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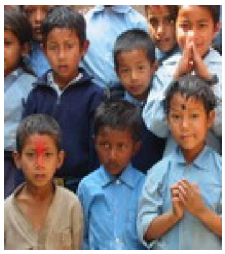
Building Productive Capacities: Challenges and Opportunities for Least Developed Countries

Clovis Freire

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WP/12/02

MPDD Working Papers
Macroeconomic Policy and Development Division

Building Productive Capacities: Challenges and Opportunities for Least Developed Countries*

by Clovis Freire[1]

March 2012

Abstract

The views expressed in this Working Paper are those of the author(s) and should not necessarily be considered as reflecting the views or carrying the endorsement of the United Nations. Working Papers describe research in progress by the author(s) and are published to elicit comments and to further debate. This publication has been issued without formal editing.

Building productive capacities is a top priority for least developed countries to promote development and graduate from the status of least developed country. This paper discusses the challenges and the opportunities for these countries to build their productive capacities. It argues that the main challenge is to manage the long-term effects of the increase in the terms of trade of commodities and reduction of terms of trade of manufactures, which threaten their growth trajectory. The paper presents a method to identify the opportunities for diversification that promotes the generation and acquisition of productive capacities. It also presents a list of potential new products and export markets that could be targeted by government and private sector for achieving higher long-term gains.

JEL Classification Numbers: O11, O14, O33, O57

Keywords: Productive Capacity, Least Developed Countries, Economic Development

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* I thank Mr. Syed A. M. Nuruzzaman, Chief of Countries with Special Needs Section, Macroeconomic Policy and Development Division of ESCAP, and participants of the UNCTAD's Expert Meeting of least developed countries "Challenges and opportunities for LDCs: Graduation and Structural transformation", held in Addis Ababa, Ethiopia, on 28 February to 1 March 2012, for comments on a previous version of this paper. The views expressed herein are those of the author and do not necessarily reflect the views of the United Nations. It has been issued without formal editing.

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Building Productive Capacities: Challenges and Opportunities for Least Developed Countries

Clovis Freire

I. INTRODUCTION

Building productive capacities has been recognized by the United Nations in the Istanbul Programme of Action (IPoA) as a top priority for least developed countries to benefit from globalization, increase resilience, sustain growth as well as poverty eradication, achieve structural transformation, and generates full and productive employment and decent work for all (United Nations, 2011).

This paper discusses the challenges and the opportunities for least developed countries to build their productive capacities, promote structural transformation and facilitate their graduation from the least developed country status. It argues that the main challenge is to manage the long-term effects of the increase in the terms of trade of commodities and reduction of terms of trade of manufactures. This shift in price creates incentives for firms in least developed countries to further specialize in either primary commodities or low-value manufacture, retarding the diversification of their economies. The paper also presents a method to identify the opportunities for diversification that promotes the generation and acquisition of productive capacities. It presents a list of potential new products and export markets that could be targeted by the government and the private sector for achieving higher long-term gains.

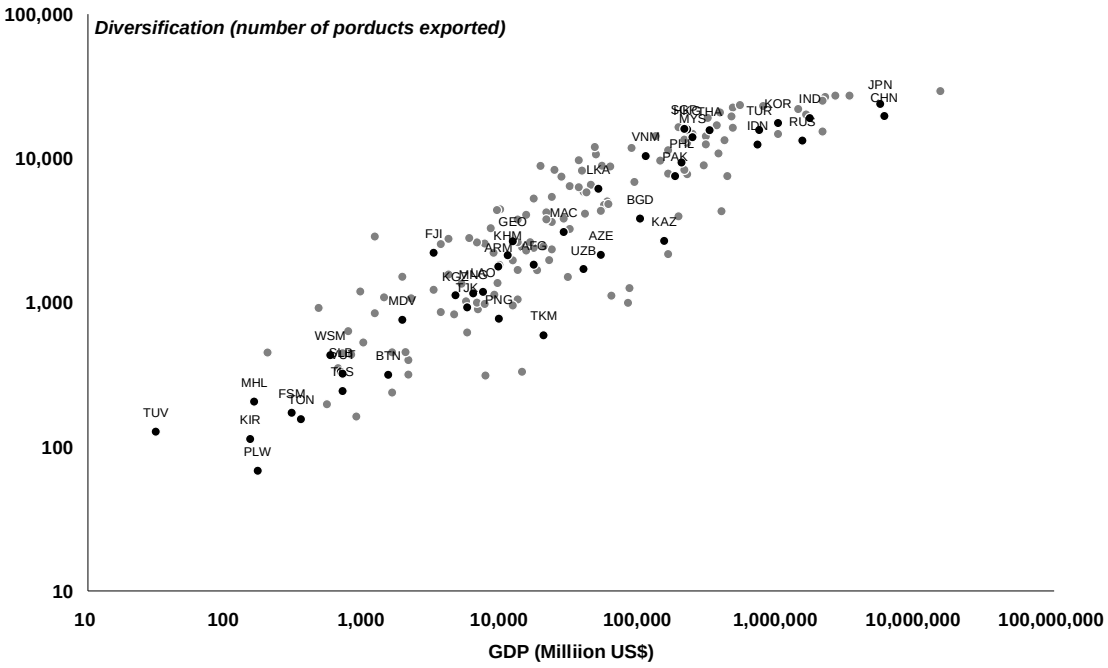
The paper starts by discussing some stylized facts related to economic growth, diversification and productive capacities. It then presents the experience of Asia-Pacific countries in building their productive capacities. The paper shows that, similar to other least developed countries, those in Asia-Pacific have not made much progress over the past 25 years when compared with world's average. The paper then discusses the experience of Viet Nam, one of the few countries that were able to transform their productive capacities when stating from low levels. The paper then discusses the challenges and opportunities for least developed countries to build their productive capacities and ultimately graduate. The final section presents conclusions and recommendations.

II. DEVELOPMENT, DIVERSIFICATION AND PRODUCTIVE CAPACITIES

Economic development is associated with the production of an expanding range of goods and services, not simply producing more of the same. This is one of the stylized facts that come out of recent literature on growth, trade and development. For example, Imbs and Wacziarg (2003) shows that, as incomes increase, economies become more diversified. Using highly disaggregated US trade data, Schott (2004) shows that US trading partners do specialize within products – when exporting the same product, rich nation export the varieties of higher unit value while poorer nations export the ones of

lower unit value. But they do not specialize across products – rich nations export to the US many different products, including the products exported by poorer nations. Using trade data disaggregated by unit price of the products, ESCAP (2011) shows that diversification within and across products occur in tandem and are both associated with an increase in total output. Figure 1 illustrates this stylized fact regarding the association between GDP and diversification, using the number of products exported as a proxy for product diversification.

Figure 1. Higher output is associated with diversification



Source: Author based on data from the United Nations Commodity Trade Statistics Database (COMTRADE) and from the World Bank's World Development Indicators.
Note: Number of products exported is the number of category of products exported classified using HS 2002 trade data disaggregated at 6-digit level and further disaggregated by unit price by applying the methodology applied in ESCAP(2011) and described in Freire(2011).

Another stylized fact presented in ESCAP (2011) is that economies that are more diversified tend to export products that are not very common, meaning that they are not produced by many other countries. This empirical regularity is also presented and discussed in Hausmann and Hidalgo (2010) using three different trade classification systems. This fact suggests that as countries diversify their product-mix of exports they face lower competition, improving their chances to increasing gains.

The least developed countries, however, have not diversified and continue to produce fairly standard goods. For example, ESCAP (2011) shows that, in 2009, least developed countries in Asia-Pacific exported in average only half the number of categories of products exported by other countries and faced 10 per cent more competition. To add to the challenge, between 1984 and 2009, the average diversification of countries participating in international trade doubled. Therefore, if least developed countries do not diversify they will not remain in the same position related to other countries, they will fall behind.

It may seems possible for firms in least developed countries to diversify to any

product that already exist elsewhere, given that product diversification for these countries does not need to involve the invention of new products but rather the emulation of production that already exist in more developed countries. However, diversification is a path dependent process. Products that are produced in a country today affect the products that will be produced in that country in the future. Thus not all possibilities are available at a given point in time.

A useful framework to analyze possible paths for diversification is to imagine a space occupied by all products and where products are connected to each other if they are usually part of the same product-mix (Hausmann and Klinger, 2007; Hidalgo and others, 2007; ESCAP,2011). An empirical regularity of such product space is that some products are very well connected while some others are connected to only a few products. Products that are well connected provide a platform for further diversification in the future.

Hidalgo and Hausmann (2009) use the structure of a bipartite network connecting countries to the products they export to quantify the set of capabilities available in the country using a method that they called "method of reflections". The assumptions are that: i) products require a specific set of capabilities to be produced, ii) countries have some of these capabilities available but not all of them, and iii) it will be produced in a country only the products for which the required set of capabilities are available in that country.

ESCAP (2011) uses a revised version of the method of reflections to arrive at a "productive capacity index". Productive capacities can be generally defined as the set of capabilities available in a country to produce and market its output of goods and services (ESCAP, 2011). These capabilities include resource endowments (i.e. labour, physical capital, human capital, land), total factor productivity, mechanisms for the allocation of these endowments to specific uses, and any other factor that contributes to maximizing the output of the economy, including trade and transport integration, institutions, policies and regulations. The results for countries of Asia and the Pacific region show that the majority of them have below global average productive capacities. Freire (2011a), extending the productive capacity index to all Least developed countries, shows that the least developed countries with the highest levels of productive capacity in 2009 were Uganda, Tanzania and Bangladesh, while the countries with the lowest were Tuvalu, Kiribati and Guinea-Bissau.

III. BUILDING PRODUCTIVE CAPACITIES

The experience of the Asia-Pacific least developed countries in building productive capacities is not different from the experience of other least developed countries. Freire (2011a) shows that both groups increased their productive capacities seven fold since 1985, when measured in relation to the productive capacity of the US. However, differences exist between landlocked and small island developing states. The group of landlocked has increased their productive capacity slightly faster than the average of the group of least developed countries, while the group of small island developing states, on the other hand, has the lowest level of productive capacity and has made the slowest progress in the past 25 years. That highlights the special challenges faced by small island developing states given their remoteness and small population.

While the least developed countries have increased their productive capacities when measured as a percentage of the productive capacity of the USA, in relation to the global average the situation is different. In Asia-Pacific region, with the exception of Bangladesh and Nepal, all least developed countries were either in the same position or further away from the world's average productive capacity in 2009 than in 1991. While China, India and other emerging economies increased their productive capacities in the past 25 years, when compared with the world's average, countries with below-average productive capacity such as the least developed countries have in general dropped further below. In fact, UNCTAD (2011) shows that only Uganda and Tanzania were able to increase their productive capacities during that period, when compared with the global average. That suggests that the growth path that the least developed countries have followed and the international regime that they are inserted were not conducive to the improvement of their productive capacities.

