laying the

³⁹ Manufactures: commodities in SITC sections 5 (chemicals), 6 (basic manufactures), 7 (machinery and transport equipment), and 8 (miscellaneous manufactured goods), excluding division 68 (non-ferrous metals).

⁴⁰ Ores and metals comprise the commodities in SITC sections 27 (crude fertilizer, minerals); 28 (metalliferous ores, scrap); and 68 (non-ferrous metals).

⁴¹ These results confirm previous findings “all Asian success stories are stories of industrializations; neither tourism, nor primary exports, nor services have played similar role, with the possible exception of software services in India since 2000 (Szirmai, 2011).

⁴² Fuels comprise SITC section 3: Mineral fuels, lubricants and related materials such as coal, briquettes, coke, petroleum (oils and gases), natural gas and electric current.

⁴³ Food comprises the commodities in SITC sections 0 (food and live animals), 1 (beverages and tobacco), and 4 (animal and vegetable oils and fats) and SITC division 22 (oil seeds, oil nuts, and oil kernels).

foundations for lifelong learning and human development. In this way, secondary (schooling) has a positive and significant impact on the economic growth controlling by the other explanatory variables, in the first five regressions at 5 per cent of significance. Therefore, if Secondary schooling rate increases in one per cent, the per capita economic growth rate increases between 0.012 and 0.019 per cent. Similar impacts have been finding in Barro (2004), Loayza and Soto (2004) and others; consequently, the results confirm a strong evidence of the Human Capital theory.

The Gross Capital Formation (GKF) has a positive and significant effect on the economic growth process also at 5 per cent (two stars) in all regressions keeping constant the other explanatory variables; consequently, this is a robust variable to explain the economy growth in the whole 30-years period. In accordance with the World Bank (2013) this variable outlays on additions to the fixed assets of the economy plus net changes in the level of inventories⁴⁴. If the investment in Gross Capital Formation increases in 1 per cent, the per capita economic growth rate increases also, but only in 0.1 per cent.

In the case of the General Government Final Consumption Expenditures (GC), its impact is negative in all regressions, but also statistical significant in regressions vi and vii of the Table No 2. This indicator shows all government current expenditures for purchases of goods and services (including compensation of employees)⁴⁵; consequently, more government consumption brings distortions in the economies and reduces the possibility of getting a higher economy growth rate. In general, excessive Fiscal Policy in the economy brings inefficiencies. In this way, if the Government expenditures increase in 1 per cent, the average economic growth rate is reducing in 0.05 per cent.

Finally, the highest adjusted R-square is for the regressions that introduce MANEX as a transmission channel of the “Learning by Exporting”; in other words, they contain the highest fraction of variance explained by the model.

⁴⁴ Fixed assets include land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. Inventories are stocks of goods held by firms to meet temporary or unexpected fluctuations in production or sales, and "work in progress." According to the 1993 SNA, net acquisitions of valuables are also considered capital formation (World Bank, 2013).

⁴⁵ This GC also includes most of the government expenditures on national defence and security, but excludes government military expenditures that are part of government capital formation. Formerly, it has been called General Government Consumption (World Bank, 2013).

Table No 2: Regressions for the Period 1980 – 2010

	(1) gdp	(2) gdp	(3) gdp	(4) gdp	(5) gdp	(6) gdp	(7) gdp
gdp81	-.8013007** (-3.48)	-.8607798** (-3.76)	-.8516786** (-4.11)	-.9222277** (-4.42)	-.8988557** (-4.67)	-.3295324** (-2.34)	-.2860397** (-2.00)
indva	.119122 (1.02)						
agriva	.0792667 (0.69)	.0542105 (0.89)	-.0077698 (-0.32)	-.0098835 (-0.42)			
serva	.1516157 (1.36)	.1336651** (2.12)	.0625202** (3.19)	.0647559** (3.35)	.0698775** (4.02)		
secondary	.0211146** (2.62)	.0194412** (2.50)	.0166503** (2.11)	.0178682** (2.29)	.0186133** (2.37)	.0126817* (1.69)	.0124178 (1.55)
gkf	.1042475** (3.45)	.1032836** (3.41)	.0834374** (2.69)	.0758055** (2.43)	.0772604** (2.56)	.0879874** (3.56)	.0994699** (4.14)
gc	-.0354921 (-1.39)	-.037105 (-1.44)	-.0351717 (-1.40)	-.0351905 (-1.40)	-.0353698 (-1.40)	-.052455** (-2.22)	-.0502631** (-2.09)
manva		.1042931 (1.57)					
nomanva		.1019229 (1.52)	.0392203* (1.78)	.0449671** (2.10)	.0504239** (2.69)	.0170449 (0.96)	
manex			.0200145** (4.15)	.0187129** (3.94)	.0194374** (4.22)	.0174392** (3.53)	
metalex				-.0175169** (-2.50)	-.0172728** (-2.38)	-.0143505* (-1.92)	-.0296134** (-3.33)
agrex					.0017792 (0.22)	.0000713 (0.01)	-.0178014 (-1.59)
servex						.0158594** (2.59)	.0122771* (1.88)
fuelex							-.0138131** (-2.48)
foodex							-.0169353** (-2.76)
_cons	-8.274874 (-0.73)	-5.876758 (-0.99)	1.083351 (0.51)	1.722166 (0.80)	.9253135 (0.87)	.9313825 (0.92)	2.196657* (1.78)
N	134	134	134	134	134	132	134
r2	.3850368	.3913781	.4616214	.4804428	.479786	.4083065	.3928416
r2_a	.3508722	.3524262	.4271652	.4427331	.4420285	.364657	.3487737
rmse	1.287599	1.286057	1.209568	1.193019	1.193773	1.19978	1.205815

t statistics in parentheses

* p<0.10, ** p<0.05

5.3.- Decade assessment

In order to check the behaviour and impact of the explanatory variables for each decade, their variability and robustness, the thesis considers regressions separately for the three sub-periods of ten years (1980s, 1990s and 2000s decades); keeping the same equations and explanatory variables used for the whole 30-years estimations, showed in the aforementioned subsection. In the case of the sub-period 1980s the sample is restricted for less number of countries because of missing date; therefore, we obtained some results slightly changed regarding for the whole 30-years period (See Table No 3).

