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How rich countries became rich and why poor countries remain poor: It's the economic structure. . .*duh!*☆

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ABSTRACT

Becoming a rich country requires being able to produce and export commodities that embody certain characteristics. We classify 779 commodities (exported) according to two dimensions: (1) sophistication (measured by the income content of the products exported) and (2) connectivity to other products (measured by how easy it is to 'jump' into other potential exports). We identify 88 "good" products (highly sophisticated and well connected products), 93 "bad" products (unsophisticated and poorly connected products), and 598 "middle" products. Then, we categorize 154 countries into four groups according to the export share of each of these three types of products. There are 21 countries whose export baskets contain at least 15% of "good" products; 41 countries with a significant share of relatively sophisticated and well connected products; 50 countries with a significant share of relatively unsophisticated and not well connected products; and 42 countries whose export basket contains at least 15% of "bad" products.

1. Introduction

The world has been divided for quite some time into three groups of countries: (i) the club of rich nations, with income per capita above $12,000, according to the World Bank (using 2007 data); (ii) a very large group of poor countries with low income per capita; and (iii) a group of countries that falls in between these two. Some countries in the third group seem to move forward, but slowly, with the consequence that very few graduate and make it into the first group. Nations in this group are, for example, Brazil, Malaysia, Mexico, Philippines or Venezuela. They are referred to as being in the "middle-income trap".[1]

Explaining why *most* countries in the world are not rich is not easy. This paper contributes toward answering the question of why many countries progress very slowly by studying the characteristics of countries' export baskets. We argue that what allows countries to become rich is the type of economic activities they engage in, i.e., the type of goods they end up producing and exporting. Different products have different consequences for economic development.

In the tradition of Kuznets (1966), Kaldor (1967), or Chenery et al. (1986), it has been recognized that development is about the transformation of the productive structure and the accumulation of the capabilities necessary to undertake this process. In this vein, the recent work of Hidalgo et al. (2007) is a novel contribution to the structural transformation literature. These authors introduce the *product space*, an application of network theory that yields a graphical representation of all products exported in the world. Consistent with the structural transformation literature, they argue

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[1] See Felipe et al. (2012) for an extensive analysis of the middle-income trap.

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that: (i) development is a path-dependent process; (ii) comparative advantage depends more on nations' capabilities to understand, master, and use technologies, than on factor endowments (see also Lall, 1992, 2000a,b); and (iii) not all products have the same consequences for development.[2]

In this paper, we elaborate upon the idea that not all products have the same consequences for development. Section 2 discusses the concept of capabilities in the context of the product space; and the methodology we use, including the two key concepts used to classify products and countries, namely *sophistication* (measured by the income content of a product), and *connectivity* to other products (measured by how easy or difficult it is to jump to other potential exports). Section 3 presents the results. We classify 779 exported commodities according to these two dimensions. There are 88 "good" products, 93 "bad" products, and 598 "middle" products, according to combinations of sophistication and connectivity. We then classify 154 countries depending on the export shares of these types of products. Our results indicate that there are 92 countries whose export baskets contain significant shares of unsophisticated and poorly connected products. The other 62 countries' export baskets have significant shares of relatively sophisticated and well connected products. Section 4 concludes.

2. Capabilities, sophistication, and connectedness

A key challenge that most countries in the world face is how to upgrade and diversify their export baskets. Many countries have been able to exploit their low-wage advantage to attract foreign direct investment into many industries. However, the challenges to deepen industrial capabilities, to upgrade the skills of the local labor force, to set up and build an innovation and research basis, to develop capacity in the domestic economy, and to move into high-value added and more sophisticated products, are significant. As noted above, Hidalgo et al. (2007) argue that while growth and development are the result of structural transformation, not all activities have the same consequences for a country's growth prospects. The implication is that a sustainable growth trajectory must involve the introduction of new goods and not merely involve continual learning on a fixed set of goods. Hausmann et al. (2007) show that, after controlling for other factors such as initial per capita income, countries with a more sophisticated export basket grow faster. In other words, what a country exports does matter for subsequent growth. De Ferranti et al. (2000) show that export diversification is associated with a higher GDP growth.

However, export diversification and upgrading are not easy. This is because venturing into a new activity entails a significant amount of uncertainty about the profitability of the new venture. Another possible reason why export diversification is not easy is that many new activities may require other large-scale investments that are critical to the profitability of the new activity itself.

Hausmann and Klinger (2007) investigate the process by which countries are able to diversify their export mix. They argue that countries change their export mix by moving to products that are "nearby" the products in which they already excel, i.e., those products that they export with revealed comparative advantage (RCA). This is based on the idea that each product requires a specific set of capabilities, and that if a country has RCA in a product, it must mean that the country has accumulated the product-specific capabilities necessary to export it successfully. What are these capabilities? They are: (i) human and physical capital, the legal system, institutions, etc. that are needed to produce a product (hence, they are product-specific, not just a set of amorphous factor inputs); (ii) at the firm level, they are the "know-how" and working practices held collectively by the group of individuals comprising the firm; and (iii) the organizational abilities that provide the capacity to form, manage, and operate activities that involve large numbers of people.

Hidalgo et al. (2007) conceptualize these ideas in the newly developed *product space*. The rationale behind the product space is that if two goods need similar capabilities, a country should show a high probability of exporting both with revealed comparative advantage. In the product space, products are linked by way of their *proximity*, defined as the conditional probability of exporting product (A) given that product B is co-exported.

We use a country's position in the product space to classify it according to two product characteristics, sophistication (PRODY) and connectivity to other products (PATH). Following Hausmann et al. (2007), we calculate PRODY as the weighted average of the GDP per capita of the countries that export that product. Algebraically:

$$\text{PRODY}_i = \sum_c \left[\frac{xval_{ci}/\sum_i xval_{ci}}{\sum_c (xval_{ci}/\sum_i xval_{ci})} \right] \times \text{GDPpc}_c \quad (1)$$

where $xval_{ci}$ is the value of country c's export of commodity i and GDPpc_c is country c's per capita GDP. We calculate PRODY for 779 products using trade data (SITC-Rev.2 4-digit level, UNCOMTRADE Database) for 2003–2007, and use the average of the five years. GDP per capita (measured in 2005 PPP$) is from the *World Development Indicators*. PRODY is, therefore, measured in 2005 PPP$. It varies from a low of $1182 for "fabrics, woven of jute or other textile bast fibers" to a high of $35,885 for "halogenated derivatives of hydrocarbons."

The rationale that underlies PRODY is that, absent any trade interventions, high-income countries are able to export despite higher wages because of the characteristics of the products. One such characteristic is the level of technology embedded in their products. However, this is not the only reason. Other reasons why activities are located in high per capita income countries include the quality of infrastructure, intellectual property rights, the degree of divisibility of the production process, transportation costs, and possibilities of knowledge spillovers from agglomeration, especially in the case of research and development-intensive activities. Thus, PRODY, not only reflects technological sophistication, but also incorporates these other factors.[3]

The second criterion that we use segregates products according to how easily the capabilities that they embody can be redeployed and used to export other products. Recall that we have argued that development is a path-dependent process, and whether or not a

[2] There are two other strands of the development literature that relate to our work. First, is Nelson's (1956) concept of low-level poverty trap and Myrdal's (1957) model of cumulative causation. Second, is the literature on capabilities à la Sutton (2001, 2005).

[3] PRODY is used to estimate a country's level of sophistication, called EXPY by Hausmann et al. (2007). EXPY (calculated as a weighted average of the PRODY, the latter in turn is calculated using income per capita [Eq. (1)], of the exported products) is higher for richer countries. However, there is circularity in the calculation of EXPY. This results from the way it is calculated (i.e., by using countries' income per capita). As a result, it is a foregone conclusion that rich countries export rich country goods. To address this concern, Hidalgo and Hausmann (2009) introduced the notion of *complexity*, which does not use information on income. Instead, it uses information on how 'diversified' an economy is, and how 'unique' the products it exports are. An algorithm that uses this information for many countries yields measures and rankings of both country and product complexities. Using the method in Hidalgo and Hausmann (2009), we have calculated the measure of country complexity (EXPY). With our data, the Spearman rank correlation between EXPY and country complexity is 0.82. Details are available upon request.

country is able to venture into new activities is determined by the existing set of capabilities. Can the capabilities that allow a country to export basic mobile phones, for example, be redeployed to export smart phones or luxury cars?

Hidalgo et al. (2007) introduced the notion of "proximity." This is a measure of whether a country that exports a product will be able to export another one. Proximity between two products *i* and *j*, denoted φ_{ij}, is the minimum of the pairwise conditional probabilities that a country exports a good given that it exports another one. Algebraically:

$$\varphi_{ij} = \min\{P(RCA_i|RCA_j), P(RCA_j|RCA_i)\}, \quad 0 \le \varphi_{ij} \le 1 \tag{2}$$

where $P(RCA_i|RCA_j)$ is the conditional probability that a country exports good *i* with RCA (RCA_i) given that it already exports good *j* also with RCA (RCA_j).[4] Since the measure of proximity involves using the minimum of the pairwise conditional probabilities, the matrix of conditional probabilities is symmetric. Given that we have 779 products, we calculate a total of 303,031 (=(779 × 778)/2) proximities.