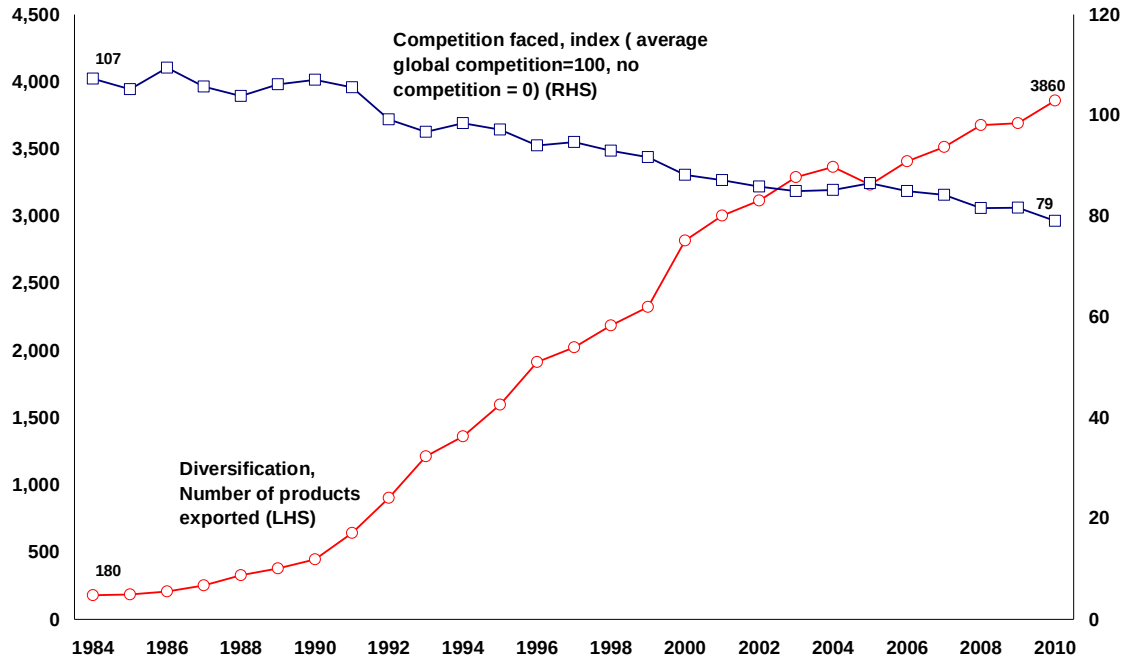
But such lack of progress in building productive capacity starting from such low levels is not exclusive of the least developed countries. ESCAP (2011) shows that only four countries were able to transform their productive capacities in the past 25 years when starting from such low levels: Estonia, Latvia, Lithuania and Viet Nam. The fact that these countries were also moving from a central planning to a market economy highlights the importance of market-based allocation of resources across economic activities for the increase of productive capacities.

The experience of Viet Nam's transformation provides important insights in the process of increasing productive capacity. As discussed in the previous section, diversification is a fundamental element in this process. Figure 2 shows that from 1984 to 2010 the number of categories of products exported by Viet Nam has increased by more than 20 fold, from 180 to 3,860 categories at 5-digit level SITC rev-2 classification further disaggregated by differences in unit price.[2]

Not only Viet Nam has diversified, its product-mix has become less common, reducing the competition faced by the firms of that country. Taking as the yardstick the global average number of countries in competition for the import markets of similar product-mix, the competition faced by firms in Viet Nam reduced by about 20 per cent in that same period.

[2] For details on the classification methodology see Freire (2011), appendix section 4 "Accounting for differences in product quality".

Figure 2. Increasing diversification and reducing competition of Viet Nam's exports

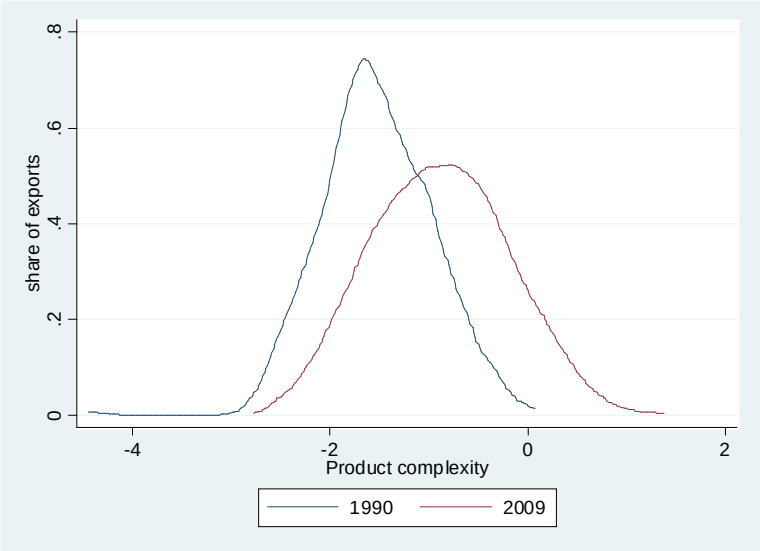


Source: Author based on data from the United Nations Commodity Trade Statistics Database (COMTRADE).
Note: Number of products exported is the number of category of products exported classified using SITC rev-2 trade data disaggregated at 5-digit level and further disaggregated by unit price by applying the methodology applied in ESCAP (2011) and described in Freire (2011).

The transformation of product-mix can be assessed by analyzing the product-mix exported by Viet Nam at different years and assessing how complex they were, in terms of the capabilities required to produce them. To measure such product complexity, this paper analyses how diversified are the countries that export each product and how common are the other products that they export. Products that are exported by diversified countries that export exclusive product-mix are considered to be more complex than products that are exported by less diversified countries that export rather common products (See *Appendix* section 1 for details).

Figure 3 presents how the complexity of the product-mix exported by Viet Nam has changed over time. The graph is normalized to have the products with global average complexity in the middle (measured as zero complexity) and standard deviations from the average measure as one. The Figure shows that, from 1990 to 2009, the average complexity of the product-mix shifted to the right towards more complex products. ESCAP (2011) shows that the upper limit of the distribution of Viet Nam's product complexity has expanded gradually. The new products of higher complexity that are added to the product-mix are not far apart from the most complex products of the previous product-mix, suggesting that the transformation of product-mix complexity has not occurred through leapfrogging but through incremental increases.

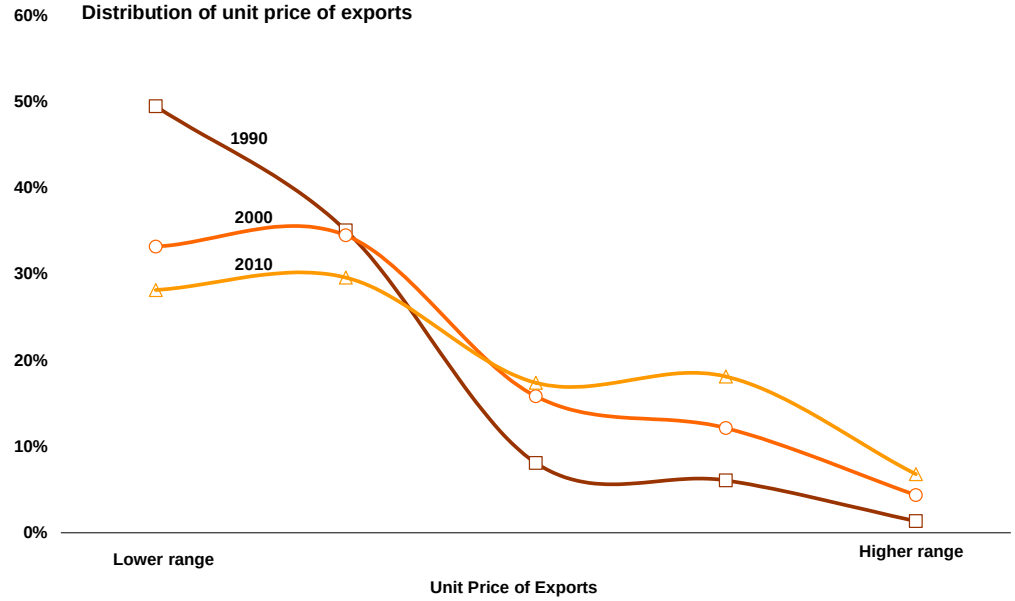
Figure 3. Increasing complexity of Viet Nam's products



Source: Author based on data from the United Nations Commodity Trade Statistics Database (COMTRADE).
Note: Product complexity is a measure of how diversified are the countries that export that product and how common are the other products that they export. See *Appendix* section 1 for details.

As exports from Viet Nam became more complex they also became more expensive. This is illustrated by figure 4, which shows that in 1990 half of products exported by Viet Nam could be classified in the low end of the price range when compared with all other products of the same category, while almost none could be classified within the higher end of price range. In 2010 the situation had changed with less than 30 per cent of products in the low-end and about the same proportion in the higher-end price ranges.

Figure 4. Increasing value addition of Viet Nam's product-mix



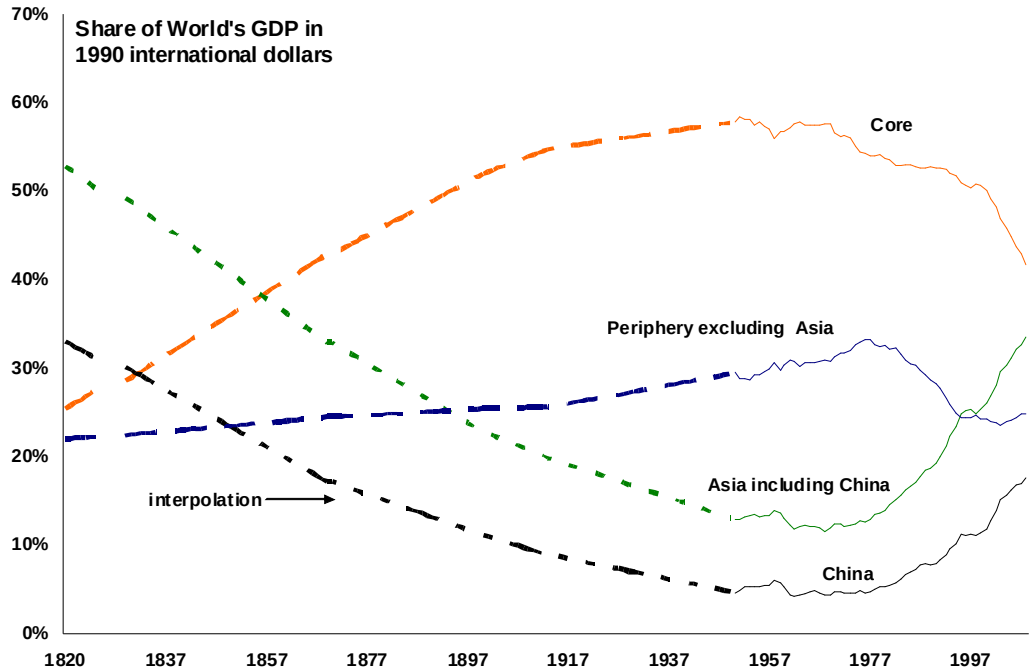
Source: Author based on data from the United Nations Commodity Trade Statistics Database (COMTRADE).
Note: Unit price ranges are identified by applying the methodology used in ESCAP (2011) and described in Freire (2011).

IV. CHALLENGES

A key challenge for the least developed countries that seek to diversify their economies is to manage the long-term effects of the boom in commodity terms of trade. Breaking the historical downward trend in prices of commodities, since 2000 the average annual price growth rates have ranged from 8.5 per cent for raw materials to 17.4 per cent for metals and minerals.[3] The boom in commodities has ended a secular decline in commodity terms of trade. The countries that experienced the highest increase in their terms of trade in the past decade were major exporters of energy resources or minerals. On the other hand, countries whose main exports are manufactures have seen their terms of trade deteriorate.