The coefficients estimated for MANEX and METALEX still having significant effects, positive and negative, respectively, in some regressions. Consequently, if the share of manufacture exports increases in 1 per cent, the economic growth rate increases in 0.05 per cent. On the other hand, if the share of Ores and Metal exports increases in 1 per cent, the average economic growth rate reduces in almost 0.08 per cent. These impacts are higher than the estimated for the whole 30-year period. Even though the Service Value Added (SERVA) can have positive and significant impacts on the economic growth in this subsample (regression ii of Table No 3), the Service exports (SERVEX) do not have any significant impact, because of international restrictions like the compelling Public Debt financial crises in many developing countries in this so-called “The Lost Decade” of Latin America.

Additionally, these new results confirm that the Gross Capital Formation (GFF) is a robust variable to explain positive and significant the economy growth process of a country, in most of them at 5 per cent of significance. Now the impact is higher than before, if the Gross Capital Formation increases in 1 per cent the per capita economic growth rate increases about 0.2 per cent (the fifth of part 1 per cent). However, in the cases of (i) the initial GDP per capita and (ii) the secondary rate of schooling they are statistical not significant, we cannot obtain any conclusion from both; neither evidence of conditional convergence nor human capital theories in the 1980s-subperiod.

Table No 3: Regressions for the 1980s Decade

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	gdp	gdp	gdp	gdp	gdp	gdp	gdp
gdp81	.2341528 (0.30)	-.3065051 (-0.41)	.2686609 (0.23)	-.3015752 (-0.26)	-.4640713 (-0.95)	-.5564046 (-1.11)	-.3494575 (-0.61)
indva	1.133099 (1.15)						
agriva	1.109378 (1.13)	4.423743** (3.68)	.1693038 (0.93)	.0263239 (0.16)			
serva	1.055555 (1.14)	4.397963** (3.66)	-.0211627 (-0.25)	-.0213787 (-0.25)	-.0512336 (-0.51)		
secondary	.0250872 (0.80)	.0309801 (0.91)	-.0051855 (-0.12)	.0071165 (0.18)	.0152797 (0.36)	.0116342 (0.28)	.0355985 (1.14)
gkf	.1666833** (2.12)	.1910235** (2.54)	.2151979* (2.11)	.2050178** (2.25)	.1779239* (1.83)	.1876049* (1.85)	.1350263** (2.12)
gc	-.0001141 (-0.00)	-.0444565 (-0.60)	.2260007 (1.60)	.1346102 (1.00)	.1422944 (1.05)	.1108201 (0.94)	-.0542424 (-0.74)
manva		4.425373** (3.69)					
nomanva		4.552771** (3.68)	.0020255 (0.02)	.0093806 (0.11)	-.0134254 (-0.15)	.0190397 (0.32)	
manex			.0674858** (3.15)	.0537322** (2.58)	.0481555* (1.94)	.0511208* (2.12)	
metalex				-.0768822** (-3.17)	-.0797418** (-3.70)	-.0805432** (-3.68)	-.0749975** (-3.01)
agrex					-.0415033 (-0.71)	-.0235234 (-0.48)	-.1499964** (-2.67)
servex						-.2431258 (-0.08)	-.6667682 (-0.28)
fuelex							-.0192622 (-1.02)
foodex							-.0101186 (-0.64)
_cons	-113.8432 (-1.17)	-442.3812** (-3.70)	-12.38588 (-0.86)	-4.082847 (-0.31)	.0639408 (0.01)	-2.154924 (-0.51)	2.014559 (0.50)
N	43	35	25	25	25	25	39
r2	.3062984	.4763265	.5922251	.7187063	.7226762	.718674	.6022218
r2_a	.1675581	.3151962	.3883377	.5499301	.5562819	.5498784	.4787734
rmse	2.429116	2.32621	2.069842	1.775503	1.762929	1.775604	1.923197

t statistics in parentheses

* p<0.10, ** p<0.05

For the 1990s-decade, the number of countries increased substantially regarding the 1980s, we have more than one hundred countries, there is no evidence of conditional convergence like in the 1980s. Now the Service Value Added (SERVA) has a significant and positive impact on the economy growth (See Table No 4), like in the estimations for the whole period (1980-2010). If the share Service Value Added/GDP increases in 1 per cent the average economic growth rate increases in 0.12 per cent (regressions iii, iv and v of Table No 4). The MANEX and METALEX present the same significant impacts, positive and negative respectively, like in the assessment for the 30-years, which in turn show robustness of these variables to explain the economy growth process. Therefore, if the manufacture exports increases as a share of the all merchandise exports in 1 per cent, the economic growth rate increases in 0.025 per cent; the half of the observed for the 1980s-subperiod. On the other hand, if the share of Ores and Metals increases in 1 per cent, the economic growth rate decreases in 0.03 per cent, also the half of the observed for the 1980s-subperiod. The service exports (SERVEX) have positive and significant impact in the economy growth (regressions vi and vii of Table No 4). If its share (regarding total goods and service exports) increases in one point, the economic growth rate increases in 3 per cent. There is evidence that in the 1990s service exports led the economic growth. Finally, the Government Expenditure has a negative and significant impact (regressions ii - v).