We use Balassa's (1965) measure of RCA. It is the ratio of the export share of a product in the country's export basket to the same ratio at a worldwide level. Algebraically:

$$RCA_{ci} = \frac{xval_{ci}/\sum_i xval_{ci}}{\sum_c xval_{ci}/\sum_i\sum_c xval_{ci}} \tag{3}$$

where $xval_{ci}$ is the value of country *c*'s export of commodity *i*. For purposes of our analysis, country *c* exports product *i* with RCA if $RCA_{ci} > 1$.

To calculate proximities, we first calculate the RCA index for a country's exports of commodity *i* using Eq. (3) for each of the five years from 2003 to 2007. We then average the five values. If the averaged RCA is greater or equal than one, then the country has RCA in commodity *i*. We then obtain the proximities (as in Eq. (2)) of each product with respect to the other 778 products.

A high value of the proximity measure (φ_{ij}) means that the two goods require similar capabilities. Note that the concept of proximity is based on trade outcomes and not physical characteristics of the products. The underlying assumption behind the notion of proximity is that if the capabilities needed to produce two different products are similar, then this would be revealed in the fact that countries that export one good should also export the other one. This would be reflected in a high value of proximity φ_{ij}, i.e., the two products are "nearby." The implication is that if the two products are "nearby", but a country currently exports only one of the two with RCA > 1, then this country has the required capabilities to potentially export the other product also with RCA > 1. And conversely, if proximity between these two products is low then exporting them must involve the use of different capabilities.

Fig. 1 shows the distribution of proximities in the product space. The figure reveals that this distribution is highly skewed, as most linkages (proximities) are very weak, below 0.4. And Table 1 shows the average proximity *within* and *among* 11 groups according

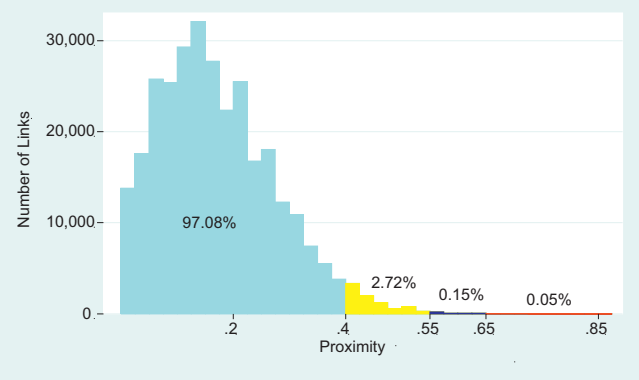

Fig. 1. Distribution of proximities in the product space.
Source: Authors.

to Leamer's (1984) classification.[5] "Within" proximities measure the easiness to jump across products within a given group. "Among" proximities measure the easiness to jump from one group into the other one.[6] The former are significantly higher, reflecting the fact that moving within a group is, in general, easier than moving out of it.

Finally, for each product we measure the proximity of that product to all other products. This measure is called PATH (Hausmann and Klinger, 2006) and it is calculated as the sum of all proximities of product *i* to each of the other 778 products. Algebraically:

$$PATH_i = \sum_j \varphi_{ij}, \quad 0 \le PATH_i \le 778 \quad (\text{No. of products} - 1) \tag{4}$$

Products with a high PATH are those that use capabilities that are similar to those used by many other products.

3. Results

3.1. Products

Based on the distribution of the products according to their sophistication (PRODY), we classify all products into high-PRODY, mid-PRODY, or low-PRODY, depending on whether they belong to the first, second, or third tercile, respectively, of the PRODY distribution. Similarly, we classify each product as being high-PATH, mid-PATH, or low-PATH. This gives a (3 × 3) PRODY–PATH matrix with nine cells. Table 2 shows this matrix, which provides the following information: the number of products in each cell, the average PRODY, and average PATH of the products in each cell. As could be expected, PATH increases as we move down across rows (but does not vary much across columns for a given row), while PRODY increases as one moves to the right across columns (but does not vary much across rows for a given column). Out of the 779 products that we work with, 88 are in the cell HPR_HPA. These are the most sophisticated and best connected products. We refer to them as "good" products. At the other end, the cell LPR_LPA cell contains 93 products. We refer to them as "bad" products. The remaining 598 "middle" products are distributed across the six remaining cells MPR_LPA, HPR_LPA, LPR_MPA, MPR_MPA, HPR_MPA, LPR_HPA, MPR_HPA. These products have different combinations of sophistication and connectedness. The 264 products in the cells MPR_HPA, HPR_MPA and MPR_MPA are close to the "good" products. The 165 products in the cells

[4] The conditional probability that a country exports good *i* with RCA given that it exports good *j* also with RCA is calculated as the ratio of the number of countries that export *both* goods *i* and *j* with RCA to the number of countries that export good *j* with RCA. Then we choose the smaller of the two conditional probabilities. This implies (given that they only differ in the denominator) that we choose the one with the larger denominator (i.e., the more ubiquitous product). This is done in order to obtain a lower probability, and this way to minimize the number of false acceptances.

[5] Note that the original Leamer classification divides products into ten groups and does not classify some of the SITC (Rev. 2) 2-digit categories. These are categorized as in Hidalgo et al. (2007). Also, the Leamer (1984) category "capital-intensive products" is split into two: capital-intensive products (excluding metals) and metal products. The SITC (Rev. 2) 2-digit categories that make up each of the Leamer (1984) groups are shown in Table A.1.

[6] Both within and between proximities are unweighted averages and, as discussed in the text, they are the average of the minimum of the two possible conditional probabilities.

Table 1
Average proximity *within* and *between* Leamer groups.

	PET	RAW	FOR	TRO	ANI	CER	LAB	CAP	MET	MAC	CHE
PET	0.356										
RAW	0.111	0.335									
FOR	0.106	0.157	0.513								
TRO	0.126	0.147	0.174	0.454							
ANI	0.119	0.146	0.183	0.198	0.435						
CER	0.105	0.127	0.141	0.163	0.160	0.286					
LAB	0.105	0.131	0.178	0.167	0.158	0.131	0.434				
CAP	0.116	0.133	0.171	0.169	0.160	0.144	0.212	0.480			
MET	0.135	0.170	0.221	0.175	0.169	0.149	0.204	0.223	0.568		
MAC	0.109	0.113	0.158	0.110	0.121	0.108	0.168	0.169	0.205	0.447	
CHE	0.145	0.140	0.162	0.147	0.160	0.141	0.157	0.166	0.204	0.198	0.485

Source: Authors.
Note: PET – petroleum; RAW – raw materials; FOR – forest products; TRO – tropical agriculture; ANI – animal products; CER – cereals; LAB – labor-intensive; CAP – capital-intensive (exc. metals); MET – metals; MAC – machiner; CHE – chemicals.

Table 2
PRODY–PATH distribution of the 779 products.

		PRODY		
		Low PRODY (LPR)	Mid PRODY (MPR)	High PRODY (HPR)
PATH	Low PATH (LPA)	(LPR_LPA) No. of products: 93 Average PRODY: $5480 Average PATH: 94	(MPR_LPA) No. of products: 64 Average PRODY: $15,552 Average PATH: 98	(HPR_LPA) No. of products: 103 Average PRODY: $23,434 Average PATH: 99
	Mid PATH (MPA)	(LPR_MPA) No. of products: 101 Average PRODY: $7196 Average PATH: 138	(MPR_MPA) No. of products: 91 Average PRODY: $15,027 Average PATH: 137	(HPR_MPA) No. of products: 68 Average PRODY: $22,697 Average PATH: 137
	High PATH (HPA)	(LPR_HPA) No. of products: 66 Average PRODY: $9132 Average PATH: 159	(MPR_HPA) No. of products: 105 Average PRODY: $15,360 Average PATH: 167	(HPR_HPA) No. of products: 88 Average PRODY: $21,227 Average PATH: 164

Source: Authors.
Note: Total number of products at the SITC (Rev. 2) 4-digit level is 779. PRODY is measured in 2005 PPP$.

MPR_LPA and LPR_MPA are close to the "bad" products. And the remaining 169 products in HPR_LPA and LPR_HPA contain extreme combinations of sophistication and connectedness.

Fig. 2 shows the distribution of the 779 commodities, split into the nine cells, according to the 11 Leamer groups. Table A.1 shows the number of products, average PRODY, and average proximity, as well as the share of products in each of the nine cells in Table 2 for the 11 Leamer groups and the SITC (Rev. 2) 2-digit code.

The most sophisticated Leamer groups are machinery and chemicals, with an average PRODY close to $20,000. These products, together with metals, are also the best connected and they tend to be *man-made*. They are together referred to as the *core commodities*. On the other hand, tropical agriculture and cereals are the least sophisticated groups and petroleum the worst connected. These products tend to be *nature-made*.