The current boom in commodity terms of trade is not totally unprecedented. The rise of the Western Europe and their offshoots in the 19th century in the midst of the first globalization also created the conditions to a commodity price boom. Prices of primary products soared with the increasing output from manufacture production. The industrial revolution increased the growth rates in the rich core countries which specialized in manufactures much faster than it did in the poor periphery countries which specialized in primary products. Both groups of countries gained from the trade boom but the periphery missed the big push given by industrialization and fell behind, giving rise to the great income divergence between the rich countries and the poor periphery much of which persists to this day (Williamson, 2011).

Figure 5. The rise of Asia, share of global GDP



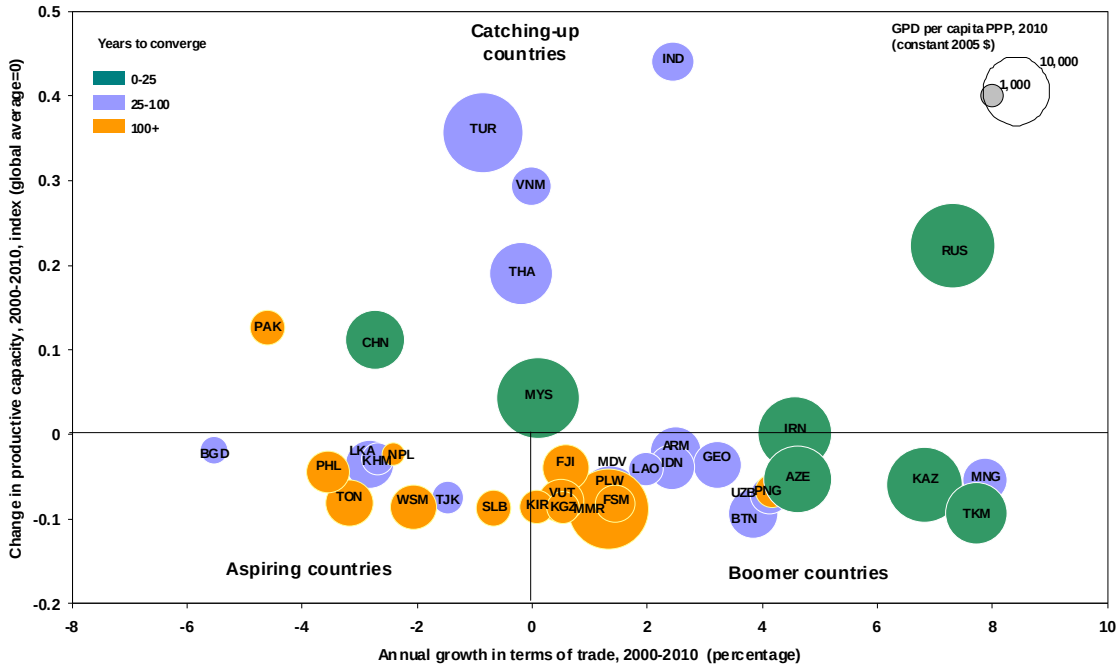
Source: Author based on data from Maddison, 2009.
Notes: 'Core' correspond to Western Europe (i.e. Austria, Belgium, Denmark, Finland, France, Germany, Italy, Netherlands, Norway, Sweden, Switzerland and United Kingdom), its Western offshoots (i.e. Australia, New Zealand, Canada, United States), and Japan. 'Asia' corresponds to China, India, Indonesia (including Timor-Leste until 1999), Philippines, Republic of Korea, Thailand, Taiwan, Bangladesh, Myanmar, Hong Kong, Malaysia, Nepal, Pakistan, Singapore, and Sri Lanka. 'Periphery' corresponds to the World excluding the 'core' countries.

[3] Author based on data from World Bank Commodity Price Data, available from http://go.worldbank.org/4ROCCIEQ50 (accessed 27 September 2011). Values for other commodity indices are: energy (15.1 per cent) and food (9.2 per cent).

Similar to what happened 190 years ago, in the late 1970s a group of countries, this time around from Asia, started to rise and increase its share in global GDP (figure 5). This time, however, the rate of increase has been at least twice as fast. The share in global GDP of these Asian countries increased 20 percentage points in 30 years - from 13 per cent in 1979 to 33 per cent in 2008. The engine of such growth has been China, which share in global GDP increased from 5 per cent in 1979 to 17 per cent in 2008. Its fast growth has also pushed many other Asian countries that were able to integrate themselves into their supply chains of manufacturing production.

However, the same factors that have contributed to the increasing divergence during the 19th century are at play today. This time around the dynamics are more complex because there are not only two groups of countries (i.e. core and periphery) but four: 1.) the 'incumbent' developed countries; 2.) the 'catching-up' countries that are growing through industrialization and structural transformation; 3.) the 'commodity-boom' countries that are benefiting from the high commodity prices; and 4.) the 'aspiring' countries, those low-income resource-poor countries, that have yet to build their productive capacities to move up in the income ladder. The latter three groups represent a division of developing countries according to their progress in building up productive capacities, their gains terms of trade and the expected time for them to catch-up with high income countries assuming that they continue their current growth trajectory (figure 6).

Figure 6. The new periphery, selected Asia-Pacific countries



Source: Author based on data from the United Nations Commodity Trade Statistics Database (COMTRADE) and from the World Bank's World Development Indicators.
Note: Productive capacity is calculated using a revised version of the method of reflections (Hidalgo and Hausmann, 2009) as applied in ESCAP (2011) and described in Freire (2011).

The impact of the commodity boom in the growth trajectory of these countries depends on the extent that price shifts for both manufactures and commodities will alter incentives within each economy either towards or away from increasing diversification and modernization. The declining terms of trade of manufacture creates incentives for

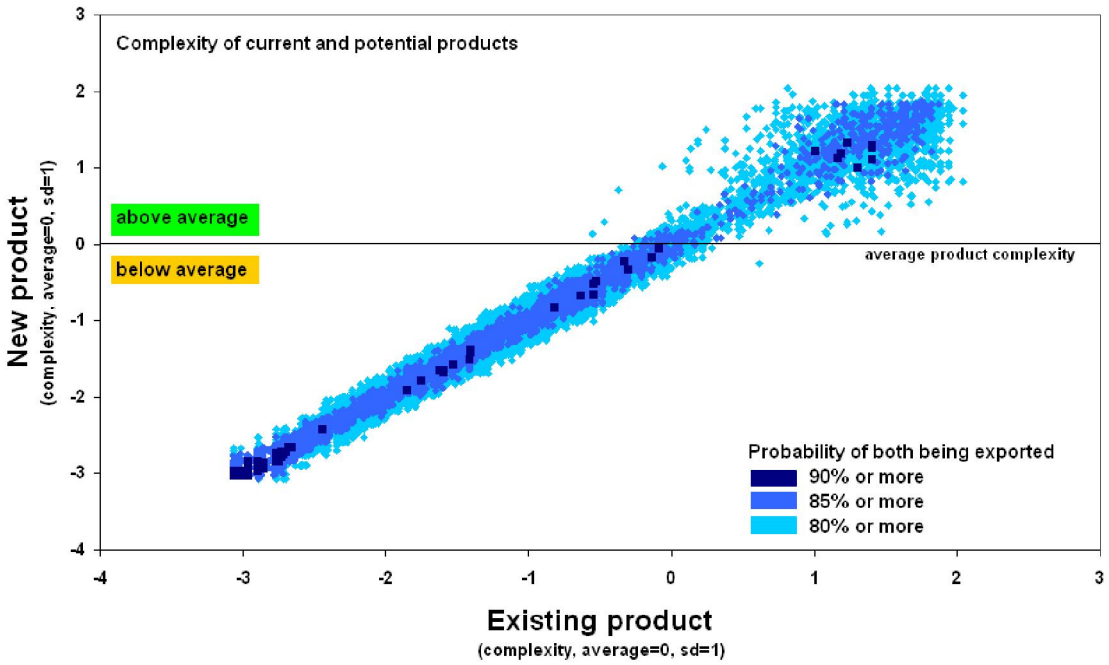
the aspiring countries to boost production and trade of the same products that they already produce. Commodity-boom countries, on the other hand, have the incentive to further specialize in primary products.

These asymmetric incentives resulting from the commodity boom create two main long-term risks for least developed countries. First, there is the risk that the commodity-boom countries get trapped in specializing in fewer economic activities that are more volatile and prone to rent seeking, thus reducing the prospects for long-term growth – similar to the experience of periphery countries during the industrial revolution. Second, the aspiring countries, faced with decreasing prices for their manufactures and the incentives to specialize in low-skill industries, fail to create new economic activities and productive employment and fall further behind.

V. OPPORTUNITIES

Where are the opportunities for least developed countries to diversify their economies and graduate? Given the experience of countries that have transformed their productive capacities, the opportunities are in products that are more complex (i.e. those that are produced by a smaller number of countries which in addition are also more diversified) and that are nearby to the existing product-mix in the product space (i.e. those that require a set of capabilities to be produced that is somewhat similar to that required to produce the current product-mix). Figure 7 illustrate the global distribution of such opportunities.

Figure 7. Where the opportunities are



Source: Author based on data from the United Nations Commodity Trade Statistics Database (COMTRADE).
Note: Product complexity is a measure of how diversified are the countries that export that product and how common are the other products that they export. See *Appendix* section 1 for details.

The figure shows in the horizontal axis the complexity of all products produced in 2010

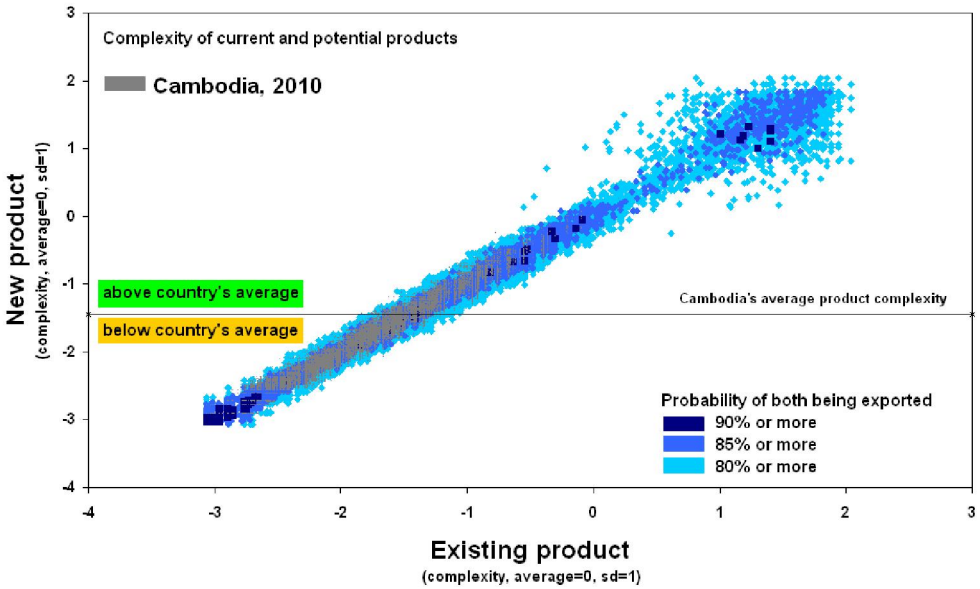
classified at 6-digit level HS 2002 and further disaggregated by unit price. The scale is normalized in such a way that the average global complexity is zero and the standard deviation of the distribution of product complexity is 1. In the vertical axis, the graph shows the complexity of potential new products. Therefore, each dot in the graph represents a pair composed by an existing and a new product. The colour of the dots indicates the proximity of the existing and new products measured as the probability of a country to export both products at same time (Hidalgo and others, 2007).