In the 2000s-decade (See Table No 5), the number of countries is higher regarding the two previous sub-periods, in this way the behaviour of the explanatory variable of convergence is similar our results for the 30-years period. The coefficients of the Logarithm of the per capita GDP for 2001 are significant in all regressions, keeping their initial sign (negative), which in turn show strong evidence of conditional convergence in the new millennium. The speed of converge is higher than the findings for the whole 30-years; consequently, the number of years to poorer countries catching up richer ones is around 30-period, because before financial crises in the industrialized countries the economy world has increased faster than in the 1980s.

In this subsample the manufacture exports (MANEX) have a positive and significant impact at 10 per cent (one star) in accordance with the regression number v of the Table No 5, showing that if its share increases in 1 per cent, the economic growth rate increases also, but only 0.015 per cent, slightly less than in the 30-year assessment. In the case of FOODEX, its

coefficient shows negative impact at 10 per cent of significance; so that if the food exports increase in one per cent point, the economic growth rate reduces marginally in 0.018 per cent. However, the resulted coefficients for the other explanatory variables are different from the initial assessment of the 30-years; the SERVA, MANEX, METALEX, FUELEX and SERVEX coefficients are statistically not significant, we cannot conclude anything.

The results for the Schooling (secondary) and Gross Capital Formation (GKF) are similar the ones obtained for the 30-years, both have significant and positive impacts, but the GKF only in the first four regressions at 10 per cent of significance (one star). Now one more per cent of the Schooling rate leads to higher economic growth in 0.05 per cent, the size effect for this last decade is marginally higher than the obtained for the whole 30-years period in around 0.03 per cent. In the case of the size effect of GKF, this is less than in the whole 30-years sample about 0.04 per cent. Thus, if the investment in GKF increases in 1 per cent as a share of the GDP, the annual economic growth rate increases in only 0.06 per cent in the first decade of the new millennium.

Finally, the estimated regressions for the last decade (2000s) show that the intercepts are positive and statistically significant (at 5 per cent) in all regressions, different from the assessment for the whole 30-years and also from each previous decades (1980s and 1990s). Actually, the intercept does not have any clear interpretation in this context because it means that countries economically grown if all the explanatory variables take zero value, which is impossible in the current world economy. The economic activity to create value added and international commerce exist, similarly the education and fixed capital investments; lastly, the governments are expending every day. When the real-world meaning of interpretation of the intercept is nonsensical it is best to think of it only mathematically as the coefficient that determines the level of the regression line (Stock and Watson, 2004).

Table No 4: Regressions for the 1990s Decade

	(1) gdp	(2) gdp	(3) gdp	(4) gdp	(5) gdp	(6) gdp	(7) gdp
gdp91	-.254049 (-0.62)	-.1112145 (-0.26)	-.2500008 (-0.59)	-.485417 (-1.12)	-.4727955 (-1.21)	.4962694 (1.03)	.4268564 (0.92)
indva	1.057276** (2.01)						
agriva	1.042708** (2.06)	.0386629 (0.46)	.0167913 (0.31)	.0034838 (0.07)			
serva	1.080793** (2.07)	.1433459 (1.30)	.1314158** (2.25)	.1384664** (2.39)	.1190792** (2.08)		
secondary	.0124364 (0.61)	-.0126647 (-0.56)	-.020642 (-0.92)	-.0183905 (-0.85)	-.0113306 (-0.54)	-.0252262 (-0.90)	-.0304884 (-1.11)
gkf	.0546804* (1.71)	.0774618** (2.30)	.052057 (1.37)	.0324961 (0.85)	.0332471 (0.85)	.0315737 (0.70)	.0647698 (1.14)
gc	-.0470307 (-1.46)	-.0763031* (-1.88)	-.0791417* (-1.96)	-.0779056** (-2.06)	-.0669604* (-1.73)	-.0507217 (-1.14)	-.0128212 (-0.28)
manva		.0740793 (0.71)					
nomanva		.0765005 (0.76)	.0605607 (1.20)	.0726292 (1.49)	.0700002 (1.60)	.019061 (0.59)	
manex			.0309748** (3.03)	.0284906** (2.81)	.0253584** (2.45)	.0262965** (2.23)	
metalex				-.0363996** (-3.31)	-.0345002** (-3.49)	-.0200462 (-1.55)	-.0462754** (-3.90)
agrex					.0153099 (1.39)	.0158397 (1.23)	-.0155355 (-1.50)
servex						2.964634* (1.69)	3.075257* (1.72)
fuelex							-.0211209* (-1.94)
foodex							-.0336575** (-2.42)
_cons	-103.7607** (-2.06)	-7.854668 (-0.89)	-4.692983 (-1.11)	-2.564349 (-0.61)	-2.152238 (-0.92)	-2.826198 (-1.01)	-.3657421 (-0.14)
N	108	106	106	106	107	101	106
r2	.2696864	.1858729	.2586922	.2914525	.2566107	.1876497	.2027216
r2_a	.2185645	.1187284	.1975534	.2250262	.1876364	.1073073	.1279767
rmse	2.229295	2.387901	2.278607	2.239262	2.282851	2.414318	2.339229

t statistics in parentheses

* p<0.10, ** p<0.05

5.4.- Early conclusions from the econometric assessment and forthcoming research

After having analyzed both, the whole 30-years period and the three sub-decades, which showed the variability of the estimations over time, and illustrate well what results are fragile and what are robust, we can see that the impact of the Manufacture exports (MANEX) on the economic growth is positive and significant. On the other hand, the Metals and Ores exports (METALEX) impact is negative and significant. Both are annual average shares regarding the total merchandise exports. Let us not forget that the preliminary assessment found that there is a positive cross-section correlation between the average economy growth rates (gdp) and MANEX, and negative correlation with METALEX. However, the empirical literature (Section II) about the quantitative effects of manufacture and metal exports is scarce in explaining their influences on the economic growth. Indeed, if the manufacture exports have a positive and significant impact on the economy growth in the last three decades, “Pacific Alliance” countries specialized in raw material exports such as Ores and Metals, Fuels, Foods and Agriculture, have not been the most benefited from the process of globalization and expansion of the international commerce.