3.2. Countries

Next, we classify countries according to the shares of "good" and "bad" products that they export. To do so, we calculate, for each country, the share of products exported with RCA > 1 in each of the nine cells in Table 2 (as percentage of the country's total number of products exported with RCA > 1). We then assign each country to the cell with the largest share (not shown for reasons of space). The LPR_MPA and MPR_HPA cells contain the largest number of countries, 86 and 25, respectively.[7] Closer inspection shows that there is considerable heterogeneity among countries within these two cells. For this reason, we split all countries into two groups according to the share of core commodities exported with RCA > 1, in the total number of commodities exported with RCA > 1. "High-core" countries are those where the share of core commodities exported with RCA > 1 (in the total number of commodities exported with RCA > 1) is above 30%.[8] "Low-core" countries are those where the share is less than 30%. There are 62 "High-core" countries and 92 "Low-core" countries. As argued above, "core commodities" are, on average, the most sophisticated and the ones with the highest PATH. Countries that export a significant share of core commodities face very different development prospects from those faced by countries with a low presence in the core. The list of high-core and low-core countries by sophistication and connectedness of the export basket is shown in Table 3. Tables A.2 and A.3 show, for each of the high-core and low-core countries, the percentage of products exported with RCA > 1 in each of the nine cells (of Table 2 above), the total number of products exported with RCA > 1, and the share of core products in the total number of products exported with RCA > 1. Table A.4 provides detailed information for a group of selected countries.

[7] The number of countries in the other cells is as follows: HPR_HPA, 9; HPR_MPA, 3; HPR_LPA, 2; MPR_MPA, 11; MPR_LPA, 0; LPR_HPA, 5; and LPR_LPA, 13.

[8] Of the 779 commodities at the 4-digit SITC (Rev. 2) level of disaggregation, 41.1% (i.e., 320) are core commodities: metals, chemicals and machinery.

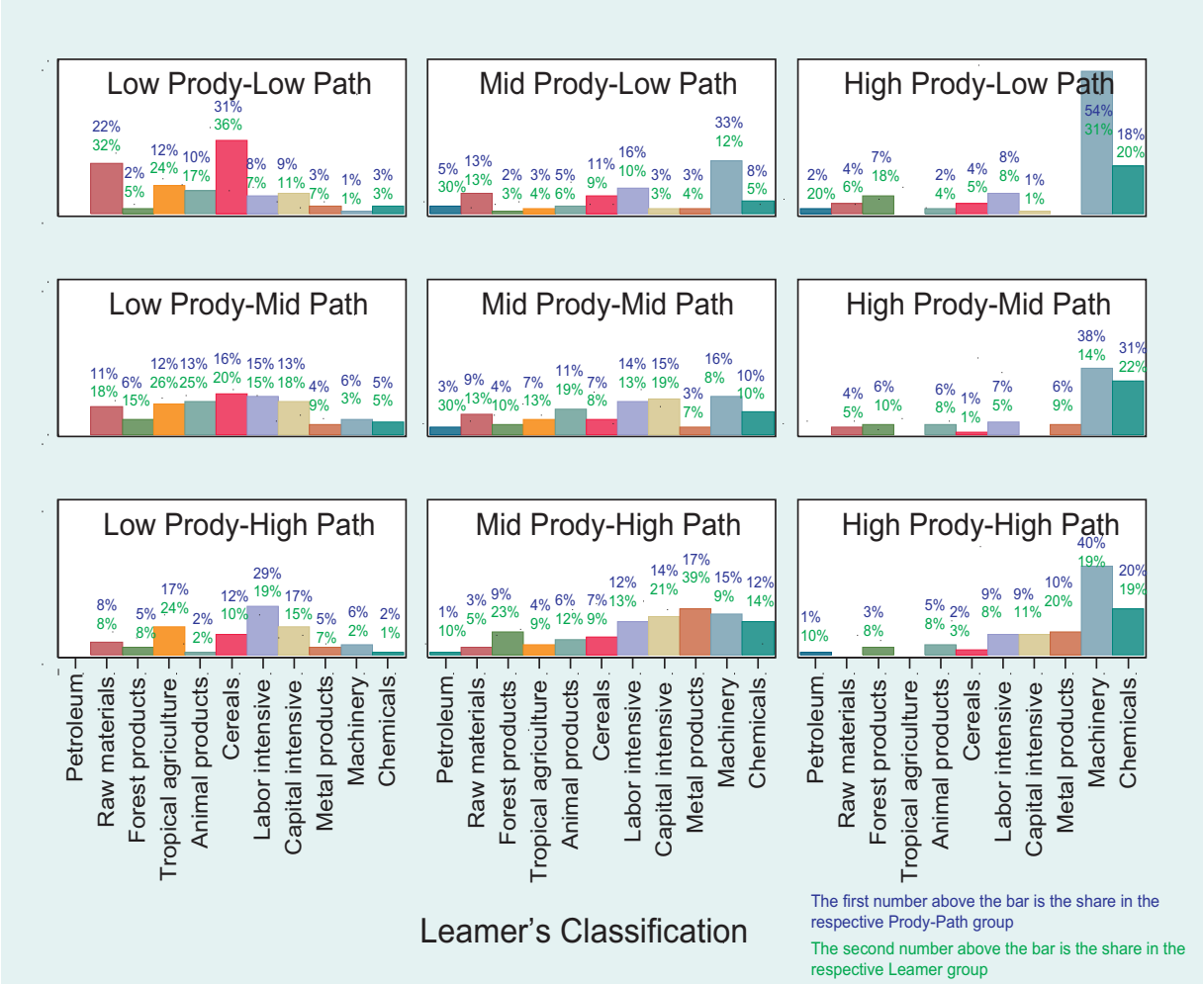

Fig. 2. Distribution of products according to PRODY and PATH.
Source: Authors.

Table A.2 indicates that there are 21 countries (out of the 62) where the cell HPR_HPA represents at least 15% of the total number of products.[9] In some of these countries, the share of this cell is the highest. The only advanced countries where this cell represents less than 15% are Canada, Ireland and the Netherlands. The country with the highest share in the HPR_HPA cell is Finland, 26.7%. Also, in these 21 countries, the cell LPR_LPA ("bad" products) is very small in general (in Germany, Sweden and

Table 3
Distribution of countries according to the share of "good" and "bad" products exported.

High-core countries		Low-core countries	
High share of "good" products (21 countries)	Significant share of sophisticated and well connected products (41 countries)	Significant share of not sophisticated and well connected products (42 countries)	High share of "bad" products (50 countries)
Austria, Belarus, Belgium, Croatia, Czech Republic, Denmark, Finland, France, Germany, Hungary, Italy, Japan, Norway, Poland, Slovakia, Slovenia, Spain, Sweden, Switzerland, USA, United Kingdom	Armenia, Barbados, Belize, Bosnia Herzegovina, Brazil, Bulgaria, Burundi, Canada, China, Hong Kong, Costa Rica, Cyprus, Gambia, Georgia, Guinea-Bisau, India, Ireland, Israel, Jordan, Lebanon, Liberia, Malaysia, Malta, Mexico, Netherlands, Niger, Panama, Philippines, Portugal, Rep. Korea, Romania, Russia, Saint Kitts, Nevis and Anguilla, Samoa, Senegal, Seychelles, Sierra Leone, Singapore, South Africa, Thailand, Ukraine	Albania, Angola, Argentina, Bahrain, Cambodia, Chile, Macao, Colombia, Dominican Rep., Egypt, El Salvador, Estonia, Fiji, Greece, Guatemala, Iceland, Jamaica, Kuwait, Kyrgyzstan, Lao PDR, Latvia, Lithuania, Madagascar, Malawi, Mauritius, Mongolia, Morocco, Nepal, New Zealand, Oman, Pakistan, Qatar, Rep. Moldova, Saudi Arabia, Syria, Tajikistan, TFYR Macedonia, Trinidad and Tobago, Tunisia, Turkey, United Arab Emirates, Uruguay	Algeria, Australia, Azerbaijan, Bangladesh, Benin, Bolivia, Burkina Faso, Cameroon, Central African Republic, Chad, Congo, Côte d'Ivoire, Democratic Republic of the Congo, Djibouti, Ecuador, Equatorial Guinea, Ethiopia, Gabon, Ghana, Guinea, Guyana, Haiti, Honduras, Indonesia, Iran, Kazakhstan, Kenya, Lao PDR, Libya, Malawi, Mali, Mauritania, Mozambique, Nicaragua, Nigeria, Papua New Guinea, Paraguay, Peru, Rwanda, Sri Lanka, Sudan, Suriname, Togo, Turkmenistan, Uganda, United Rep of Tanzania, Uzbekistan, Venezuela, Vietnam, Yemen, Zambia

Source: Authors.

Slovakia, <2% of the total). The remaining 41 high-core countries have a significant, but not as a high, share of sophisticated and well connected products.

Table A.3 indicates that there are 50 countries (out of the 92) where the cell LPR_LPA represents at least 15% of the total number of products (40% in Congo and the Democratic Republic of Congo). The table contains only 3 advanced countries, Australia, Iceland and New Zealand. With a few exceptions, cell HPR_HPA represents <10% of the total number of products. The remaining 42 low-core countries do not have a significant share of sophisticated and well-connected products.

3.3. Policies

Finally, this analysis allows us to sketch policies for each group of countries. Necessarily, the policies discussed are generic and, when implemented, they will have to be made country-specific. The 62 high-core countries are well-positioned to continue doing well. At least 30% of the products that they export with RCA > 1 are core products.[10] The policies these countries require are of two types: (i) competitiveness policy for the 21 countries with a high share of products in the HPR_HPA cell. These countries need to focus on quality upgrading of the existing products instead of jumping into new products and (ii) soft parsimonious industrial policy for the other 41 countries. These are policies to facilitate horizontal jumps to nearby products. They also need to develop a process whereby government, industry, and cluster-level private organizations can collaborate on interventions that can directly increase productivity. Finally, they need to focus on interventions that deal directly with potential coordination problems that keep productivity low in some existing or rising sectors (e.g., programs and grants to help particular clusters by increasing the supply of skilled workers; encourage technology adoption; improve regulation and infrastructure).