The graph shows that up to the level of global average complexity, the complexity of new products is close to the complexity of existing products (i.e. half standard deviation above and below), while for products with above average complexity the distribution is more diffused with opportunities one standard deviation above and below.

What is important for each country is to map out the potential new products that could be produced with a high probability given their current product-mix and that have complexity above the average complexity of that product-mix. Figure 8 illustrates the map of potential new exports in the case of Cambodia. The average complexity of Cambodia's product-mix is -1.44, thus, new products with complexity above that level would contribute in pushing the distribution of complexity of the country's product-mix towards more complex products. Figure 9 shows, however, that the majority of the pairs of existing products and potential new export opportunities are concentrated below the country's average product complexity, reducing the probability of more complex new economic activities emerge.

Every year, many new products are produced and many others are discontinued. The increase of productive capacity of a country entails a higher rate of success in the diversification towards new products that are more complex than the average. These more complex new products face lower competition, thus have higher chances to succeed, but they are also less numerous in the total set of potential new products reducing their chances of them being actually discovered by entrepreneurs.

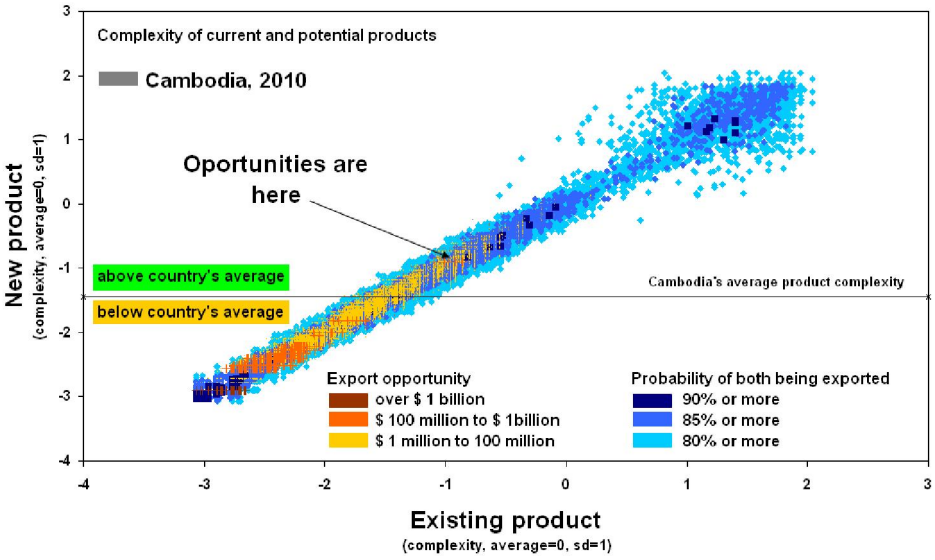
Figure 8. Where the opportunities are, Cambodia



Source: Author based on data from the United Nations Commodity Trade Statistics Database (COMTRADE).
Note: Product complexity is a measure of how diversified are the countries that export that product and how common are the other products that they export. See *Appendix* section 1 for details.

Another factor that influences the rate of discovery of new products is its expected demand. Products that are in high demand are more likely to attract entrepreneurs and are also more likely to succeed. Figure 9 maps the export opportunities of the potential new products in the case of Cambodia. Export opportunity indicates the potential increase in demand of different products and it is measured as the average annual increase of product's imports as a share of global imports. The indicator is multiplied by the total value of imports in 2010 to give a monetary indication of the potential increase in demand (See *Appendix* section 2 for more details).

Figure 9. The opportunities are in new products with above average complexity and high global demand



Source: Author based on data from the United Nations Commodity Trade Statistics Database (COMTRADE).
Note: Product complexity is a measure of how diversified are the countries that export that product and how common are the other products that they export (See *Appendix* section 1 for details). Export opportunity is a measure of the degree to which the potential new exports of one country match the expanding import markets of another (See *Appendix* section 2 for details).

Figure 9 shows that the potential new products with higher export opportunities (over $1 billion) are concentrated at the less-complex part of the set. Potential new products with export opportunity above $100 million are, with few exceptions, below country's average product complexity. These results indicate that new products with below average complexity are more likely to attract entrepreneurs, perpetuating the low complexity of the country's product-mix. The lower competition in the markets of products of higher complexity is a counterbalancing factor that prevents the average complexity of the country's product to move indefinitely towards the lower end.

The change in the distribution of product complexity, and consequently in the country's productive capacity, is driven by the balance between the higher demand for lower-complexity new products and the lower competition in the markets of higher-complexity new products.

The government has a role in nudging the discovery process towards the new products that have higher complexity. Successful diversification towards these new products will generate the new capabilities that will increase the country's productive capacity. They will also facilitate the process of diversification towards other products with higher complexity. That process of increasing product complexity, and consequently increasing productive capacity, has a social benefit that can not be captured by the private entrepreneur. The society will benefit if a larger proportion of entrepreneurs take their chances in those products of higher complexity, but that benefit is not internalized by the entrepreneurs themselves, thus the diversification towards those products is likely to be below the optimum social level. The government should, therefore, support and facilitate the diversification towards those new products of above average complexity and that have high demand through selective policies, including industrial and trade policies and infrastructure development.

The reduced number of diversification opportunities that meet the above criteria indicates that these selective policies should be targeted to a few products. That is illustrated in table 1, which lists, for each least developed country, the number of products that are currently produced, classified at 6-digit level HS 2002 and further disaggregated by unit price; the total number of potential new products that will require, to be produced, capabilities that are closely related to those already in existence; the number of those potential new products that have above country's average complexity; and the number of those that have export opportunity higher than $100 thousand, $1 million and $100 million.

The table shows that almost all potential new products with above country's average complexity have export opportunity higher than $100 thousand. Moreover, the majority of them have export opportunity higher than $1 million. The number of potential new products reduces drastically when considering those with export opportunity higher than $100 million. For example, Bhutan's product-mix indicates that there are 517 potential new products with above average complexity and export opportunity higher than $1 million, but only 5 of those have export opportunity higher than $100 million.

The majority of these export opportunities are in Asia, particularly in China. In fact, export opportunities in China in some cases are higher than the sum of the opportunities in all other countries (table 2). Least developed countries will, therefore,

benefit the most if China's special preference agreements are expanded to all of them and cover these potential new products.

The appendix lists the potential new products for diversification that would provide the major long-term gains and their top 10 export opportunity markets.

Table 1. Potential new products related to those already produced by least developed countries

				Products that are more complex and have export opportunity higher than		
Country	***Current number of products***	***Total***	***More complex***	***$100 Thousand***	***$1 Million***	***$100 Million***
Afghanistan	1830	2360	1407	1406	1271	13
Angola	1258	1929	1034	1031	939	10
Bangladesh	3816	1979	1281	1278	1140	19
Benin	997	1744	959	959	903	9
Bhutan	315	1403	612	612	571	5
Burkina Faso	1130	2125	1137	1137	1051	10
Burundi	237	1194	499	499	471	6
Cambodia	2124	1973	1185	1184	1042	11
Central African Republic	453	1906	944	944	877	11
Chad	311	1216	672	672	636	11
Comoros	197	1145	573	573	554	13
Democratic Republic of the Congo	1679	2252	1332	1332	1221	15
Djibouti	363	1706	875	874	815	7
Equatorial Guinea	331	1134	503	503	486	6
Eritrea	316	1433	699	699	656	10
Ethiopia	1503	2071	1151	1151	1049	10
Gambia	435	1378	629	629	605	9
Guinea	826	1807	959	957	886	11
Guinea-Bissau	162	1033	469	469	454	5
Haiti	897	1873	1098	1098	1002	14
Kiribati	113	936	405	405	384	7
Lao People's Democratic Republic	1183	2002	1211	1211	1098	16
Lesotho	399	1286	781	781	739	13
Liberia	528	1622	877	876	821	12
Madagascar	2213	2057	1120	1120	1006	9
Malawi	1346	2080	1213	1212	1133	14
Mali	1363	2069	1266	1264	1147	13
Mauritania	858	1759	921	921	862	8
Mozambique	1822	2233	1298	1298	1172	15
Myanmar	1724	2115	1290	1290	1186	14
Nepal	2649	2344	1370	1367	1203	13
Niger	1017	2303	1374	1374	1247	12
Rwanda	619	1833	933	933	876	11
Samoa	431	1553	762	762	710	8
Sao Tome and Principe	450	1452	595	595	539	5
Senegal	2617	2212	1530	1529	1364	19
Sierra Leone	1505	2196	1389	1389	1264	17
Solomon Islands	331	1329	635	635	599	10
Somalia	312	1723	877	877	802	9
Sudan	1116	1917	1033	1033	955	7
Timor-Leste	243	1048	420	420	403	8
Togo	1223	2052	1236	1234	1148	13
Tuvalu	127	752	353	353	340	8
Uganda	2391	2383	1515	1512	1350	18
United Republic of Tanzania	3617	2144	1346	1340	1176	16
Vanuatu	321	1270	493	493	465	7
Yemen	1101	2020	1279	1278	1173	17
Zambia	2615	2268	1434	1432	1277	18

Source: Author based on data from the United Nations Commodity Trade Statistics Database (COMTRADE).
Note: Number of products exported is the number of category of products exported classified using HS 2002 trade data disaggregated at 6-digit level and further disaggregated by unit price by applying the methodology applied in ESCAP (2011) and described in Freire (2011).

Table 2. Top 5 export opportunities for top 10 potential new products

Country	Countries with highest value of export opportunities Importer ($ Million)				
Afghanistan	CN 1110	KR 320	MX 120	IN 112	FR 85
Angola	CN 879	KR 359	US 95	FR 83	MX 81
Bangladesh	CN 1079	KR 332	IN 134	BR 134	US 127
Benin	CN 1063	MX 140	DE 123	US 80	IT 80
Bhutan	CN 887	KR 89	MX 82	US 81	NL 49
Burkina Faso	CN 1030	KR 400	MX 132	JP 60	NL 48
Burundi	CN 834	US 140	DE 123	MX 92	CA 50
Cambodia	CN 918	KR 360	MX 126	US 84	FR 66
Central African Republic	KR 354	CN 241	US 76	NL 51	FR 49
Chad	CN 1088	US 226	MX 141	DE 125	BE 64
Comoros	CN 239	US 237	DE 141	BE 95	GB 91
Democratic Republic of the Congo	CN 950	KR 357	MX 87	US 77	FR 66
Djibouti	CN 894	US 122	MX 106	FR 53	RU 53
Equatorial Guinea	DE 169	US 85	FR 74	CA 73	SA 61
Eritrea	CN 901	DE 170	MX 132	FR 91	NL 68
Ethiopia	CN 869	KR 333	MX 88	US 84	FR 82
Gambia	DE 148	US 130	CN 110	GB 54	FR 53
Guinea	CN 275	MY 154	FR 141	HK 88	DE 72
Guinea-Bissau	DE 142	FR 104	US 94	UA 52	NL 50
Haiti	CN 999	MX 139	DE 135	FR 89	US 74
Kiribati	DE 126	SA 58	GB 56	US 54	NL 50
Lao People's Democratic Republic	CN 989	KR 356	US 140	MX 124	FR 91
Lesotho	CN 931	US 257	MX 179	DE 159	BE 121
Liberia	CN 997	US 132	MX 130	DE 126	FR 98
Madagascar	CN 913	MY 171	US 128	MX 119	KR 88
Malawi	CN 882	MY 179	US 134	DE 98	MX 75
Mali	CN 980	US 197	MX 120	FR 91	NL 89
Mauritania	CN 904	US 101	MX 91	FR 89	RU 72
Mozambique	CN 953	DE 149	MX 133	IN 107	GB 106
Myanmar	CN 988	IN 120	US 119	MX 115	KR 81
Nepal	CN 1008	KR 391	DE 108	MX 96	US 95
Niger	CN 978	FR 325	ES 143	BE 117	GB 100
Rwanda	DE 204	CN 87	FR 80	NL 71	RU 65
Samoa	DE 165	US 131	FR 94	SA 58	CA 56
Sao Tome and Principe	CN 895	MX 121	US 78	TH 60	DE 54
Senegal	CN 993	FR 340	ES 143	IN 136	BE 116
Sierra Leone	CN 879	US 162	MX 86	DE 82	NL 78
Solomon Islands	CN 1051	US 237	MX 132	DE 113	HK 107
Somalia	DE 167	US 112	FR 111	GB 94	CN 71
Sudan	CN 897	MX 118	US 93	FR 78	DE 73
Timor-Leste	DE 155	CN 155	GB 105	US 96	HK 82
Togo	CN 922	KR 404	MX 125	US 99	FR 85
Tuvalu	US 274	DE 138	GB 113	BE 82	FR 77
Uganda	KR 403	MY 158	CN 124	US 95	NL 65
United Republic of Tanzania	CN 918	KR 183	IN 144	MX 82	TH 81
Vanuatu	DE 145	US 142	IN 102	CA 68	FR 61
Yemen	CN 999	DE 135	MX 131	FR 87	US 74
Zambia	CN 875	MY 176	DE 145	US 95	MX 93

Source: Author based on data from the United Nations Commodity Trade Statistics Database (COMTRADE).