On the other hand, countries that have been specializing in Manufacture exports (including high-tech products) with high productivity and innovation content have been taking advantage from the expansion of the international commerce such as Asian Tigers. It is also fair to point out that Szirmai (2012) finds that the average share of manufacturing increased between 1950 and 1980 in almost all the countries⁴⁶, but in the next 25 years, this share continued increasing in many Asian economies, while Latin America registered a process of deindustrialization. Therefore, these previous findings help to explain the poor economy performance of this region in the assessment period of the thesis (1980-2010).

The results are also compatible with Hausmann, Hwang and Rodrik (2005), they showed that exports of high productive goods have a positive impact on the economy performance and the per capita income; but exports of simple goods with low productivity - such as raw materials- are associated with poor economy performances. Indeed, the indirect

⁴⁶ As we can remember from the sections III and IV of the thesis, this increasing was supported by the Import Substitution Industrialization policies adopted starting the second half of twenty century in some countries.

impact of manufacturing is much more important (Lavopa and Szirmai, 2012), because of spurring some economy connected activities. Unfortunately, this indirect impact has not been measuring explicitly by these thesis regressions.

Likewise, the output of the regressions also supports the Kaldorian hypothesis that manufacture activities are the main engine of the economic growth process in the last decades. For Szirmai (2012) the productivity in the manufacture sectors is higher than others, and offers especial opportunities for capital accumulation. In the case of Lavopa and Szirmai (2012), coincidentally with the thesis findings, manufacture exports play a more important role in explaining the economy growth than the simple share of manufactures in the GDP. Other authors found that the externalities of manufacture production are ten times higher than no manufactures (Hausmann, Hwang and Rodrik, 2005). For all these reason this thesis more suitable has been concentrating on the impact of these exports on the economy growth. It also fair to point out that the size effects have been reducing “as time goes by”; which in turn said that there are other factors to explain the economic growth process in the last decades such as Research and Development investment (R&D)⁴⁷.

The econometric results are also part of the empirical differences observed between Asian Tigers and Latin American countries in the last decades; both regions are producing and exporting different products, with different contents and productivities, having also different socioeconomic performance. However, because of the fact that the thesis is measuring basically correlations, we cannot be totally sure about the underlying causalities. This is a very deep question that future researchers could be dealt with using more sophisticated causality econometric techniques in their forthcoming assessments to prove whether export shares Granger causes economic growth rate. Another related suggestion is the use of a detailed dynamic panel data analysis to introduce the effects of the variables that dynamically have been changing over time such as Research & Development, Science & Technology related issues, and impacting dynamically the economy growth process. Surely, these suggestions could be material for more than one follow-up academic working paper.

⁴⁷ To assess the impact of the R&D investment on the economy growth, the Annexes 1 and 2 include regressions for the 2000s decade. In Annex No 1, R&D as a share of the GDP, resulted being statistically not significant. In the Annex No 2, it has considered a dummy == 1 for countries that have spent more than 1.5 per cent of their GDP in R&D in average in the last decade; therefore, this main input of innovation has some positive and significant effect on the economy growth in the last decade.

Table No 5: Regressions for the 2000s Decade

	(1) gdp	(2) gdp	(3) gdp	(4) gdp	(5) gdp	(6) gdp	(7) gdp
gdp01	-1.603677** (-5.56)	-1.575157** (-5.30)	-1.603722** (-5.26)	-1.589903** (-5.14)	-1.529961** (-4.79)	-1.103264** (-4.94)	-1.135378** (-5.08)
indva	-.0496028 (-0.73)						
agriva	-.1258436* (-1.68)	-.1070785 (-1.63)	-.0727036** (-2.27)	-.0747337** (-2.28)			
serva	-.0582997 (-0.82)	-.0435804 (-0.60)	-.0095525 (-0.30)	-.0112956 (-0.35)	.0483163 (1.22)		
secondary	.051287** (3.86)	.0508525** (3.75)	.050502** (3.89)	.0499445** (3.74)	.0516112** (3.63)	.0496652** (3.58)	.0482116** (3.56)
gkf	.0657204* (1.94)	.0671926* (1.93)	.0624852* (1.75)	.0639895* (1.79)	.0486251 (1.17)	.0459288 (0.96)	.0544723 (1.27)
gc	-.0243014 (-0.70)	-.02485 (-0.70)	-.0245292 (-0.69)	-.0238124 (-0.66)	-.0413276 (-1.00)	-.0890443** (-2.46)	-.0838091** (-2.57)
manva		-.0271415 (-0.37)					
nomanva		-.0346075 (-0.50)	.0040091 (0.12)	.0021256 (0.06)	.0564608 (1.45)	.0320694 (1.19)	
manex			.0050419 (0.66)	.0054307 (0.71)	.0141972* (1.81)	.0113335 (1.52)	
metalex				.0071328 (0.50)	.0016682 (0.11)	-.0007002 (-0.05)	-.0105828 (-0.79)
agrex					-.0115604 (-0.64)	-.0059089 (-0.30)	-.017744 (-0.99)
servex						.3096584 (0.23)	.4430768 (0.31)
fuelex							-.0031509 (-0.33)
foodex							-.0178428* (-1.76)
_cons	17.06237** (2.13)	15.21067** (2.01)	11.96199** (4.32)	11.92979** (4.30)	6.548542** (3.70)	7.371024** (4.56)	8.953532** (5.11)
N	117	116	116	116	117	113	118
r2	.4647651	.4650377	.4673133	.4687695	.3929481	.3860436	.3833331
r2_a	.4303922	.4250405	.4274862	.423665	.3418876	.332397	.3319442
rmse	1.68963	1.704817	1.701187	1.706855	1.892077	1.795046	1.796031