The 92 low-core countries face a very different set of problems. Emphasis in these countries has to be toward increasing the number of core products exported with RCA > 1. Many of the products exported by the 50 countries with a high share of bad products are nature-made and subject to decreasing returns. None of these countries will ever get rich without developing an advanced industrial and service sector. This may require, for example, the government engaging into hard parsimonious industrial policy, which would entail, for example facilitating jumps into far away products by taking "strategic bets" and getting directly involved in the development of new sectors. This, however, will be difficult for many countries in this group, as, by definition, they lack the required capabilities, as defined in Section 2. For this reason, it is imperative that these countries focus their efforts on accumulating new capabilities. This will require increasing the level of human capital to acquire skills, technology, and knowledge (in many cases, basic management, accounting, and record keeping); and it will also require increasing the drive to diversify and to increase sophistication by embracing a realistic industrial vision. Finally, these countries may also need to consider tariff exemptions, subsidies to the private sector, and public inputs in general, etc. to develop an industry.[11]

4. Conclusions: it's the economic structure. . .*duh!*

In this paper we have argued that the key distinctive feature that sets apart rich from poor countries is their respective productive structures and the specific characteristics of the products that they export. These, in turn, depend on the capabilities that firms possess. Development in this paradigm is a process of accumulating capabilities, generating new activities and letting others disappear. The primary driver of growth is the gradual build-up in firms' capabilities, which raises the economy-wide real wage.

Using the SITC 4-digit level, we have classified 779 products according to their sophistication and connectivity. We have determined that there are 88 "good" products. These are very sophisticated and well-connected to the other products. At the other extreme, there are 93 "bad" products. The other 598 products contain different combinations of sophistication and connectedness. These are not sophisticated and not well connected. This has allowed us to split the 154 countries in our analysis into four groups on the basis of the composition of export basket: (i) 21 countries that export a significant share of "good" products (i.e., sophisticated and well-connected products), in general man-made; (ii) 41 countries with a significant share of relatively more sophisticated and well connected products; (iii) 50 countries with a significant share of unsophisticated and not well connected products; and (iv) 42 countries whose export basket contains a high share of "bad" products.

Appendix A

See Tables A.1–A.4.

[9] Technically speaking, Sierra Leone belongs to this group. However, it is clearly a different country as the export share of the group LPR_LPA is very high, also 15% of the total.

[10] Some of these countries are in the so-called middle-income trap (see Felipe et al., 2012), e.g., Philippines, Brazil, Jordan, Lebanon, South Africa.

[11] These policies have to be consistent with World Trade Organization (WTO) rules. Amsden (2000) and Amsden and Hikino (2000) argue that the new rules of the WTO allow countries to promote their industries, including the manufacturing sector, in particular under the umbrella of advancing science and technology (e.g., by setting up technology parks). In this context, subsidies in exchange for monitorable, results-oriented performance standards are acceptable. Countries can, for example, target national champions. The hurdles that developing countries face are the following: (i) informal political pressures by the developed countries in favor of market opening; (ii) the subjection of countries that make use of WTO rules to promote their industries to "reciprocal control mechanisms"; and (iii) their lack of "vision."

Table A.1
Average PRODY, average proximity, and distribution (percentage of the total number of products) across the nine cells in Table 2 for Leamer categories and for the 2-digit SITC (Rev. 2) categories.

SITC 2-digit	SITC Description	No. of products	Ave. PRODY	Ave. Proximity	HPR_ HPA	HPR_ MPA	HPR_ LPA	MPR_ HPA	MPR_ MPA	MPR_ LPA	LPR_ HPA	LPR_ MPA	LPR_ LPA
Petroleum		10	16,352	0.118	10.0		20.0	10.0	30.0	30.0			
33	Petroleum and petroleum products	10	16,352	0.118	10.0		20.0	10.0	30.0	30.0			
Raw materials		62	11,228	0.142	0.0	4.8	6.5	4.8	12.9	12.9	8.1	17.7	32.3
27	Crude fertilizer and crude minerals	18	11,650	0.146		11.1	5.6	11.1	16.7	5.6	5.6	22.2	22.2
28	Metalliferous ores	16	7784	0.118					6.3	18.8	6.3	25.0	43.8
32	Coal	6	11,497	0.128					16.7	33.3			50.0
34	Gas	3	16,362	0.085			33.3			33.3			33.3
35	Electric current	1	9793	0.202							100.0		
68	Non-ferrous metals	17	13,487	0.155		5.9	11.8	5.9	17.6	5.9	11.8	17.6	23.5
97	Gold, non-monetary	1	4769	0.122									100.0
Forest products		39	15,593	0.175	7.7	10.3	17.9	23.1	10.3	2.6	7.7	15.4	5.1
24	Cork and wood	9	10,155	0.145					33.3	11.1		44.4	11.1
25	Pulp and waste paper	6	21,073	0.146		33.3	66.7						
63	Cork and wood, cork manufactures	11	13,186	0.171			18.2	36.4			18.2	18.2	9.1
64	Paper	13	18,867	0.204	23.1	15.4	7.7	38.5	7.7		7.7		
Tropical agriculture		46	8755	0.16				8.7	13.0	4.3	23.9	26.1	23.9
5	Vegetables and fruit	22	9042	0.162				4.5	13.6	4.5	27.3	40.9	9.1
6	Sugar	6	8898	0.169				16.7			50.0	16.7	16.7
7	Coffee	10	5941	0.134				10.0			10.0	20.0	60.0
11	Beverages	5	11,462	0.169					40.0	20.0	20.0		20.0
23	Crude rubber	3	11,226	0.152				33.3	33.3				33.3
Animal products		52	12,701	0.162	7.7	7.7	3.8	11.5	19.2	5.8	1.9	25.0	17.3
0	Live animals	5	14,448	0.152		20.0	20.0	20.0				20.0	20.0
1	Meat	12	17,872	0.172	16.7	8.3	8.3	16.7	33.3	8.3		8.3	
2	Dairy products	6	17,661	0.195	33.3	16.7		33.3	16.7				
3	Fish	8	12,230	0.135					25.0	25.0		12.5	37.5
21	Hides, skins	7	8905	0.145		14.3					14.3	42.9	28.6
29	Crude animal and vegetable materials	9	7171	0.148					22.2			55.6	22.2
43	Animal and vegetable oils and fats	4	9642	0.161				25.0	25.0			25.0	25.0
94	Animals, live (nes)	1	4526	0.140								100.0	
Cereals		80	9089	0.141	2.5	1.3	5.0	8.8	7.5	8.8	10.0	20.0	36.3
4	Cereals	16	11,446	0.160			6.3	25.0	18.8		6.3	25.0	18.8
8	Feeds	5	11,413	0.140				20.0		40.0		40.0	
9	Miscellaneous edible products	3	16,452	0.194	33.3			33.3			33.3		
12	Tobacco	6	6302	0.147							16.7	66.7	16.7
22	Oil seeds	12	6048	0.112					8.3	8.3	16.7	8.3	58.3
26	Textile fibers	24	8101	0.126		4.2	4.2	4.2	8.3	8.3	12.5	12.5	45.8
41	Animal oils and fats	2	19,495	0.152			100.0						
42	Fixed vegetable oils and fats	12	7814	0.119	8.3					16.7		16.7	58.3
Labor intensive		98	13,691	0.183	8.2	5.1	8.2	13.3	13.3	10.2	19.4	15.3	7.1
66	Non-metallic mineral	32	16,037	0.183	18.8	12.5	12.5	12.5	15.6	6.3	9.4	9.4	3.1
82	Furniture	3	14,019	0.215				100.0					
83	Travel goods, handbags	1	11,549	0.139									100.0
84	Articles of apparel	28	8103	0.170					3.6		53.6	32.1	10.7
85	Footwear	1	9793	0.175								100.0	
89	Miscellaneous manufacture	31	16,277	0.167	6.5	3.2	12.9	19.4	16.1	25.8	3.2	6.5	6.5
93	Special transactions, not classified	1	16,992	0.145					100.0				
96	Coin (other than gold coin)	1	16,680	0.156					100.0				
Capital intensive		72	12,693	0.185	11.1	0.0	1.4	20.8	19.4	2.8	15.3	18.1	11.1
61	Leather	11	10,405	0.166	9.1			18.2	18.2		9.1	36.4	9.1
62	Rubber	9	16,371	0.215	11.1			44.4	33.3		11.1		
65	Textile yarn, fabrics	49	12,316	0.177	10.2		2.0	18.4	18.4	2.0	16.3	18.4	14.3
81	Sanitary fixtures and fittings, nes	3	16,210	0.204	33.3					33.3	33.3		
Metals		46	15,307	0.204	19.6	8.7	0.0	39.1	6.5	4.3	6.5	8.7	6.5
67	Iron and steel	22	14,526	0.197	13.6			45.5	13.6	4.5	9.1	9.1	4.5
69	Manufactures of metals, nes	24	16,023	0.204	25.0	16.7		33.3		4.2	4.2	8.3	8.3