VI. CONCLUSIONS AND RECOMMENDATIONS

This paper argues that least developed countries should pay special attention in building productive capacities in their development strategies - not only to produce more of the same but to produce and trade new and more sophisticated products. The least developed countries have not made much progress in this front over the years. That highlights the special circumstances that these countries face and the need for target assistance and strategies for the improvement of their productive capacities.

The increase in productive capacities is not a matter of the efficient exploitation of the existing comparative advantages. Economies build their productive capacities through a path-dependent diversification process that expands their production bases by including products that are increasingly more complex, thus facilitating even further diversification in the future. Therefore, a pragmatic strategy for least developed countries to build their productive capacities is to let these capacities be generated or acquired as part of the process of such strategic diversification through the combined efforts of the State and the private sector.

The implementation of such strategic diversification requires the selective promotion of new economic activities over traditional ones through the use of targeted industrial, infrastructure, trade, investment and private sector development policies. An environment conducive to the private sector activities allows for an easier transition to a more diversified economy. As in any entrepreneurial venture, some of these new activities will fail. Ideally, clear benchmarks for success should be set and the market is invariably in a better position than the State to establish them. A pragmatic measure of success is progress in foreign markets, which was the measure used by East Asian countries during their industrialization process. New product (and service) development need to be promoted and replicated by attracting sufficient capital. The aim is not to scale up particular firms but to facilitate the replication of successful business models by many other firms. Such strategy should be put into perpetual motion for developing countries to catch up with the frontier countries. In this process, it is essential to strengthen national institutions and good governance in order to provide a stable environment for the evolution of the economy, the curbing of capitalist cronyism and the promotion of development goals.

That requires “developmental states”, government that gives top priority to economic development in government policy and seeks to design policies and institutions that promote this goal. It also requires a broader policy space that allows industrial and trade policies, macroeconomic policies and regulations that promote the transformation of productive capacities.

A key challenge in this process is to manage the long-term effects of the boom in commodity terms of trade. The boom has shifted prices for both manufactures and commodities which changes incentives within each economy either towards or away from increasing diversification and modernization. The main risks are that the commodity-boom countries could get trapped in specializing in primary products, while aspiring countries fail to create new economic activities and productive employment and fall further behind.

For commodity-boom countries to mitigate the risk of “Dutch Disease”, they should adopt development strategies to shield import competing and non-resource export sectors from de-industrialization and to foster expanding economic diversification and productive employment. Countries should require resource sectors to foster linkages and complementarities with the non-resource sectors. These complementarities will help spill over of technology and knowledge and will also facilitate the diversification of the economy toward export goods. Countries should strategically promote and finance the development of new economic activities with a vision to expand productive capacities of the economy and promote productive employment. To facilitate in increasing productivity in all domestic sectors, they should also finance transfer of technology and

accumulation of capital using resource rents. Countries should also promote development of human capital (e.g. engineers and technicians) to support the development of resource-related knowledge to foster technical progress in resource exploration, extraction, and potential substitution.

Commodity-boom countries should also consider implementing tax policies that encourage spending on domestically produced goods and less on goods produced abroad, including restriction of consumption of imported luxury goods. Countries should remove taxation on imported raw materials that are input to import competing and non-resource export sectors and that are not produced domestically to increase competitiveness of these sectors.

In the monetary front, commodity-boom countries should also consider direct intervention in the exchange market to weaken the exchange rate as a measure to fight the Dutch disease. That builds up international reserves that can be used to strengthen the country against capital account volatility. To sterilize the monetary effect (i.e. increased supply of domestic currency) of the foreign exchange intervention, central banks could issue bonds, which pay interest, to absorb the excess liquidity. Countries should loosen government regulations on investment abroad to counter act the pressure for appreciation of exchange rate. A balanced use of a menu of monetary policy instruments would minimize policy dilemmas that such strategy may bring, including the potential increase in interest rates that would attract even more capital inflows.

Another risk that commodity-boom countries face is the increasing economic volatility caused by the high volatility of commodity prices. Such price volatility is bad for business. When the bust in prices comes, and eventually it does come, some of the high investments to increase output made during the boom period turn out not profitable and have to be sized down. That creates extreme volatility, particularly for the smaller economies that tend to further specialize in few resource-based economic activities, becoming increasingly more exposed to this risk. Countries that diversify towards other products, particularly in manufacturing, and services are able to shield their economies against the vagaries of the commodity markets.

In the case of least developed countries that are labour-abundant, they should engage into the global economy in a way that balances the short term gains of exploiting their current comparative advantages in low-skill industries with the long term gains of fostering new economic activities. In this context, countries should diversify their economies to insert themselves into catching-up economies supply chain, particularly with China, and reduce their reliance on only few labour intensive manufactures that are exposed to fierce competition. Higher wages in fast growing catching-up economies may create the necessary space for those least developed countries to continue to diversify their economies towards manufacturing and other higher value-added economic activities.

REFERENCES

Abdon, Arnelyn, Amrife Bacate, Jesus Felipe and Utsav kumar (2010). Product complexity and economic development. Levy Economics Institute of Bard College. Working Paper No. 616.

ESCAP, 2011. Economic and Social Survey of Asia and the Pacific 2011- Sustaining Dynamism and Inclusive Development: Connectivity in the Region and Productive Capacity in Least Developed Countries. ST/ESCAP/2586. Sales No. E.11.II.F.2.

Freire, C., 2011. Productive Capacities in Asia and the Pacific. MPDD Working Papers, ESCAP, Macroeconomic Policy and Development Division. WP/11/17.

_____, 2011a. Productive Capacities in the Least Developed Countries. Background paper prepared for UNCTAD's The Least Developed Countries Report 2011.

Freire, C., and Isgut, A., 2012. Export opportunities turning East. MPDD Working Papers, ESCAP, Macroeconomic Policy and Development Division. forthcoming.

Hausmann, Ricardo, and Bailey Klinger (2007). The structure of the product space and the evolution of comparative advantage. CDI Working Paper No.146, April. Cambridge, MA: Harvard University, Center for International Development. Available from www.hks.harvard.edu/var/ezp_site/storage/fckeditor/file/pdfs/centers-programs/centers/cid/publications/faculty/wp/146.pdf.

Hausmann, Ricardo, and César A. Hidalgo (2010). Country diversification, product ubiquity, and economic divergence. CID Working Paper No. 201, October. Cambridge, MA: Harvard University, Center for International Development. Available from www.hks.harvard.edu/var/ezp_site/storage/fckeditor/file/pdfs/centers-programs/centers/cid/publications/faculty/wp/201.pdf.

Hidalgo, C.A., and others (2007). The product space conditions the development of nations. Science, vol. 317, No. 5837, pp. 482-487. Available from http://arxiv.org/ftp/arxiv/papers/0708/0708.2090.pdf.

Hidalgo, César A., and Ricardo Hausmann (2009). The building blocks of economic complexity. PNAS, vol.106, No. 26, pp. 10570-10575. Available from www.chidalgo.com/Papers/HidalgoHausmann_PNAS_2009_PaperAndSM.pdf.

Imbs, J., Wacziarg,R. 2003. Stages of Diversification. American Economic Review, American Economic Association, vol. 93(1), pages 63-86, March.

Schott, P., 2004. Across-product versus within-product specialization in international trade. Quarterly Journal of Economics, vol. 119, No. 2, pp. 647-678.

United Nations, 2011. Programme of Action for the Least Developed Countries for the Decade 2011-2020. A/CONF.219/3.

UNCTAD, 2011. The Least Developed Countries Report, 2011: The Potential Role of South-South Cooperation for Inclusive and Sustainable Development.

Williamson, Jeffrey G., 2011. Trade and Poverty: When the Third World Fell Behind. The MIT Press. ISBN-10: 0262015153

APPENDIX

1. Product complexity

This paper uses the method of reflections proposed by Hidalgo and Hausmann (2009) to measure diversification and ubiquity of country's product-mix. The method constructs a network of countries and products that they export and iteratively calculate a generalized measure of diversification and ubiquity as follows:

Mcp = 1 if country c exports product p
Kc,0 = Number of products exported by country c
Kp,0 = Number of countries that export product p

$$K_{c,N} = \frac{1}{K_{c,0}} \sum_p M_{cp} K_{p,N-1} \quad \text{(Generalized measure of diversification)} \qquad (1)$$

$$K_{p,N} = \frac{1}{K_{p,0}} \sum_c M_{cp} K_{c,N-1} \quad \text{(Generalized measure of ubiquity)} \qquad (2)$$

The measure of product complexity (PCOMP) is taken as the normalized value of the Kp value of the 5th interaction of the method of reflections:

$PCOMP = \frac{Kp5 - < Kp5 >}{sd(Kp5)}$, where < Kp5> is the mean and sd(Kp5) is the standard deviation.

To illustrate this idea, take the example of two products: low-priced women's dresses made of synthetic fibres and low-priced bars of alloy steel. Both were exported by 100 economies in 2009, but the average diversification of the countries that exported women's dresses was 3,357 products while the average diversification of countries that exported the bars of alloy steel was 3,505 products. If a product is exported by countries that have higher diversification, it is assumed that this product requires more capabilities to be produced. Thus, a bar of alloy steel would require more capabilities to be produced than women's dresses. The analysis continues to identify how common is the product-mix of the countries that export each product – a more exclusive product-mix indicates that the relevant countries have more capabilities available to them. Such interactive analysis is carried out until no further information is obtainable from this method, which for the dataset used happens on the 5th interaction.

Abdon at all (2010) expands Hidalgo and Hausmann (2009) empirical analysis to explore the relationship between complexity of a product, termed product sophistication, and country's income. They find that major exporters of the more complex products are the high-income countries and the major exporters of the less complex products are the low-income countries. In addition, export shares of the more complex products increase with income, while export shares of the less complex products decrease with income.