t statistics in parentheses

* p<0.10, ** p<0.05

VI.- CONCLUSIONS, RECOMMENDATIONS AND FUTURE POLICIES

In the first part of this section the thesis considers some comparative conclusions between “Asian Tigers” and “Pacific Alliance” countries, from the previous assessment and the background of the author. In the second/last subsection, the thesis considers policy recommendations based on the “Innovation, Institutions & Development” specialization in Maastricht Graduate School of Governance, the e-learning course “Innovation Policies” of the World Bank Institute (2013), and the lessons learned by the author in East Asian countries in previous years.

6.1.- Main conclusions:

The poor economic performance of some Latin American countries during the last half part of the past century ending with bottlenecks, inefficiencies, crises and protracted periods of stagnation, was caused by different economic policy experiments that ended in the “Lost Decade” (1980s), gotten negative real per capita GDP growth rates. The economy and industrial policies were discontinued, existed mixed policies: Import Substitution Industrialization, Socialism, Populism and Neo-liberalism. Other causes of the failure are the small markets to gain scale economies and produce with less unit costs in the cases of Chile, Peru and Colombia, the high custom barriers and tariffs that closed international competition. These economies along with Mexico are suffering from the absence of high quality of education to researching, developing or adapting new technology and innovation policies.

Import Substitution Industrialization policies were not only adopted by Latin America but also by Asian Tigers; however, in Asia the model was export-oriented, combined with industrial and innovation policies. The Asian Tiger’s experiences have been the center of different working papers that consider them examples of economy growth and productive jobs creation models; they have been representing lessons for Latin American countries. Since the 1980s, Asian Tiger exports are concentrated on high-tech industry goods. Their per capita GDP have surpassed the obtained by Latin American countries, allowing them reducing considerable their poverty rates. Currently, most of Latin American economies are still based on raw material exports; they have not entered in the technological “catching up” stage.

The manufacturing industrialization processes of Asian Tigers have been supporting positively the results of their educational system. For instance, Singapore is reaching the first

places in the two main tests of Mathematics and Science: (i) Trends in International Mathematics and Science Studies and (ii) Program for International Student Assessment (PISA), this includes the abilities of understandable reading. In the case of Hong Kong and South Korea, they have been getting the second and seven first positions in the solution of problems, Mathematics and Science, of the PISA in the last decade. In general Asian Tigers are reaching the highest position in these international assessments, above OECD countries (2009). On the other hand, Latin American countries are located almost in the last positions, being Peru one of the worst. There is the classic “chicken and egg” problem, not industrialization based on high tech goods, not good education quality.

Another important factor that explains the economic successful of Asian Tigers is the good command of English, they do not expect that children go to secondary school, since the 11 or 12 years old, to teach them English; it could be more difficult and costly. On the other hand, in average for Latin American students is more difficult to have good command of English because they start studying it compulsory in the secondary level. Furthermore, in Latin America nowadays there are special English teaching institutions created with the support of the United States of American and Great Britain Embassies to teach English privately, which in turn increasing the education cost for children who are interested in managing this foreign language. Additionally, while the university lectures are in English in Southeast Asian countries, in Latin American they are only in Spanish.

The neoliberal regimen adopted by Chile since the end of 1973, Peru and Colombia in the 1990s, showing better results in terms of macroeconomic stability, increasing of their exports, GDP and GNI Per capita and the reduction of poverty rates recently in the 2000s. On the other hand, their exports have showed poor high-tech component, they have a primary export structure based on raw materials without innovation, science and technological contents, which are capital intensive and do not contribute directly to create much jobs. Indeed, there are considerable poverty rates in the Pacific Alliance region regarding the Asian Tigers. Lastly, Latin American countries are competing in attract Foreign Direct Investment for primary sectors as raw material exploitation, mining and oil, showing dependent path.

The participations of Transnational Companies (TNC) and Foreign Direct Investment (FDI) have been important in both regions. For instance, they accounted for 25, 30, 40 and more than 40 per cent of the manufacture production in Chile, Peru, Mexico and Colombia.

However, different from Asian countries the TNC in Latin America have been concentrating on natural resources exploitation, in the case of Mexico also in maquiladora activities. But, the participation of foreign capitals have different history in Southeast Asia since starting its process of industrialization, they have contributed to spur the industrial development, the technological transfers, improving the quality of education; and in the catching up process.

Asian Tigers increased their international commerce while were adopting ISI policies⁴⁸ taking advantage on “Learning by exporting” and international commerce, while the adoption of ISI policies in Latin America was heterogeneous. They led Latin America to close their economies, avoiding competition with international manufactures in order to produce them domestically, but this was inefficiently and allowed some corruption activities. However, after the accumulation of some inefficiency originated in the over State support under the ISI model, the chaebols (conglomerates of big enterprises) in South Korea accounted for the financial crisis by the middle of 1990s, plus other moral hazard problems caused by excessive intervention and weak regulation system.