Table A.1 (*Continued*)

SITC 2-digit	SITC Description	No. of products	Ave. PRODY	Ave. Proximity	HPR_ HPA	HPR_ MPA	HPR_ LPA	MPR_ HPA	MPR_ MPA	MPR_ LPA	LPR_ HPA	LPR_ MPA	LPR_ LPA
Machinery		180	19,745	0.19	19.4	14.4	31.1	8.9	8.3	11.7	2.2	3.3	0.6
71	Power generating	19	20,046	0.179	31.6	10.5	31.6	15.8		10.5			
72	Specialized for particular industries	28	21,157	0.179	17.9	21.4	28.6	17.9	7.1	3.6		3.6	
73	Metalworking	8	21,788	0.183	25.0	50.0	25.0						
74	General industrial	26	21,619	0.208	65.4	19.2	7.7	3.8		3.8			
75	Office and data processing	11	20,980	0.127		9.1	63.6		9.1	18.2			
76	Telecommunications	12	17,610	0.138			33.3			66.7			
77	Electrical	25	18,514	0.169	8.0	4.0	32.0	8.0	20.0	24.0	4.0		
78	Road vehicles	13	16,602	0.190	15.4	15.4	7.7	23.1	15.4	7.7	7.7	7.7	
79	Other transport equipment	16	15,513	0.156	6.3	12.5	12.5	6.3	25.0		6.3	25.0	6.3
87	Professional and scientific instruments	11	21,663	0.163		27.3	63.6	9.1					
88	Photographic equipment	10	22,746	0.117			90.0		10.0				
95	Armored vehicles, firearms, and ammunition	1	9641	0.181							100.0		
Chemicals		94	19,872	0.188	19.1	22.3	20.2	13.8	9.6	5.3	1.1	5.3	3.2
51	Organic	22	24,464	0.175	13.6	36.4	36.4	4.5	4.5	4.5			
52	Inorganic	11	13,478	0.168	9.1		9.1	9.1	27.3	18.2		9.1	18.2
53	Dyeing and tanning	8	18,677	0.195	25.0	50.0			12.5			12.5	
54	Medicinal and pharmaceutical	7	25,168	0.181	42.9	28.6	28.6						
55	Oils and perfume	6	13,756	0.185			16.7	50.0				33.3	
56	Fertilizers	4	10,867	0.151					25.0		25.0	25.0	25.0
57	Explosives	3	14,486	0.152				33.3	33.3	33.3			
58	Artificial resins and plastic	23	21,815	0.183	30.4	26.1	26.1	8.7	4.3	4.3			
59	Chemical materials, nes	10	18,473	0.189	20.0	10.0	10.0	50.0	10.0				

Source: Authors.
Note: HPR_HPA – high PRODY – high PATH; HPR_MPA – high PRODY–mid PATH; HPR_LPA – high PRODY–low PATH; MPR_HPA – mid PRODY–high PATH; MPR_MPA – mid PRODY–mid PATH; MPR_LPA – mid PRODY–low PATH LPR_HPA – low PRODY–high PATH; LPR_MPA – Low PRODY–mid PATH; LPR_LPA – low PRODY–low PATH.

Table A.2
Distribution of products exported with RCA across the nine cells: high-core countries.

	HPR_ HPA (%)	HPR_ MPA (%)	HPR_ LPA (%)	MPR_ HPA (%)	MPR_ MPA (%)	MPR_ LPA (%)	LPR_ HPA (%)	LPR_ MPA (%)	LPR_ LPA (%)	RCA_ total	Share_ core (%)
Armenia	11.6	7.4	7.4	17.4	9.1	4.1	11.6	19.8	11.6	121	37.2
Austria	25.5	14.3	6.2	23.9	8.5	3.1	10.0	6.6	1.9	259	53.7
Barbados	12.5	3.9	13.3	19.5	12.5	9.4	10.2	11.7	7.0	128	39.8
Belarus	17.8	3.3	2.6	29.0	13.2	4.6	17.8	9.2	2.6	152	32.9
Belgium	18.4	11.5	6.8	22.3	13.3	4.3	9.7	9.4	4.3	278	42.1
Belize	10.8	11.8	5.4	14.0	9.7	6.5	8.6	21.5	11.8	93	35.5
Bosnia and Herzegovina	9.0	3.0	3.6	24.0	13.8	1.8	19.8	18.6	6.6	167	32.3
Brazil	8.0	5.5	8.0	16.9	13.4	4.5	9.5	17.4	16.9	201	38.8
Bulgaria	10.3	3.4	3.9	20.6	11.2	1.7	21.9	21.9	5.2	233	31.8
Burundi	8.9	6.3	3.8	16.5	10.1	3.8	10.1	20.3	20.3	79	39.2
Canada	13.2	7.8	9.3	22.0	15.1	5.4	6.3	13.2	7.8	205	29.8
China	6.6	4.7	9.3	13.6	11.2	13.2	14.3	17.4	9.7	258	35.7
Hong Kong, China	3.8	6.5	12.4	11.3	14.0	15.6	11.3	15.6	9.7	186	34.9
Costa Rica	1.1	3.2	5.3	25.3	10.5	6.3	15.8	20.0	12.6	95	29.5
Croatia	17.0	3.6	4.9	23.2	11.6	1.3	19.6	15.6	3.1	224	35.3
Cyprus	12.2	7.4	7.4	11.1	13.8	4.8	15.3	16.9	11.1	189	34.4
Czech Rep.	19.5	11.9	4.3	24.9	11.9	5.4	13.0	7.6	1.4	277	48.0
Denmark	23.7	11.4	8.3	21.1	11.8	4.4	7.9	8.8	2.6	228	46.5
Finland	26.7	14.0	13.4	16.3	11.1	2.3	7.6	6.4	2.3	172	59.3
France	19.8	10.8	10.8	23.3	12.7	2.2	8.6	8.6	3.2	314	51.0
Gambia	7.8	3.9	11.7	9.1	10.4	6.5	9.1	23.4	18.2	77	32.5
Georgia	4.4	3.6	8.0	9.4	15.9	8.0	14.5	22.5	13.8	138	34.8
Germany	24.3	16.3	12.8	21.4	11.3	4.2	5.6	3.0	1.2	337	62.6
Guinea-Bissau	4.0	5.0	18.8	11.9	5.0	8.9	15.8	16.8	13.9	101	45.5
Hungary	17.4	4.4	9.2	25.0	11.4	6.0	14.7	9.2	2.7	184	41.8
India	7.4	6.2	5.0	12.4	12.0	3.5	14.0	22.9	16.7	258	31.8
Ireland	11.6	12.8	24.4	10.5	11.6	8.1	4.7	9.3	7.0	86	43.0
Israel	11.7	11.0	14.1	13.5	11.0	4.9	8.6	16.6	8.6	163	50.3
Italy	20.7	11.6	6.7	21.3	10.1	3.1	11.6	11.3	3.7	328	49.7
Japan	19.4	18.4	22.9	11.4	11.0	9.0	3.0	3.0	2.0	201	75.1
Jordan	4.0	3.3	4.6	22.5	15.9	4.0	15.9	22.5	7.3	151	31.1
Lebanon	8.6	4.8	6.7	19.1	10.0	6.2	13.3	21.4	10.0	210	30.0
Liberia	10.3	3.5	0.0	3.5	13.8	6.9	13.8	20.7	27.6	29	41.4
Malaysia	4.7	1.9	19.8	11.3	11.3	17.9	7.6	11.3	14.2	106	46.2
Malta	8.2	6.9	16.4	17.8	17.8	9.6	8.2	8.2	6.9	73	47.9
Mexico	10.7	7.3	12.7	14.0	9.3	8.0	15.3	19.3	3.3	150	52.0
Netherlands	13.5	12.2	15.1	18.5	12.2	4.2	5.9	10.5	8.0	238	44.1

Table A.2 (*Continued*)