To illustrate the concept, Figure *A* presents the proportion of products of different complexity that are produced by Japan, Bangladesh and Tuvalu. The graphs were

normalized to have the products with average complexity in the middle (measured as zero complexity) and standard deviations from the average measured as one. Products exported are classified using SITC rev-2 trade data disaggregated at 5-digit level and further disaggregated by unit price by applying the methodology applied in ESCAP (2011) and described in Freire (2011).

It is clear from the figure that a rich country such as Japan exports products of a rather large range of complexity. As a matter of fact, richer countries produce low complexity products just as the poorer countries, but also produce more complex products. As for poorer countries, such as the least developed countries in the Asia-Pacific region, their exports are concentrated in low complexity products. Small island countries that produce fewer products, such as Tuvalu, have a high proportion of their product-mix concentrated in a set of products of low complexity.

A. The complexity of the product-mix of selected countries (2009)

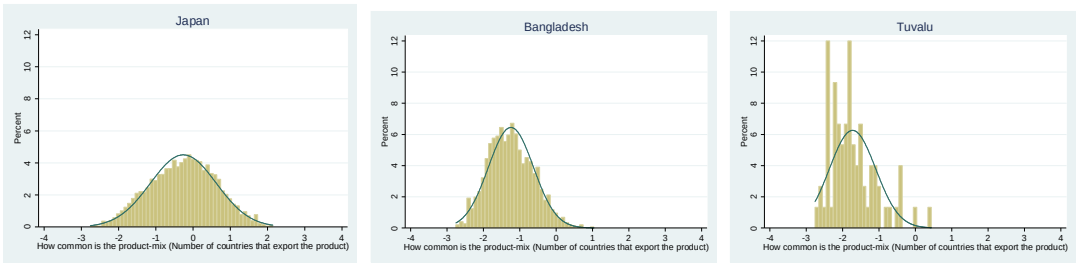
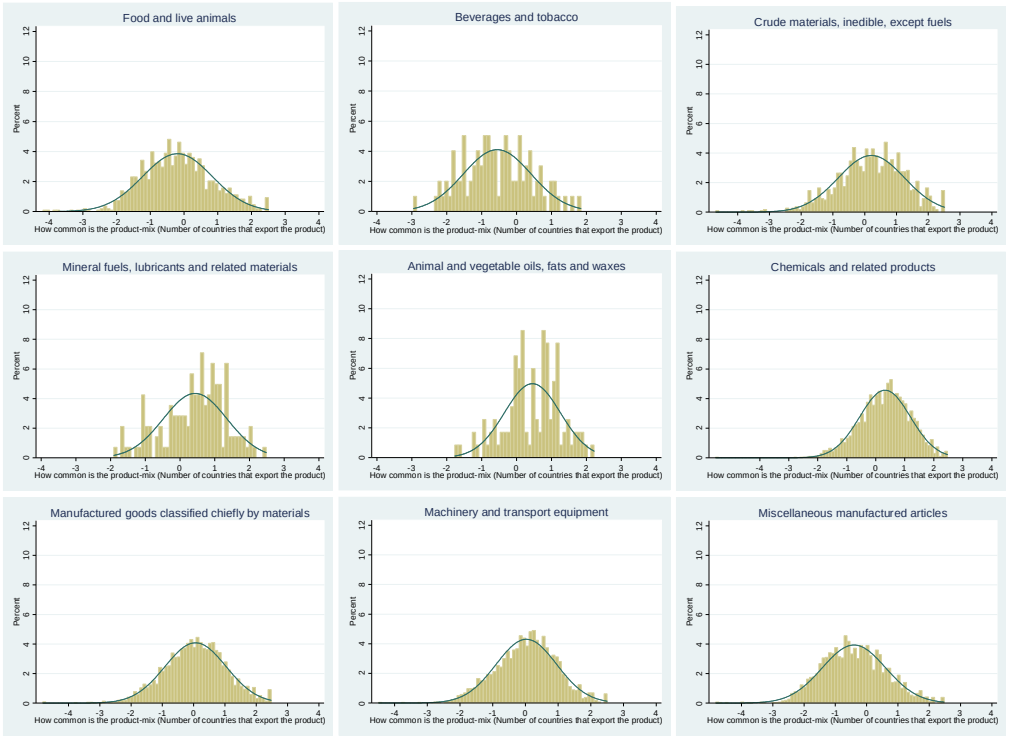


Figure *B* shows graphs with a distribution of the complexity of products of different types (as classified by the Standard International Trade Classification – revision 2). As it is clear from these graphs, there is no concentration of complexity level associated with different types of products.

B. The complexity of products by industry (2009)



Within the nine types considered in the analysis, there are low, medium and high complexity products. This suggests that what matters is not the broad industry but the individual products within the industry. It is possible to find manufactured products of very low complexity and products related to food and live animals of high complexity. There are, however, differences in the 'average' product in each industry. Industries of food and live animals, beverages and tobacco and miscellaneous manufactured articles, which include apparel and clothing accessories, have, on average, products of lower complexity.

C. The complexity of products by product price (2009)

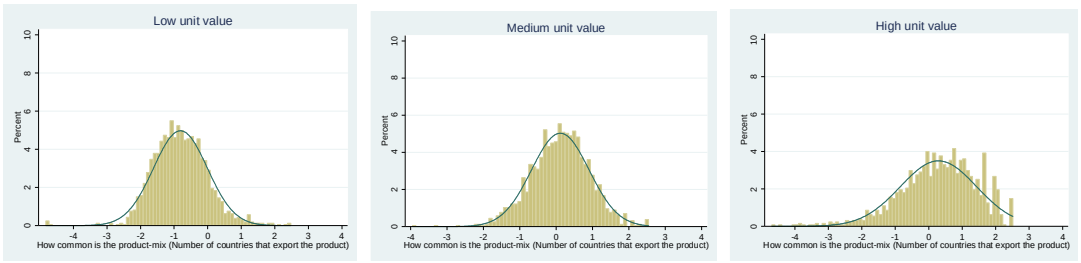


Figure *C* shows the distribution of product complexity by price range. Although lower-priced products could be as complex as higher-priced products, on average, they have lower complexity than middle- and high-priced products. This highlights the fact that another way for increasing product complexity is through differentiating production into higher-priced products.

2. Export opportunity of potential new products

The export opportunity of potential new products is a monetized type of overlap index designed to measure the degree to which the potential new exports of one country match the expanding import markets of another. A higher degree of export opportunity of potential new products indicates more favorable prospects for trade expansion towards the new products given the past rate of growth of the import markets.

The indicator is defined as the sum of the difference of the shares of the sectoral imports of the import country in total world imports between two periods. For any pair of countries, only the sectors that meet the following criteria are included: 1) share of the sectoral imports in total world imports has increased between the two periods, and 2) that sector represents for the export country a potential new product with above average complexity.

The index is calculated as follows:

$\sum_i G_{isd}^{t0,t1} \times M^{2010}$, where $G_{isd}^{t0,t1} = \frac{m_{id}^{t1}}{M^{t1}} - \frac{m_{id}^{t0}}{M^{t0}}$ if complexity of i > country's average complexity and $\frac{m_{id}^{t1}}{M^{t1}} > \frac{m_{id}^{t0}}{M^{t0}}$, and zero otherwise.

Where *s* is the source country, *d* is the destination country, $G_{isd}^{t0,t1}$ is the growth in

the share of imports *m* of industry *i* in country *d* in the period between *t0* and *t1* (*t0* < *t1*). *M* is the total imports by all countries in all products, therefore, $\frac{m_{id}^{t1}}{M^{t1}}$ is the share of imports of product *i* by country *d* in total world's imports of all products in the period *t1*. See Freire and Isgut (2012) for details of the generic export opportunity indicator.

Appendix. Potential new products for diversification of LDCs – sorted by export opportunity

(HS) Description, price range	Export opportunity (US$ Million)	Afghanistan	Angola	Bangladesh	Benin	Bhutan	Burkina Faso	Burundi	Cambodia	Central African Republic	Chad	Comoros	Democratic Republic of the Congo	Djibouti	Equatorial Guinea	Eritrea	Ethiopia	Gambia	Guinea	Guinea-Bissau	Haiti	Kiribati	Lao People's Democratic Republic	Lesotho	Liberia	Madagascar	Malawi	Mali	Mauritania	Mozambique	Myanmar	Nepal	Niger	Rwanda	Samoa	Sao Tome and Principe	Senegal	Sierra Leone	Solomon Islands	Somalia	Sudan	Timor-Leste	Togo	Tuvalu	Uganda	United Republic of Tanzania	Vanuatu	Yemen	Zambia
(901380) Liquid crystal devices not constituti..., $9-301	942	1	1	1	1	1	1	1	1		1		1	1		1	1				1		1	1	1	1	1	1	1	1	1	1	1			1	1	1	1		1		1			1		1	1
(870332) Vehicles princ. designed for the tpt...., $22341-34015	870																														1					1													
(720851) Flat-rolled prods. of iron/non-alloy ..., $0-1	420	1	1	1			1		1	1			1				1						1									1										1		1					
(310420) Potassium chloride, ..., $0-2	388			1																																												
(120510) Low erucic acid rape/colza seeds, whe..., $0-6	369																						1																											
(851220) Lighting/visual signalling equip. of ..., $16-16	344				1			1			1	1			1	1		1		1	1	1		1	1								1		1			1		1			1		1	1	
(842952) Self-propelled mech. shovels & excava..., $37665-88671	329	1		1															1												1					1			1										
(847989) Machines & mech. appls. having indivi..., $159-5310	284										1	1																																					
(730429) Casing & tubing, seamless, of iron (e..., $1-8	275																																					1											
(902139) Artificial parts of the body other th..., $247-1157	271										1	1												1																			1							
(720839) Flat-rolled prods. of iron/non-alloy ..., $0-0	265																																												1				
(710691) Silver (incl. silver plated with gold..., $466-702	259																												1			1									1							
(841199) Parts of the oth. gas turbines of 841..., $32-330	246																																										1							
(390210) Polypropylene, in primary forms, ..., $1-2	214				1																1		1					1																			1			
(720711) Semi-finished prods. of iron/non-allo..., $0-1	210																														1									1									
(721049) Flat-rolled prods. of iron/non-alloy ..., $0-1	200			1																						1								1			1							1				
(441129) Fibreboard of wood/oth. ligneous mats..., $0-1	199	1	1	1					1				1	1		1	1		1	1			1		1	1	1	1	1	1	1	1	1	1	1	1	1	1		1	1		1		1				1
(854290) Parts of the electronic integrated ci..., $0-55	185																		1							1	1																		1				1
(851719) Telephone sets other than those of 85..., $90-92	179											1																																					
(721391) Bars & rods, hot-rolled, in irregular..., $0-0	178		1		1	1	1		1	1			1								1	1	1			1	1	1		1	1	1	1	1			1	1				1		1	1		1	1
(870120) Road tractors for semi-trailers (excl..., $24539-55260	177																																				1												
(390120) Polyethylene having a sp.gr. of 0.94/..., $1-1	176									1			1								1												1														1	
(840820) Compression-ignition int. comb. pisto..., $1485-5195	176											1			1	1		1				1		1	1									1				1									1	
(900211) Objective lenses for cameras/projecto..., $204-586	175																						1		1			1										1										
(470329) Chemical wood pulp, soda/sulphate, ot..., $0-0	174																													1											1						
(870321) Vehicles (excl. of 87.02 & 8703.10) p..., $3893-7668	170															1																																
(280920) Phosphoric acid & polyphosphoric acid..., $0-4	169	1		1																										1					1									1	1		
(841810) Combined refrigerator-freezers, fitte..., $310-491	151																																										1						
(902131) Artificial joints, ..., $283-1066	150		1	1																					1	1	1		1		1					1							1		1		1
(441039) Particle board, of wood, n.e.s. in 44..., $0-1	145	1	1	1			1		1	1			1	1		1	1		1	1	1		1		1	1	1	1	1			1	1	1			1	1	1		1	1		1	1	1	1	1
(711299) Waste & scrap of precious metal/metal..., $20-533	141				1																																	1										
(910221) Wrist-watches other than electrically..., $56-1630	136																																								1							
(870422) Motor vehicles for the tpt. of gds. (..., $20438-44672	133																															1															
(840690) Parts of the steam turbines & oth. va..., $20-191	133		1	1		1			1	1			1			1	1	1	1	1	1		1			1	1	1	1	1		1				1	1	1	1	1			1	1	1	1		1	1
(300439) Medicaments cont. hormones/oth. prods..., $56-507	130											1						1			1		1					1	1														1					1	
(640291) Footwear (excl. waterproof) with oute..., $0-15	128							1			1													1																				1				1		
(300420) Medicaments cont. oth. antibiotics (e..., $28-181	127											1																																					
(730820) Towers & lattice masts of iron/steel,..., $2-8	126	1			1	1	1		1	1			1	1			1	1			1	1	1	1	1		1	1	1		1		1				1			1			1				1	
(854290) Parts of the electronic integrated ci..., $499-1166	125			1																																												
(382490) Other chem. prods. & preps. of the ch..., $8-19	122										1	1																																				
(900120) Sheets & plates of polarising mat., ..., $32-257	120				1																																										
(381512) Supported catalysts, with precious me..., $33-166	120																												1		1																	1
(220710) Undenatured ethyl alcohol of an alcoh..., $0-1	119														1																		1															
(720917) Flat-rolled prods. of iron/non-alloy ..., $0-0	119						1		1				1				1				1		1						1		1				1	1							1			1
(902190) Appliances which are worn/carried/imp..., $83-974	118										1	1												1																				1					
(390760) Poly(ethylene terephthalate), in prim..., $1-2	117			1													1									1	1			1		1			1													1
(720838) Flat-rolled prods. of iron/non-alloy ..., $0-0	117												1																																1		1	1