The adoption of Innovation, Science and Technology policies in Asia have been leading actively by the governments, while Latin American governments have missed them; especially, after the Lost Decade (1980s). These policies allowed Asian countries to increase their competitiveness and export high-tech goods; on the other hand, Latina America has focused on macroeconomic policies to reach fiscal, monetary and external equilibriums, to recovery competitiveness. Thus, while Latin American suffered a serious recession, stagnation and inflation in the 1980s, Asian Tigers were economically increasing at high rates, as well as they started to change into high-tech industry exports. According to Den Berg (2012), this is in part because of the fact that Asian Tigers protected their infant industries, including subsidies, even as other policies to encourage these protected firms to export other markets, including other adjustments of the ISI model.

The Asian Tigers promoted the development of economic cultures through massive communication means, different from which has been existing in Peru, where there is a predominance of a legalistic culture and the increasing of bureaucratic/regulatory difficulties; the Asian countries have more flexible regulation for doing business.

⁴⁸ It is also fair to point out that in the last years South Korea has been the sixth export country in the world.

Different from Latin American, East Asian Micro and Small Enterprises (MSEs) have been participating in export activities very active. The participation of Korean and Taiwanese MSEs in the export structure is higher than 40 and 50 percent, respectively. While, in Latin America the participation has been very poor, about 20 percent in Mexico, and lesser than 5 percent in Colombia, Chile and Peru regarding their total exports. The weak participation in these three countries is due to: (i) their mining and energetic based exports that are capital intensive, therefore micro and small capitals cannot participate; (ii) These countries do not have much manufacturing export industries, or not create high export value added (not inspiration); therefore, MSEs cannot participate in the chain of value added creation.

The comparative advantages of Asian Tigers, as island and peninsula, in the Asia-Pacific region have helped them to develop manufacturing industries, shipping related services and financial service centers. But in the case of comparative advantage of Latin America that accounted for natural resources, did not help them to reach faster high quality standard of living. There has been a virtuous circle between industrialization and high human development in East Asia; on the other hand, a vicious circle between raw material exploitation/exports and poor human development indexes in Latin American. At the same time, the millionaires (as a share of population) in Singapore and Hong Kong are the highest in the world. Finally, Asian Tigers have been ranking in better positions than Latin American countries in the cases of economy freedom, corruption and competitiveness. Hong Kong and Singapore are the best placed to do business in the world, with most friendly regulations and least cost to start and run a business (Doing Business Report).

Last but not least, the regressions for the three sub periods (decades) confirm the robustness of manufacture exports (1980s and 1990s) as a factor that has been driving positively the economy growth process; similarly, the service exports (1990s). Therefore, exporting manufactures and services generate a virtuous circle in the economy growth process regarding the whole thirty years period (1980-2010). On the other hand, the assessment of the sub periods (1980s and 1990s), confirms the robustness of the ores and metals exports to explain the negative effect on the economy growth process the simple exploitation and exportations of raw materials; which in turn fulfilling the *curse of natural resource* hypothesis tested.

6.2.- Public Policy Recommendations for “Pacific Alliance” of Latin America: “Innovation Policy⁴⁹” and “Technology Policy”

It is important the adoption of a Pragmatic Innovation Agenda⁵⁰ in these Latin American countries, especially in the case of Peru, taking into account their sequencing and scaling up for the short, medium and long run of the policies. They must survive in the long term; unless thirty years. In this way, innovation policies should be developed with the current resources and constraints that exist in each country, governments cannot copy exactly other experiences such as “Asian Tigers”. Furthermore, this Agenda should be flexible and adaptable, in accordance with the global, economic and technological changes and local needs of the economies⁵¹. For the World Bank Institute (2013), there are three important elements/principles to take into consideration to elaborate a Pragmatic Innovation Agenda for a developing country, in accordance with East Asian experiences:

Firstly, develop a broad human development agenda to strengthen the quality of education; especially, in the basic levels (primary and secondary). Do not forget that in the case of the four members of Pacific Alliance (Mexico, Chile, Colombia and Peru), both basic levels of education have serious problems of quality; therefore, these countries cannot start promoting innovation policies based on intensive high-tech industry products because they require high-quality of human resources.

Secondly, it is important more coordination between education, industrialization and trade policies, because there is a strategic mutual interdependence between them, and also some complementarities. More industrialization require more high-educated people, similarly, more international trade development of industrial products require more high-educated people, including the managing of foreign languages. Indeed, high-quality educated people

⁴⁹ A complex technological related process that put attention on the overall innovative of the economy, institutions and organizational performance to find new solutions for fulfilling population necessities, reaching economic growth, international competitiveness and improve social cohesion (Lundval and Borrás, 2004).

⁵⁰ World Bank Institute. E-learning course: “Introduction to Innovation Policy”. Washington, April – June, 2013.

⁵¹ The author has been recommending the adoption of these policies since he was living in East Asia, through Peruvian newspapers “La Republica”, “Expreso”, “La Primera”, “El Peruano”; and specialized magazines.

allowed industrialization also. This is the classical “egg and chicken” problem that governments should try to break it by promoting both at the same time⁵².

Thirdly, consider the need of including a domestic value added in the final good that a country produces to sell abroad, or the local content of the export goods. It is not recommendable to sell simple raw materials, without any kind of domestic content, it is important to add some value in order to generate more employment. Furthermore, this allowed inspiration and innovation activities to strengthen local human capital, because the added value should be in accordance with the characteristics and requirements of the final foreign clients.