	HPR_ HPA (%)	HPR_ MPA (%)	HPR_ LPA (%)	MPR_ HPA (%)	MPR_ MPA (%)	MPR_ LPA (%)	LPR_ HPA (%)	LPR_ MPA (%)	LPR_ LPA (%)	RCA_ total	Share_ core (%)
Niger	5.6	4.4	4.4	11.1	8.9	7.8	6.7	26.7	24.4	90	34.4
Norway	16.8	10.5	14.7	11.6	16.8	6.3	5.3	9.5	8.4	95	46.3
Panama	5.2	3.3	6.5	13.1	13.7	13.1	13.1	22.2	9.8	153	30.7
Philippines	3.0	3.0	14.9	6.9	6.9	12.9	14.9	24.8	12.9	101	34.7
Poland	18.7	4.9	3.4	24.7	10.1	4.9	18.7	12.4	2.3	267	34.8
Portugal	12.4	6.2	6.2	23.0	9.6	4.3	19.1	13.4	5.7	209	31.1
Rep. of Korea	13.5	10.1	12.2	18.2	18.9	9.5	6.1	8.1	3.4	148	56.8
Romania	11.0	3.4	3.4	22.0	9.1	3.4	19.6	21.1	7.2	209	35.9
Russian Federation	3.8	5.7	8.6	13.3	15.2	11.4	8.6	15.2	18.1	105	41.0
Saint Kitts, Nevis and Anguilla	9.5	4.7	6.1	10.8	17.6	8.1	10.8	22.3	10.1	148	40.5
Samoa	5.2	5.2	17.2	6.9	13.8	10.3	12.1	19.0	10.3	58	37.9
Saudi Arabia	3.6	10.7	14.3	12.5	19.6	10.7	8.9	10.7	8.9	56	30.4
Senegal	4.3	5.5	4.9	15.2	10.4	4.9	12.2	28.7	14.0	164	31.1
Seychelles	4.4	6.7	11.1	17.8	6.7	13.3	8.9	15.6	15.6	45	40.0
Sierra Leone	15.0	7.5	3.3	18.3	10.8	6.7	9.2	14.2	15.0	120	37.5
Singapore	10.7	14.3	28.6	7.1	11.6	9.8	1.8	8.0	8.0	112	62.5
Slovakia	20.3	7.0	1.6	34.2	9.1	3.2	12.8	10.2	1.6	187	43.9
Slovenia	22.6	11.1	4.5	26.3	9.1	2.5	12.4	9.5	2.1	243	48.6
South Africa	6.3	4.3	4.3	18.8	13.0	7.7	10.1	21.2	14.4	208	31.3
Spain	19.2	9.6	5.6	23.2	11.9	4.3	10.9	11.3	4.0	302	41.1
Sweden	23.4	12.9	15.9	21.4	11.0	4.5	6.5	3.0	1.5	201	59.2
Switzerland	22.8	17.5	16.5	15.1	7.8	3.9	6.8	6.8	2.9	206	64.6
Thailand	7.4	2.0	9.4	18.3	14.9	9.9	11.4	18.3	8.4	202	34.7
USA	20.0	13.1	18.4	15.6	10.0	5.0	5.0	9.4	3.4	320	56.9
Ukraine	9.4	3.7	3.7	17.8	16.2	6.3	17.8	15.7	9.4	191	37.2
United Kingdom	18.6	14.1	17.3	18.2	12.5	4.0	6.5	4.0	4.8	248	56.9

Source: Authors.

Note: Numbers reported in the first nine columns are the share of each of the nine cells of Table 2 in the total number of products exported with RCA (also see note to Table A.1). RCA_total is the total number of products exported with RCA by each country. Share_core is the share of the number of core products exported with RCA in the total number of products exported with RCA.

Table A.3
Distribution of products exported with RCA across the nine cells: low-core countries.

	HPR_ HPA (%)	HPR_ MPA (%)	HPR_ LPA (%)	MPR_ HPA (%)	MPR_ MPA (%)	MPR_ LPA (%)	LPR_ HPA (%)	LPR_ MPA (%)	LPR_ LPA (%)	RCA_ total	Share_ core (%)
Albania	7.3	2.4	4.2	14.6	9.7	3.6	18.8	33.3	6.1	165	22.4
Algeria	0.0	0.0	10.0	5.0	30.0	5.0	5.0	30.0	15.0	20	30.0
Angola	14.3	0.0	28.6	0.0	14.3	14.3	0.0	14.3	14.3	7	0.0
Argentina	6.4	2.9	7.0	21.6	12.9	5.3	9.9	21.6	12.3	171	25.1
Australia	2.9	5.0	6.4	10.7	18.6	7.1	7.1	22.9	19.3	140	15.0
Azerbaijan	1.5	4.4	10.1	1.5	11.6	4.4	14.5	33.3	18.8	69	23.2
Bahrain	4.3	6.4	8.5	21.3	18.1	6.4	11.7	13.8	9.6	94	30.8
Bangladesh	0.0	0.0	0.0	3.7	11.1	2.5	28.4	37.0	17.3	81	7.4
Benin	3.3	1.1	2.2	8.8	11.0	2.2	13.2	36.3	22.0	91	22.0
Bolivia	3.5	1.2	5.8	5.8	9.2	2.3	9.2	40.2	23.0	87	17.2
Burkina Faso	5.2	0.0	0.0	13.0	11.7	3.9	13.0	32.5	20.8	77	22.1
Cambodia	0.0	1.4	0.0	5.6	9.7	5.6	26.4	38.9	12.5	72	12.5
Cameroon	0.0	0.0	0.0	4.1	6.1	4.1	14.3	40.8	30.6	49	10.2
Central African Rep.	2.1	8.5	2.1	17.0	8.5	2.1	10.6	21.3	27.7	47	23.4
Chad	6.7	0.0	13.3	13.3	13.3	13.3	13.3	6.7	20.0	15	26.7
Chile	2.8	0.9	9.2	14.7	16.5	6.4	15.6	22.0	11.9	109	15.6
China, Macao SAR	5.6	2.8	7.0	9.9	11.3	8.5	25.4	22.5	7.0	71	15.5
Colombia	6.1	3.4	2.7	21.6	13.5	3.4	18.2	18.2	12.8	148	20.9
Congo	0.0	3.3	6.7	0.0	0.0	13.3	10.0	26.7	40.0	30	6.7
Côte d'Ivoire	2.5	0.0	3.7	11.1	3.7	4.9	16.1	27.2	30.9	81	18.5
Dem. Rep. of the Congo	4.4	2.2	2.2	2.2	4.4	8.9	6.7	28.9	40.0	45	17.8
Djibouti	7.9	5.0	3.6	17.9	6.4	5.0	11.4	25.7	17.1	140	27.1
Dominican Rep.	5.1	5.1	4.3	12.8	8.6	1.7	19.7	29.9	12.8	117	20.5
Ecuador	2.6	1.3	3.9	9.1	10.4	6.5	16.9	24.7	24.7	77	11.7
Egypt	4.5	2.3	2.3	18.0	12.9	4.5	18.5	25.8	11.2	178	24.2
El Salvador	2.5	2.5	4.1	24.0	9.1	3.3	22.3	24.8	7.4	121	22.3
Equatorial Guinea	0.0	0.0	28.6	0.0	0.0	14.3	14.3	14.3	28.6	7	14.3
Estonia	14.4	4.6	6.7	19.5	9.7	5.6	15.9	14.4	9.2	195	27.7
Ethiopia	2.0	0.0	4.0	8.0	10.0	4.0	13.0	35.0	24.0	100	9.0
Fiji	2.5	2.5	3.3	10.7	10.7	6.6	21.3	30.3	12.3	122	15.6
Gabon	0.0	4.2	8.3	0.0	8.3	8.3	20.8	29.2	20.8	24	20.8
Ghana	0.9	1.8	1.8	12.4	8.9	2.7	15.9	30.1	25.7	113	16.8
Greece	11.2	3.0	1.3	21.0	12.5	5.2	16.7	20.2	9.0	233	26.6
Guatemala	2.7	2.7	0.7	23.2	8.0	1.3	24.5	23.8	13.3	151	15.9
Guinea	0.0	0.0	2.1	10.4	10.4	8.3	8.3	22.9	37.5	48	20.8
Guyana	3.9	2.6	2.6	11.7	11.7	6.5	13.0	27.3	20.8	77	23.4
Haiti	0.0	1.5	1.5	7.6	7.6	4.6	24.2	37.9	15.2	66	10.6
Honduras	0.0	3.8	1.9	13.2	7.6	0.9	19.8	35.9	17.0	106	12.3

Table A.3 (*Continued*)