(HS) Description, price range	Export opportunity (US$ Million)	Afghanistan	Angola	Bangladesh	Benin	Bhutan	Burkina Faso	Burundi	Cambodia	Central African Republic	Chad	Comoros	Democratic Republic of the Congo	Djibouti	Equatorial Guinea	Eritrea	Ethiopia	Gambia	Guinea	Guinea-Bissau	Haiti	Kiribati	Lao People's Democratic Republic	Lesotho	Liberia	Madagascar	Malawi	Mali	Mauritania	Mozambique	Myanmar	Nepal	Niger	Rwanda	Samoa	Sao Tome and Principe	Senegal	Sierra Leone	Solomon Islands	Somalia	Sudan	Timor-Leste	Togo	Tuvalu	Uganda	United Republic of Tanzania	Vanuatu	Yemen	Zambia
(840734) Spark ignition recip. piston engines ..., $2382-4712	116			1									1										1						1	1	1		1			1			1				1	1		1	1
(901390) Parts & accessories of the arts. of 9..., $71-573	116	1		1			1		1	1	1		1			1					1			1	1	1	1			1	1	1			1	1	1	1		1	1			1	1			1
(720837) Flat-rolled prods. of iron/non-alloy ..., $0-0	116			1		1	1																1			1					1												1	1			1
(841510) Window/wall type air-conditioning mac..., $357-369	115							1				1			1			1				1		1									1								1		1			1		
(720221) Ferro-silicon, cont. by wt. >55% of s..., $1-2	114																																											1				
(760612) Plates, sheets & strip, rect. (incl. ..., $0-3	114												1		1		1		1								1			1						1	1		1									
(854430) Ignition wiring sets & oth. wiring se..., $0-17	114										1	1												1																				1				
(380830) Herbicides, anti-sprouting prods. & p..., $4-17	114		1							1			1						1														1			1							1			1	1
(870210) Motor vehicles for the tpt. of 10/mor..., $11780-117981	112	1	1																					1												1	1										
(845710) Machining centres for working metal, ..., $41329-143748	112									1								1																		1										1	
(400599) Compounded rubber (excl. of 4005.10 &..., $2-9	112	1		1			1												1					1						1			1				1					1	1			
(293499) Nucleic acids & their salts, whether ..., $20-324	110																				1									1													1				
(841950) Heat exchange units, whether or not e..., $297-4596	110									1			1	1																		1												1	1		
(740811) Copper wire, of ref. copper of which ..., $7-9	109	1		1																	1	1							1		1												1				
(441039) Particle board, of wood, n.e.s. in 44..., $0-0	108	1			1				1							1	1	1						1			1			1	1	1	1		1	1	1	1	1		1	1						
(730519) Line pipe of a kind used for oil/gas ..., $1-6	107			1																			1																				1				
(902139) Artificial parts of the body other th..., $1157-2524	106																		1																												1
(390810) Polyamide-6/ -11/ -12/ -6,6/ -6,9/ -6..., $0-2	106						1																1																				1				
(853720) Boards, panels, consoles, desks, cabi..., $19-72	106				1			1			1	1		1	1	1		1	1	1	1	1		1	1				1					1	1				1	1						1	1	
(290531) Ethylene glycol (ethanediol), ..., $0-1	106																										1																		1				
(854460) Electric conductors (excl. of 8544.11..., $6-24	105										1													1																									
(380820) Fungicides, put up in forms or packin..., $5-18	103									1													1														1	1				1					1	1
(901920) Ozone therapy/oxygen therapy/aerosol ..., $32-139	102							1				1						1																1														
(721070) Flat-rolled prods. of iron/non-alloy ..., $0-1	102	1	1	1					1				1														1	1	1	1	1			1			1	1					1		1	1		1	1

(HS) Description, price range	Export opportunity (US$ Million)	top1	top2	top3	top4	top5	top6	top7	top8	top9	top10
(901380) Liquid crystal devices not constituti..., $9-301	942	CN 827.5	MX 72.3	IN 21.5	MY 14.7	RU 4.4	AR .5	TH .5	BY .3	NO .3	DZ .1
(870332) Vehicles princ. designed for the tpt...., $22341-34015	870	FR 257.3	ES 140.1	BE 90.4	LU 79.6	NO 78.5	AT 44.3	FI 42.1	AU 38.2	CH 24.5	RU 24.1
(720851) Flat-rolled prods. of iron/non-alloy ..., $0-1	420	KR 316.7	SG 14.5	CN 10.4	NL 10.2	JP 9.2	RU 8	TR 7.1	RO 5.9	MX 4.4	BR 4.1
(310420) Potassium chloride, ..., $0-2	388	BR 96.3	CN 69.5	US 28.7	MY 26.6	FR 22	BE 19.5	NL 12	PL 11.5	AU 6.9	MX 6.4
(120510) Low erucic acid rape/colza seeds, whe..., $0-6	369	CN 60.5	JP 54.9	MX 51.9	BE 47	NL 39.5	DE 35.9	FR 27.3	PK 12.9	CA 10	TR 5.2
(851220) Lighting/visual signalling equip. of ..., $16-16	344	DE 102.1	FR 26.6	GB 23.8	CA 22.3	BE 14.9	US 13.9	MX 13.8	ES 13.6	IT 11.3	SE 9.4
(842952) Self-propelled mech. shovels & excava..., $37665-88671	329	CN 127.7	HK 57.6	CA 38.1	BR 17.9	CO 17.8	TH 9.4	FR 8.1	PL 6.7	MY 5.8	EC 4.6
(847989) Machines & mech. appls. having indivi..., $159-5310	284	CN 167.7	IN 21.9	MY 18.5	EG 15.2	CH 12.3	MX 10.3	NO 8.6	PK 7.4	DZ 6.1	TN 3.6
(730429) Casing & tubing, seamless, of iron (e..., $1-8	275	US 161.4	DZ 48.1	EC 7.7	NG 5.9	OM 5.5	CA 5	NO 4.2	VE 4.1	AZ 2.7	TH 2.5
(902139) Artificial parts of the body other th..., $247-1157	271	US 167.6	NL 36.3	AU 15.5	CA 7.2	TR 6.8	ES 4.4	IT 3.9	IN 3.7	HK 2	BE 1.9
(720839) Flat-rolled prods. of iron/non-alloy ..., $0-0	265	KR 95.9	TR 31.1	IR 28	TH 20.4	IT 13.6	BR 10.1	JP 10	VN 5.5	MY 4.9	EC 4.2
(710691) Silver (incl. silver plated with gold..., $466-702	259	GB 76	IN 55.1	DE 33.7	JP 25.4	AT 15.5	CA 14.3	CN 13.1	TH 7.4	FR 4.8	NL 4.7
(841199) Parts of the oth. gas turbines of 841..., $32-330	246	GB 52.7	DZ 39.7	MX 20.8	CH 19.4	IN 14.5	BE 10.7	KR 10.1	VE 9.1	EG 8.1	DE 7.5
(390210) Polypropylene, in primary forms, ..., $1-2	214	CN 83.9	MX 41.9	PK 10.1	IN 8.9	PE 7.5	UA 7.4	BR 7	EG 6.5	DK 5.8	VN 5
(720711) Semi-finished prods. of iron/non-allo..., $0-1	210	TR 60.1	KR 39.4	TH 14	VN 13.7	SA 13.3	BG 12.6	MA 9	PH 7.8	AE 6	RO 4.7
(721049) Flat-rolled prods. of iron/non-alloy ..., $0-1	200	TH 37.7	DE 25.6	BR 15.3	CN 11.5	IN 11.1	UA 11	MY 8.8	PL 8.5	JP 7.3	SK 5.8
(441129) Fibreboard of wood/oth. ligneous mats..., $0-1	199	US 38.4	FR 24.1	IT 17	BE 14.7	CA 12.8	NL 11.9	JP 8.1	DE 7	VN 6.7	RU 6.1
(854290) Parts of the electronic integrated ci..., $0-55	185	MY 140	HK 30.2	IN 5	CN 3.7	DE 1.2	GB .9	PT .6	AE .5	RO .5	CR .4
(851719) Telephone sets other than those of 85..., $90-92	179	GB 50.8	SA 27.5	US 25.7	FR 10.8	NL 10.4	DE 10	ES 8.4	TH 4.5	GR 3.6	IT 2.7
(721391) Bars & rods, hot-rolled, in irregular..., $0-0	178	KR 31.3	JP 14.1	TH 12	MY 9.8	VN 8.5	NL 7.5	CN 6.7	TR 6.3	SA 6.3	PH 6.3
(870120) Road tractors for semi-trailers (excl..., $24539-55260	177	US 28.5	NL 16.9	BE 15.7	UA 13.9	OM 9.3	SA 8.3	PE 6.1	SK 5.6	CL 5.5	EC 4.9
(390120) Polyethylene having a sp.gr. of 0.94/..., $1-1	176	CN 46.6	UA 16.1	IN 14.9	BR 10.1	IL 9.5	TR 8.6	TH 7.7	MY 6.4	PK 6	DZ 4.5
(840820) Compression-ignition int. comb. pisto..., $1485-5195	176	SK 31	BE 16.1	KR 13.5	ES 12.8	BR 11.8	IN 8.8	SA 8.6	RU 8.4	CA 7.9	AR 7.6
(900211) Objective lenses for cameras/projecto..., $204-586	175	US 41.3	HK 29.9	NL 28.4	CN 24.9	CA 10.7	FR 6.5	SG 6.1	AU 4.6	ES 4.3	BE 2.3
(470329) Chemical wood pulp, soda/sulphate, ot..., $0-0	174	CN 53.2	KR 39.6	US 39.2	FR 9.9	FI 7	CH 3.4	VE 3.2	MX 3.1	RO 1.5	IN 1.5
(870321) Vehicles (excl. of 87.02 & 8703.10) p..., $3893-7668	170	BR 34	QA 22.8	NL 22.1	DE 21.4	NG 8.9	BE 8.1	GB 6.2	DK 5.9	SA 5.8	AU 5
(280920) Phosphoric acid & polyphosphoric acid..., $0-4	169	IN 85.8	PK 31.3	FR 11.2	TR 7.2	SA 6.1	DE 4.3	US 3.3	BE 2.9	KR 2.8	GB 2.6
(841810) Combined refrigerator-freezers, fitte..., $310-491	151	US 62.5	AU 11.6	CA 10.4	FR 6.5	GB 4.5	SE 4.5	SA 3.9	VE 3.6	CL 3.5	UA 3.3
(902131) Artificial joints, ..., $283-1066	150	US 56.9	DE 26.7	BE 20.4	AU 11.6	NL 11.4	CA 7.5	IN 3.4	CN 1.8	RU 1.6	TR 1.4
(441039) Particle board, of wood, n.e.s. in 44..., $0-1	145	FR 23.9	NL 18.9	DE 14.1	IT 13.1	BE 7.6	AT 5.1	CH 4.9	JP 4.9	MY 4.3	CZ 3.6
(711299) Waste & scrap of precious metal/metal..., $20-533	141	IT 65.6	KR 30.3	US 18.6	GB 10.2	SE 7.1	JP 5.6	MY 1.2	ZA .8	PL .4	NL .4
(910221) Wrist-watches other than electrically..., $56-1630	136	HK 61.4	CN 25.8	FR 16.6	IT 11.4	CH 4.1	ES 3.8	RU 2.1	CA 1.4	AU 1.3	SG 1
(870422) Motor vehicles for the tpt. of gds. (..., $20438-44672	133	SA 28.8	DZ 20.6	NL 6.4	ET 5	MX 4.8	PE 4.7	KE 4.6	SG 4.1	SE 3.9	TH 3.8
(840690) Parts of the steam turbines & oth. va..., $20-191	133	CN 27.8	FR 12.6	ZA 8.7	IN 8.6	PL 7.1	DE 6.8	CH 5.9	KR 5.7	SE 5	RO 4.5
(300439) Medicaments cont. hormones/oth. prods..., $56-507	130	US 21.9	FR 20.7	CH 11.4	ES 10.3	DE 9.4	PA 7.5	RU 5.9	BR 5.2	CN 4.6	TR 4
(640291) Footwear (excl. waterproof) with oute..., $0-15	128	US 36.8	JP 19	FR 12.8	RU 10.6	CA 6.2	UA 5.2	BE 5.2	ES 4.3	TR 2.4	AT 2.3
(300420) Medicaments cont. oth. antibiotics (e..., $28-181	127	BE 30.6	CN 16.8	UA 10.8	FR 10.2	VE 8	TR 7.3	RU 6.2	HU 4.1	DZ 3.9	CH 3.8
(730820) Towers & lattice masts of iron/steel,..., $2-8	126	US 38.3	GB 14.4	NL 10.8	SE 7.9	DK 5.8	RO 5.7	BE 4.4	DZ 3.2	FR 2.8	GH 2.6
(854290) Parts of the electronic integrated ci..., $499-1166	125	PH 122.4	KR .9	BE .5	NL .5	GB .3	SK .2	TN .1	BR .1	IT .1	JP 0
(382490) Other chem. prods. & preps. of the ch..., $8-19	122	CN 48.7	KR 12.5	HK 9.8	JP 6.6	EG 6.6	PL 5.4	US 5.2	TR 3.9	RU 3.7	MY 3