Main considerations to develop a successful Pragmatic Innovation Agenda in a country, they have been so-called pillars by the “Introduction to Innovation Policy” course of the World Bank Institute (2013):

- a) Keeping with macroeconomic stability which is a necessary starting condition, with suitable Exchange Rate, Monetary and Commercial policies. Also, it is important to follow political stability, transparency and geopolitical; without them it is impossible to start successfully with the Agenda. We need to create first and foremost a stable environment, which in turn allow private sector to allocate resources in order to seek new opportunities to make profits.
- b) It is important to identify the key actors of the innovation process, look for a mayor stakeholder’s involvement providing citizens and economy agents with better information about the benefits of Innovation & Technology policies. Furthermore, it is important involving more private and public agents in the designing of these policies to get support for their adoption, and also for possible necessary related reforms.
- c) Increasing international participation of economy agents, finding to exploit initially the comparative advantages, taking knowledge that is available to solve current problems; and at the same time develop “competitive advantages”. Try to absorbing global knowledge under the “Learning by exporting” theory and through the Foreign Direct Investment.

⁵² Keep in mind that in the labour market is the “demand side” which determines not only the quantity of the employment, but also its quality.

- d) Develop high education and research institutions, but after constructing a broad quality of basic education people, in the primary and secondary levels, including skill training and vocational aspects. Taking advantage of the facilities for kids to learn foreign languages in the early years of their lives.
- e) Political commitments to innovation and reform policies to reach technological “catching up”, play an important role in increasing the effectiveness of innovation policies (World Bank, 2013). In this way, it is very important to involve the responsible politicians and policymakers in the innovation process.
- f) Finally, constant monitoring, evaluation of the results and feedback, taking into account stakeholders linkages. Being openness to possible failures because some pilot project can fail or some experimental projects cannot be successful; being necessary to readjust them, making some improvements.

In the case of **technology policies**, following broad definition of Lundval and Borrás (2004), they are related activities to get technological progress in a country, and also they are adopted with aim to catching up more technological advanced countries. In this way it is important that countries from “Pacific Alliance” established explicitly, in how many year they are willing to reach technological advanced countries, including those from “Asian Pacific” region. Furthermore, it is very important to determine what kind of technologies the governments should stimulate their commercialization, including its imports, and the sectorial technical knowledge.

In this vein, it could be important to study the possibility to establish an especial **Ministry of Technology** to focusing on all these activities explicitly, under constitutional mandate, including the need of capturing new technological trends, keep up with the technological progress in the world, and identify what are the most socially benefited technologies for the country. It is important a better coordination among institutions related with the technological progress of the country such as Ministry of Communication, Ministry of Education and Regulation of Property Rights Institution. This also in the new economy of knowledge or innovation; indeed, some instruments of innovation and technology policies can be related and overlapped; or both can be develop at the same time by the aforementioned institution.

The investment on Research and Development (R&D), main input on innovation, from private and public sectors should increase, unless 1.5 percent of the GDP, for better performance of the economy. In the East Asia it reaches 3.5 percent of the GDP.

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Annex No 1: Research & Development Investment (rd) effects in the 2000s decade

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	gdp	gdp	gdp	gdp	gdp	gdp	gdp
gdp01	-1.562933** (-4.00)	-1.763256** (-3.97)	-1.759241** (-4.00)	-1.719271** (-3.52)	-1.667487** (-3.66)	-1.094639** (-3.25)	-1.047203** (-3.55)
indva	-.0390097 (-0.55)						
agriva	-.1149474 (-1.35)	-.1042172 (-1.34)	-.0507386 (-0.91)	-.0484152 (-0.85)			
serva	-.05447 (-0.70)	-.0248273 (-0.32)	.0318363 (0.74)	.0302941 (0.69)	.0838327 (1.63)		
secondary	.0467803** (3.28)	.0502301** (3.42)	.0487827** (3.63)	.0479592** (3.46)	.0485475** (3.22)	.0436977** (2.88)	.0406877** (2.84)
gkf	.0325813 (0.75)	.0220646 (0.47)	.0204298 (0.42)	.0207601 (0.43)	.0085752 (0.16)	.0555798 (1.20)	.0675296 (1.57)
gc	-.0789523* (-1.92)	-.0926808** (-2.08)	-.0942555** (-2.07)	-.0926071* (-1.96)	-.1149992** (-2.09)	-.1226076** (-2.45)	-.1102123** (-2.55)
rd	.2993649 (1.01)	.5095523 (1.39)	.5239635 (1.40)	.4937544 (1.18)	.2799898 (0.64)	.1611725 (0.40)	.0406342 (0.13)
manva		-.0618455 (-0.77)					
nomanva		-.0064837 (-0.08)	.0520495 (1.08)	.0513311 (1.04)	.0917237* (1.67)	.044492 (1.31)	
manex			-.0012195 (-0.14)	-.0000704 (-0.01)	.0079038 (0.89)	.0081243 (0.91)	
metalex				.0085708 (0.48)	.0077366 (0.43)	.008742 (0.50)	.0066715 (0.54)
agrex					-.0101171 (-0.35)	-.0093364 (-0.31)	-.0143121 (-0.59)
servex						2.172564 (1.16)	2.033433 (1.06)
fuellex							.0103761 (0.72)
foodex							-.0124388 (-1.07)
_cons	18.0639* (1.98)	17.73789** (2.04)	12.19027** (2.81)	11.87655** (2.59)	7.681493** (3.03)	7.578687** (3.16)	8.278152** (4.02)
N	89	89	89	89	90	89	92
r2	.5038273	.5250356	.5237575	.5254217	.4561191	.4642288	.463222
r2_a	.45421	.4709257	.4695021	.4645783	.3872734	.3955402	.3969531
rmse	1.604008	1.579255	1.581378	1.5887	1.779345	1.76842	1.753379