	HPR_ HPA (%)	HPR_ MPA (%)	HPR_ LPA (%)	MPR_ HPA (%)	MPR_ MPA (%)	MPR_ LPA (%)	LPR_ HPA (%)	LPR_ MPA (%)	LPR_ LPA (%)	RCA_ total	Share_ core (%)
Iceland	9.4	9.4	9.4	1.6	17.2	12.5	3.1	23.4	14.1	64	25.0
Indonesia	4.0	5.8	5.8	12.6	12.6	8.5	13.9	20.2	16.6	223	21.1
Iran	0.0	2.6	6.5	7.8	20.8	6.5	7.8	27.3	20.8	77	11.7
Jamaica	3.4	6.8	5.1	6.8	17.0	6.8	13.6	27.1	13.6	59	22.0
Kazakhstan	5.4	0.0	3.3	8.7	16.3	9.8	6.5	25.0	25.0	92	27.2
Kenya	1.2	2.4	3.0	18.3	9.5	3.6	14.8	30.2	17.2	169	16.6
Kiribati	1.8	3.6	3.6	7.1	17.9	8.9	10.7	32.1	14.3	56	23.2
Kuwait	8.3	8.3	20.8	8.3	20.8	12.5	4.2	8.3	8.3	24	25.0
Kyrgyzstan	4.3	3.1	4.9	12.8	12.2	3.1	21.3	26.2	12.2	164	23.2
Lao People's Dem. Rep.	3.2	1.1	1.1	5.4	12.9	1.1	19.4	35.5	20.4	93	12.9
Latvia	12.8	5.9	3.7	19.6	10.5	5.5	21.0	16.9	4.1	219	25.6
Libya	5.0	5.0	15.0	0.0	30.0	15.0	5.0	5.0	20.0	20	50.0
Lithuania	9.8	4.0	3.6	20.5	13.8	4.0	18.8	21.4	4.0	224	27.7
Madagascar	0.0	0.0	6.7	9.6	7.7	4.8	18.3	38.5	14.4	104	12.5
Malawi	3.7	1.2	0.0	6.1	11.0	3.7	23.2	37.8	13.4	82	19.5
Mali	4.1	6.8	2.7	8.1	12.2	5.4	5.4	31.1	24.3	74	28.4
Mauritania	3.6	0.0	3.6	0.0	14.3	17.9	0.0	21.4	39.3	28	10.7
Mauritius	5.1	3.4	7.6	11.0	7.6	11.0	16.1	27.1	11.0	118	24.6
Mongolia	1.9	1.0	2.9	6.8	16.5	2.9	23.3	30.1	14.6	103	12.6
Morocco	3.9	0.0	4.6	6.9	11.5	7.7	22.3	35.4	7.7	130	10.8
Mozambique	5.1	4.1	2.0	5.1	13.3	5.1	8.2	31.6	25.5	98	21.4
Nepal	2.4	3.5	3.5	19.4	9.4	4.1	20.6	24.1	12.9	170	18.8
New Zealand	10.6	5.6	8.1	19.9	13.0	5.6	11.8	17.4	8.1	161	23.0
Nicaragua	3.0	1.0	3.0	7.1	8.1	4.0	23.2	34.3	16.2	99	10.1
Nigeria	0.0	0.0	3.6	3.6	7.1	7.1	3.6	35.7	39.3	28	14.3
Oman	6.7	4.4	2.2	17.8	22.2	6.7	8.9	20.0	11.1	45	24.4
Pakistan	2.0	0.7	2.0	9.5	12.2	4.7	20.3	35.1	13.5	148	9.5
Papua New Guinea	0.0	0.0	2.0	2.0	12.2	10.2	8.2	32.7	32.7	49	8.2
Paraguay	1.1	1.1	3.2	13.8	6.4	2.1	13.8	36.2	22.3	94	10.6
Peru	1.5	3.8	3.0	12.0	15.0	5.3	14.3	27.8	17.3	133	18.0
Qatar	3.5	10.3	31.0	6.9	10.3	17.2	13.8	3.5	3.5	29	51.7
Rep. of Moldova	9.4	3.4	3.4	12.8	10.7	3.4	23.5	27.5	6.0	149	23.5
Rwanda	1.5	2.9	4.4	8.7	14.5	7.3	10.1	33.3	17.4	69	27.5
Sri Lanka	2.3	3.0	1.5	11.4	9.1	5.3	20.5	28.0	18.9	132	9.1
Sudan	2.0	0.0	6.1	2.0	8.2	4.1	4.1	42.9	30.6	49	16.3
Suriname	2.4	4.9	0.0	2.4	17.1	7.3	2.4	31.7	31.7	41	19.5
Syria	2.7	0.7	4.1	14.2	13.5	4.1	19.6	27.0	14.2	148	11.5
Tajikistan	3.0	0.0	6.0	11.9	10.5	4.5	14.9	35.8	13.4	67	22.4
TFYR of Macedonia	6.5	0.0	0.7	18.2	11.7	2.0	26.0	28.6	6.5	154	22.1
Togo	2.1	1.4	1.4	19.9	9.2	3.6	19.2	26.2	17.0	141	22.0
Trinidad and Tobago	5.8	3.9	7.7	13.5	19.2	13.5	15.4	13.5	7.7	52	34.6
Tunisia	2.0	2.6	4.6	16.5	9.2	5.3	25.0	27.6	7.2	152	23.7
Turkey	7.6	2.1	0.8	28.3	11.8	3.0	18.6	21.5	6.3	237	26.6
Turkmenistan	0.0	0.0	2.5	5.0	10.0	2.5	12.5	42.5	25.0	40	15.0
Uganda	2.9	3.7	1.5	13.2	7.4	5.2	12.5	31.6	22.1	136	26.5
United Arab Emirates	1.6	3.3	13.1	14.8	18.0	8.2	14.8	13.1	13.1	61	26.2
United Rep. of Tanzania	3.8	2.5	3.8	4.4	12.0	4.4	10.7	35.9	22.6	159	16.4
Uruguay	6.0	4.7	8.7	15.3	16.7	4.7	10.7	20.7	12.7	150	24.7
Uzbekistan	4.8	2.4	2.4	7.2	14.5	2.4	13.3	31.3	21.7	83	21.7
Venezuela	1.7	5.1	8.5	11.9	20.3	6.8	13.6	15.3	17.0	59	33.9
Viet Nam	2.5	0.0	3.8	10.1	10.7	6.9	21.4	22.6	22.0	159	13.8
Yemen	1.4	2.8	4.2	2.8	14.1	11.3	8.5	35.2	19.7	71	18.3
Zambia	6.3	3.2	4.2	13.7	9.5	6.3	9.5	29.5	17.9	95	18.9

Source: Authors.

Note: Numbers reported in the first nine columns are the share of each of the nine cells of Table 2 in the total number of products exported with RCA (also see note to Table A.1). RCA_total is the total number of products exported with RCA by each country. Share_core is the share of the number of core products exported with RCA in the total number of products exported with RCA.

Table A.4
Distribution of products exported with RCA across the nine cells: selected countries.

	RCA>1	HPR_HPA	HPR_MPA	HPR_LPA	MPR_HPA	MPR_MPA	MPR_LPA	LPR_HPA	LPR_MPA	LPR_LPA
Brazil	201	8.0	5.5	8.0	16.9	13.4	4.5	9.5	17.4	16.9
Petroleum										
Raw materials	15		6.7	6.7	6.7	6.7	13.3		20.0	40.0
Forest products	18	5.6	11.1	11.1	22.2	11.1		16.7	16.7	5.6
Tropical agriculture	20					15.0	5.0	20.0	35.0	25.0
Animal products	16	12.5		6.3	12.5	31.3			18.8	18.8
Cereals	26		3.8			3.8	3.8	7.7	26.9	53.8
Labor intensive	12	16.7	8.3	8.3	25.0	16.7		8.3	16.7	
Capital intensive	16				18.8	25.0		31.3	6.3	18.8
Metals	18				33.3	16.7	11.1	16.7	16.7	5.6
Machinery	37	18.9	16.2	18.9	24.3	5.4	8.1		5.4	2.7
Chemicals	23	17.4		17.4	26.1	17.4		4.3	17.4	

Table A.4 (*Continued*)

	RCA>1	HPR_HPA	HPR_MPA	HPR_LPA	MPR_HPA	MPR_MPA	MPR_LPA	LPR_HPA	LPR_MPA	LPR_LPA
China	258	6.6	4.7	9.3	13.6	11.2	13.2	14.3	17.4	9.7
Petroleum	2				50.0		50.0			
Raw materials	11		9.1		9.1			9.1	36.4	36.4
Forest products	7	14.3			28.6			14.3	28.6	14.3
Tropical agriculture	11				9.1			36.4	45.5	9.1
Animal products	10				10.0	30.0	10.0		40.0	10.0
Cereals	8							25.0	12.5	62.5
Labor intensive	69	2.9	5.8	1.4	14.5	11.6	13.0	23.2	18.8	8.7
Capital intensive	48	6.3			18.8	16.7	2.1	22.9	22.9	10.4
Metals	19	36.8	10.5		15.8	5.3	5.3	5.3	15.8	5.3
Machinery	55	1.8	3.6	40.0	7.3	12.7	30.9	1.8	1.8	
Chemicals	18	16.7	16.7	5.6	16.7	11.1	22.2		5.6	5.6
India	258	7.4	6.2	5.0	12.4	12.0	3.5	14.0	22.9	16.7
Petroleum	1					100.0				
Raw materials	27		3.7	3.7	3.7	18.5	14.8	3.7	22.2	29.6
Forest products	2							50.0	50.0	
Tropical agriculture	17				5.9			41.2	35.3	17.6
Animal products	13	7.7			7.7	23.1	7.7		23.1	30.8
Cereals	31				3.2	6.5		9.7	38.7	41.9
Labor intensive	40		5.0	2.5	7.5	12.5	2.5	30.0	30.0	10.0
Capital intensive	45	2.2			20.0	11.1		22.2	26.7	17.8
Metals	23	17.4			39.1	13.0		8.7	13.0	8.7
Machinery	25	24.0	12.0	16.0	12.0	16.0	8.0		8.0	4.0
Chemicals	34	20.6	29.4	20.6	11.8	8.8	2.9		5.9	
Malaysia	106	4.7	1.9	19.8	11.3	11.3	17.9	7.5	11.3	14.2
Petroleum	1				100.0					
Raw materials	7			14.3		14.3	14.3	14.3		42.9
Forest products	9				11.1			22.2	44.4	22.2
Tropical agriculture	6				16.7			16.7	16.7	50.0
Animal products	9				33.3	22.2			33.3	11.1
Cereals	10						10.0	10.0	30.0	50.0
Labor intensive	12	8.3		16.7	25.0	25.0		16.7		8.3
Capital intensive	3				66.7	33.3				
Metals	4	25.0			25.0		25.0	25.0		
Machinery	37		2.7	43.2		13.5	40.5			
Chemicals	8	37.5	12.5	25.0			12.5		12.5	
Thailand	202	7.4	2.0	9.4	18.3	14.9	9.9	11.4	18.3	8.4
Petroleum	4			25.0		50.0	25.0			
Raw materials	6					16.7		16.7	16.7	50.0
Forest products	7	14.3			42.9	14.3			28.6	
Tropical agriculture	16				6.3	6.3		37.5	37.5	12.5
Animal products	16				12.5	31.3	12.5		25.0	18.8
Cereals	18		5.6		16.7	11.1		16.7	27.8	22.2
Labor intensive	32	6.3			15.6	6.3	12.5	15.6	37.5	6.3
Capital intensive	33				33.3	21.2		24.2	15.2	6.1
Metals	8	25.0			50.0				12.5	12.5
Machinery	47	12.8	2.1	31.9	10.6	12.8	27.7		2.1	
Chemicals	15	26.7	13.3	20.0	20.0	20.0				
Algeria	20			10.0	5.0	30.0	5.0	5.0	30.0	15.0
Petroleum	2					50.0	50.0			
Raw materials	6			16.7		16.7		16.7	16.7	33.3
Forest products	1			100.0						
Tropical agriculture	1								100.0	
Animal products	1									100.0
Cereals	1								100.0	
Labor intensive	1					100.0				
Capital intensive	1								100.0	
Metals										
Machinery	1								100.0	
Chemicals	5				20.0	60.0			20.0	
Nigeria	28			3.6	3.6	7.1	7.1	3.6	35.7	39.3
Petroleum	1						100.0			
Raw materials	3			33.3			33.3			33.3
Forest products	2								100.0	
Tropical agriculture	6								50.0	50.0
Animal products	4								25.0	75.0
Cereals	5							20.0	20.0	60.0
Labor intensive										
Capital intensive	3				33.3				66.7	
Metals										
Machinery	4					50.0			25.0	25.0
Chemicals										