(HS) Description, price range	Export opportunity (US$ Million)	top1	top2	top3	top4	top5	top6	top7	top8	top9	top10
(900120) Sheets & plates of polarising mat., ..., $32-257	120	CN 76.2	HK 23.3	CZ 7.3	MX 6	PL 5.9	SG .7	SK .5	US .3	IT .1	PT 0
(381512) Supported catalysts, with precious me..., $33-166	120	DE 74.6	ES 12.9	MX 11.2	IT 3.8	CN 3.8	CZ 3.4	IN 2.3	BE 1.4	BR 1.1	SG .9
(220710) Undenatured ethyl alcohol of an alcoh..., $0-1	119	DE 51.5	NL 20.5	JM 13.3	FI 5.2	PH 4	ES 3.5	KR 3.5	DK 2	SE 2	PL 1.8
(720917) Flat-rolled prods. of iron/non-alloy ..., $0-0	119	JP 17.9	IN 14.4	TR 14.2	PL 8.9	MX 7.3	MY 5.7	BR 5.3	PE 3.3	TH 2.9	KR 2.9
(902190) Appliances which are worn/carried/imp..., $83-974	118	BE 31.1	DE 19.1	FR 17	GB 16.2	NL 11.7	CH 4.6	HK 1.9	IN 1.8	MX 1.8	ES 1.4
(390760) Poly(ethylene terephthalate), in prim..., $1-2	117	UA 24.6	DE 14.3	RU 14	VE 7.9	JP 6.7	CO 6.1	CA 5.1	PL 3.3	VN 3.2	DZ 3.1
(720838) Flat-rolled prods. of iron/non-alloy ..., $0-0	117	KR 44	CN 14.8	TR 11.9	TH 7.7	PT 5.1	PL 4	JP 3.8	BR 2.5	MK 1.6	AE 1.6
(840734) Spark ignition recip. piston engines ..., $2382-4712	116	RU 36.9	CN 28.6	GB 19.3	UA 10.8	PT 5	NL 4.9	BR 3.9	SE 2.9	MY 1.4	JP 1.2
(901390) Parts & accessories of the arts. of 9..., $71-573	116	CN 42.4	MX 37.9	HK 19.2	JP 9	CZ 2.5	GB 1.3	IN .8	MY .6	FR .4	SE .4
(720837) Flat-rolled prods. of iron/non-alloy ..., $0-0	116	KR 48.8	TR 15.7	MX 6.3	IN 5.1	UA 4.9	BR 4.5	TH 3.5	JP 3.2	PH 2.9	AT 2.7
(841510) Window/wall type air-conditioning mac..., $357-369	115	SA 42	BR 9.8	VE 7.5	IL 6.6	TH 4.2	BG 3.3	DZ 3	OM 2.9	UA 2.7	FI 2.3
(720221) Ferro-silicon, cont. by wt. >55% of s..., $1-2	114	JP 49.8	KR 26.9	DE 7	BE 5.3	IT 3.8	TR 3	TH 2.6	CZ 1.8	SK 1.2	AR 1.1
(760612) Plates, sheets & strip, rect. (incl. ..., $0-3	114	GB 18.8	FR 15.6	CA 15.4	AU 11.8	IT 8.1	AT 5.9	SE 5.5	NG 4.2	TH 3.5	JO 3.1
(854430) Ignition wiring sets & oth. wiring se..., $0-17	114	JP 21.1	KR 14.8	BE 10.4	HU 8.8	IT 7.9	RO 6.8	MA 4.9	ES 4.6	CZ 4.6	SE 3.5
(380830) Herbicides, anti-sprouting prods. & p..., $4-17	114	DE 20.5	UA 14.6	FR 7.7	BR 6.9	RU 6.8	AU 5.6	BE 5.3	PL 4.7	DK 4.4	NL 3.8
(870210) Motor vehicles for the tpt. of 10/mor..., $11780-117981	112	NG 18.2	DZ 14.8	FR 14	NL 9.5	IT 8	PH 6.3	AR 4	CL 3.9	UA 3.3	PE 2.9
(845710) Machining centres for working metal, ..., $41329-143748	112	CN 69.6	US 26.4	BR 5.7	TH 2.2	FR 1.7	RU 1.5	CH .9	HK .8	PL .6	NO .4
(400599) Compounded rubber (excl. of 4005.10 &..., $2-9	112	CN 99.2	MX 2.7	PL 2.4	BR 1.5	RU 1.4	DE .7	IN .4	TH .4	NL .3	PH .3
(293499) Nucleic acids & their salts, whether ..., $20-324	110	CA 35.4	DE 19.8	ES 19.7	IN 8.7	ZA 3.6	TH 2.3	AT 2.2	BR 2	CN 2	CZ 1.8
(841950) Heat exchange units, whether or not e..., $297-4596	110	CN 34.5	CA 18.6	US 11.2	RU 9.2	CH 5.8	IN 4	NO 3.6	BY 3.4	BR 3.1	TH 2.6
(740811) Copper wire, of ref. copper of which ..., $7-9	109	RO 15.9	GB 15.8	CN 14.4	OM 7.8	UA 6.4	TN 6	EG 4.8	VE 4.6	ZA 3.1	HU 2.9
(441039) Particle board, of wood, n.e.s. in 44..., $0-0	108	DE 14.4	ES 8.7	PL 7.3	US 7.2	DK 7	BY 7	GB 4.4	HU 3.9	SE 3.9	KR 3.3
(730519) Line pipe of a kind used for oil/gas ..., $1-6	107	KZ 36.1	DZ 17.2	US 15.3	EG 8.3	AT 6.1	BE 6	AE 2.8	HU 2.7	HR 2.1	CA 2
(902139) Artificial parts of the body other th..., $1157-2524	106	FR 28.7	NL 26.2	DE 11.8	CN 7.8	RU 6	VE 3.5	IT 3.3	BR 3.1	JP 2.7	UA 2.2
(390810) Polyamide-6/ -11/ -12/ -6,6/ -6,9/ -6..., $0-2	106	CN 42.2	CA 10.6	BE 9.9	IT 6.5	CZ 5.7	GB 3.8	HK 3.6	FI 3.3	DE 2.3	TH 2.2
(853720) Boards, panels, consoles, desks, cabi..., $19-72	106	RU 12.8	DZ 5.3	KZ 5.3	VE 4.9	TH 4.7	DE 4.2	AU 4	MX 3.7	CA 3.5	TR 3.2
(290531) Ethylene glycol (ethanediol), ..., $0-1	106	US 32.8	IN 31.3	CN 10.4	BE 9.8	LT 5.1	BR 4.1	KR 3.7	TH 2.7	TR 2	GB 1.5
(854460) Electric conductors (excl. of 8544.11..., $6-24	105	RU 11.3	CA 9.6	CN 8.3	BE 7.7	AE 6.7	MX 4.3	IT 4.1	QA 3.7	IN 3.5	BH 3.4
(380820) Fungicides, put up in forms or packin..., $5-18	103	FR 20.7	DE 10.7	GB 10.6	BR 9.3	CA 5.6	IT 5.3	UA 3.4	AT 2.9	US 2.9	RU 2.9
(901920) Ozone therapy/oxygen therapy/aerosol ..., $32-139	102	US 42	DE 7.5	FR 7.4	RU 7.3	GB 5.4	HK 4.9	NL 4	AU 3.4	VE 2.9	CA 2
(721070) Flat-rolled prods. of iron/non-alloy ..., $0-1	102	BE 24.1	RU 20.4	IT 9.8	PL 7.2	KR 4.5	SE 3.2	PT 3	UA 2.5	RO 2.3	BR 2.1