t statistics in parentheses

* p<0.10, ** p<0.05

Annex No 2: Research & Development Investment >1.5% GDP effects in the 2000s

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	gdp	gdp	gdp	gdp	gdp	gdp	gdp
gdp01	-1.841876** (-4.99)	-1.829337** (-4.63)	-1.851649** (-4.63)	-1.837528** (-4.41)	-1.650836** (-4.04)	-1.163028** (-3.90)	-1.166014** (-4.08)
indva	-.0513858 (-0.77)						
agriva	-.1471458* (-1.85)	-.1209264* (-1.82)	-.0882072** (-2.48)	-.0889799** (-2.48)			
serva	-.0622618 (-0.88)	-.0376168 (-0.54)	-.0054136 (-0.16)	-.0065146 (-0.20)	.0543736 (1.32)		
secondary	.0522796** (3.90)	.0520633** (3.81)	.0517075** (3.94)	.0513584** (3.78)	.0528808** (3.56)	.0504534** (3.48)	.0486036** (3.46)
gkf	.0632862* (1.81)	.062964* (1.73)	.0587533 (1.58)	.0597074 (1.60)	.0462051 (1.09)	.0449027 (0.93)	.0548863 (1.27)
gc	-.0379936 (-1.08)	-.0388457 (-1.06)	-.0383576 (-1.04)	-.0376008 (-0.99)	-.0486409 (-1.14)	-.0932914** (-2.47)	-.0858814** (-2.62)
rd2	1.145348* (1.93)	1.140421* (1.80)	1.124117* (1.77)	1.095936 (1.63)	.6020789 (0.89)	.3804692 (0.61)	.201616 (0.37)
manva		-.0260867 (-0.37)					
nomanva		-.0258051 (-0.38)	.0105386 (0.30)	.0092974 (0.25)	.0640809 (1.51)	.0349596 (1.20)	
manex			.0045529 (0.60)	.0047876 (0.63)	.0143642* (1.82)	.0114959 (1.54)	
metalex				.0040804 (0.27)	-.0004027 (-0.03)	-.0018705 (-0.12)	-.0108577 (-0.80)
agrex					-.0126122 (-0.67)	-.0067726 (-0.33)	-.0181883 (-0.99)
servex						.4378774 (0.33)	.5059576 (0.35)
fuellex							-.0026385 (-0.26)
foodex							-.0177153* (-1.73)
_cons	19.54333** (2.28)	16.97973** (2.19)	13.86819** (4.07)	13.80198** (3.99)	7.057693** (3.37)	7.756903** (3.90)	9.142125** (4.59)
N	117	116	116	116	117	113	118
r2	.4804221	.4800734	.4818988	.4823661	.3969484	.3878794	.3839051
r2_a	.4419348	.4359287	.437909	.4330677	.3400567	.3278676	.3263261
rmse	1.672423	1.688598	1.685631	1.692875	1.894707	1.801125	1.803568

t statistics in parentheses

* p<0.10, ** p<0.05

Annex No 3: Regressions for the period of twenty years (1991-2010)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	gdp	gdp	gdp	gdp	gdp	gdp	gdp
gdp91	-.6588836** (-2.86)	-.6501164** (-2.81)	-.6459665** (-2.76)	-.6728299** (-2.83)	-.6605179** (-2.93)	-.2812044* (-1.71)	-.2607289 (-1.57)
indva	.2521651 (1.40)						
agriva	.2252426 (1.25)	.1331587 (1.17)	-.0069061 (-0.24)	-.0070253 (-0.25)			
serva	.2631802 (1.49)	.1756946 (1.57)	.0361567 (1.53)	.0376698 (1.59)	.04225* (1.90)		
secondary	.0216692** (2.48)	.0184129** (2.20)	.0146632* (1.68)	.0151464* (1.73)	.0161289* (1.87)	.012334 (1.45)	.0114543 (1.30)
gkf	.0912843** (3.44)	.0969495** (3.47)	.0815878** (2.63)	.0786179** (2.49)	.0791816** (2.55)	.0827915** (2.78)	.0943915** (3.48)
gc	-.046614* (-1.85)	-.0480156* (-1.84)	-.0481491* (-1.83)	-.0485447* (-1.84)	-.0493283* (-1.87)	-.0727563** (-3.27)	-.0694134** (-3.43)
manva		.1695262 (1.51)					
nomanva		.1651027 (1.39)	.0282569 (1.12)	.0304101 (1.20)	.0358902 (1.57)	.0190729 (1.12)	
manex			.0146945** (2.49)	.014277** (2.44)	.0151651** (2.77)	.0130101** (2.40)	
metalex				-.0065186 (-0.83)	-.0060772 (-0.76)	-.0056697 (-0.71)	-.0166181* (-1.91)
agrex					.0056765 (0.59)	.0060515 (0.58)	-.0075832 (-0.73)
servex						.0085773 (1.25)	.0079389 (1.09)
fuellex							-.0071127 (-1.45)
foodex							-.0155833** (-2.31)
_cons	-20.83245 (-1.19)	-12.14903 (-1.11)	1.988543 (0.85)	2.189692 (0.93)	1.531339 (1.24)	1.582911 (1.32)	2.656775* (1.98)
N	130	130	130	130	130	128	130
r2	.2781472	.2720659	.2924704	.2950816	.2957316	.276147	.2777425
r2_a	.2367295	.223938	.2456915	.2422127	.2429115	.2209379	.2235732
rmse	1.358774	1.370112	1.350773	1.353884	1.35326	1.308393	1.296272

t statistics in parentheses

* p<0.10, ** p<0.05