Table A.4 (*Continued*)

	RCA>1	HPR_HPA	HPR_MPA	HPR_LPA	MPR_HPA	MPR_MPA	MPR_LPA	LPR_HPA	LPR_MPA	LPR_LPA
Bangladesh	81				3.7	11.1	2.5	28.4	37.0	17.3
Petroleum										
Raw materials										
Forest products	1							100.0		
Tropical agriculture	4							50.0	25.0	25.0
Animal products	9					22.2	11.1		33.3	33.3
Cereals	16				6.3		6.3		50.0	37.5
Labor intensive	27					7.4		51.9	37.0	3.7
Capital intensive	18				5.6	11.1		27.8	38.9	16.7
Metals										
Machinery	4				25.0	25.0		25.0	25.0	
Chemicals	2					100.0				
Rwanda	69	1.4	2.9	4.3	8.7	14.5	7.2	10.1	33.3	17.4
Petroleum	2					0.0	100.0			
Raw materials	11					18.2		9.1	27.3	45.5
Forest products	2			50.0		0.0			50.0	
Tropical agriculture	6					16.7		16.7	33.3	33.3
Animal products	11					9.1		9.1	54.5	27.3
Cereals	7							14.3	71.4	14.3
Labor intensive	7			14.3	14.3	28.6			42.9	
Capital intensive	4							25.0	75.0	
Metals	5				60.0	40.0				
Machinery	7	14.3	14.3		14.3	14.3	28.6	14.3		
Chemicals	7		14.3	14.3	14.3	14.3	14.3	14.3		14.3
Australia	140	2.9	5.0	6.4	10.7	18.6	7.1	7.1	22.9	19.3
Petroleum										
Raw materials	38		2.6	5.3	2.6	15.8	10.5	7.9	21.1	34.2
Forest products	4		50.0		25.0	25.0				
Tropical agriculture	12				8.3	8.3		16.7	50.0	16.7
Animal products	28	7.1	3.6	7.1	3.6	28.6	3.6	3.6	25.0	17.9
Cereals	27			11.1	14.8	11.1	11.1	11.1	18.5	22.2
Labor intensive	5		20.0	20.0		40.0			20.0	
Capital intensive	5				20.0	20.0		20.0	40.0	
Metals	5	20.0			40.0		20.0		20.0	
Machinery	4			25.0	50.0	25.0				
Chemicals	12	8.3	16.7		16.7	25.0	8.3		16.7	8.3
Chile	109	2.8	0.9	9.2	14.7	16.5	6.4	15.6	22.0	11.9
Petroleum										
Raw materials	18					5.6	11.1	11.1	33.3	38.9
Forest products	20	5.0	5.0	20.0	25.0	10.0		15.0	15.0	5.0
Tropical agriculture	16				6.3	12.5		37.5	37.5	6.3
Animal products	21	4.8		4.8	4.8	28.6	14.3		28.6	14.3
Cereals	11			36.4	27.3	9.1	9.1	9.1	9.1	
Labor intensive	2					50.0		50.0		
Capital intensive	4				25.0	25.0		50.0		
Metals	3				33.3			33.3	33.3	
Machinery										
Chemicals	14	7.1		7.1	28.6	28.6	7.1	7.1	7.1	7.1
Saudi Arabia	56	3.6	10.7	14.3	12.5	19.6	10.7	8.9	10.7	8.9
Petroleum	7			28.6	14.3	28.6	28.6			
Raw materials	8		25.0	25.0		12.5	12.5	12.5	12.5	
Forest products	2	50.0			50.0					
Tropical agriculture	3					33.3		33.3	33.3	
Animal products	6				33.3	16.7				50.0
Cereals	3							33.3	33.3	33.3
Labor intensive	5			20.0		20.0	20.0	20.0	20.0	
Capital intensive	5				20.0	20.0	20.0	0.0	40.0	
Metals	3				33.3	33.3		33.3		
Machinery	1									100.0
Chemicals	13	7.7	30.8	23.1	7.7	23.1	7.7			
United Arab Emirates	61	1.6	3.3	13.1	14.8	18.0	8.2	14.8	13.1	13.1
Petroleum	3			33.3			66.7			
Raw materials	9		11.1	22.2	11.1		11.1	22.2	11.1	11.1
Forest products										
Tropical agriculture	3							33.3		66.7
Animal products	3			33.3					33.3	33.3
Cereals	9						11.1	33.3	33.3	22.2
Labor intensive	8		12.5		25.0	50.0				12.5
Capital intensive	10				30.0	30.0		20.0	20.0	
Metals	4				25.0	50.0		25.0		
Machinery	7			42.9	14.3	14.3	14.3			14.3
Chemicals	5	20.0		20.0	20.0	20.0			20.0	

Table A.4 (*Continued*)

	RCA>1	HPR_HPA	HPR_MPA	HPR_LPA	MPR_HPA	MPR_MPA	MPR_LPA	LPR_HPA	LPR_MPA	LPR_LPA
Ireland	86	11.6	12.8	24.4	10.5	11.6	8.1	4.7	9.3	7.0
Petroleum										
Raw materials	8		12.5			25.0	12.5		25.0	25.0
Forest products	2	50.0			50.0					
Tropical agriculture	6				16.7	33.3	16.7	33.3		
Animal products	16	6.3	12.5	12.5	12.5	25.0	6.3	6.3	18.8	
Cereals	9				33.3	11.1			11.1	44.4
Labor intensive	6		16.7	50.0		16.7			16.7	
Capital intensive	2	50.0						50.0		
Metals	1				100.0					
Machinery	15	13.3	13.3	53.3			20.0			
Chemicals	21	23.8	23.8	38.1	4.8		4.8		4.8	
Singapore	112	10.7	14.3	28.6	7.1	11.6	9.8	1.8	8.0	8.0
Petroleum	5	20.0		20.0		40.0	20.0			
Raw materials	7						14.3		14.3	71.4
Forest products	1		100.0							
Tropical agriculture	5							20.0	40.0	40.0
Animal products	5				20.0	20.0			60.0	
Cereals	5				20.0	0.0	20.0		40.0	20.0
Labor intensive	12	8.3		41.7	16.7	25.0		8.3		
Capital intensive	2					50.0			50.0	
Metals										
Machinery	38	10.5	10.5	39.5	7.9	10.5	18.4			2.6
Chemicals	32	18.8	34.4	34.4	3.1	6.3	3.1			
Finland	172	26.7	14.0	13.4	16.3	11.0	2.3	7.6	6.4	2.3
Petroleum	1	100.0								
Raw materials	14		7.1	7.1		21.4	14.3	14.3	21.4	14.3
Forest products	25	12.0	12.0	16.0	24.0	16.0		4.0	12.0	4.0
Tropical agriculture	3					33.3		66.7		
Animal products	4	25.0	50.0			25.0				
Cereals	6	16.7	16.7	16.7	16.7	16.7		16.7		
Labor intensive	10	50.0		10.0	10.0	10.0		20.0		
Capital intensive	7	57.1			28.6			14.3		
Metals	16	18.8			43.8	12.5		12.5	12.5	
Machinery	61	31.1	18.0	23.0	13.1	6.6	1.6	1.6	3.3	1.6
Chemicals	25	36.0	24.0	8.0	12.0	8.0	4.0	4.0	4.0	

Source: Authors.

Note: The second column provides the total number of products exported with RCA > 1 and the disaggregation into the 11 Leamer categories. The rest of the columns provide the percentage of the number of products in each of the 9 cells in Table 2.

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