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Tracking the Middle-Income Trap: *What* is It, *Who* is in It, and *Why*? Part 2

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Jesus Felipe

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Abstract

This paper proposes and analyzes one possible reason why some countries get stuck in the middle-income trap: the role played by the changing structure of the economy (from low-productivity activities into high-productivity activities), the types of products exported (not all products have the same consequences for growth and development) and the diversification of the economy. We compare the exports of countries in the middle-income trap with those of countries that graduated, across eight dimensions that capture different aspects of a country's capabilities to undergo structural transformation, and test whether they are different. Results indicate that, in general, they are different. We also compare the Republic of Korea, Malaysia, and the Philippines according to the number of products that each exports with revealed comparative advantage. We find that while the Republic of Korea was able to gain comparative advantage in a significant number of sophisticated products and well connected, Malaysia and the Philippines were able to gain comparative advantage in electronics only.

Executive Summary

Using highly disaggregated trade data, this paper compares the exports of countries in the middle-income trap with those of countries that have graduated, across eight dimensions that capture different aspects of a country's capabilities to undergo structural transformation to test whether they are different. The results indicate that countries that made it into the upper middle-income group had a more diversified, sophisticated, and nonstandard export basket at the time they were about to jump than those in the lower middle-income trap today. Likewise, countries that have attained upper middle-income status had more opportunities for structural transformation at the time of the transition than countries that are today in the lower middle-income trap. The paper also finds that the sophistication of the export basket of countries in the upper middle-income trap is not statistically different from that of the countries that made it to high income at the time they were about to make the transition. However, countries in the upper middle-income trap are less diversified, are exporters of more standard products, and had fewer opportunities for further structural transformation than the countries that made it into the high-income group.

The paper compares the Republic of Korea, Malaysia, and the Philippines according to the number of products that each exports with revealed comparative advantage (since the early 1960s). While the Republic of Korea was able to gain comparative advantage in a significant number of sophisticated and well-connected products, Malaysia and the Philippines were able to gain comparative advantage in electronics only.

In this context, today's development problem can be viewed as one of how to accumulate productive capabilities and how to express them in (i) a more diversified export basket and (ii) in products that require more capabilities (i.e., more complex). The paper concludes that countries in the middle-income trap have to make efforts to acquire revealed comparative advantage in sophisticated and well-connected products. This is the most direct strategy to become a high-income country.

I. What Characterizes the Countries in the Middle-income Trap? The Role of Structural Transformation

Becoming a high-income country is not an easy walk. In Part I of this study (Felipe 2012), 37 economies of 124 analyzed were observed to have always been in the low-income group since 1950. As was seen, the transition from lower middle-income into upper middle-income, and then into high-income, can be a slow process. Some countries have been stuck in the long middle-income march for decades. Others are passing through it now and hoping to become high-income as quickly as possible. A total of 35 middle-income countries have been in this group longer than the median of the reference group used in this study and are, therefore, in the middle-income trap.

This paper sheds some light on why countries cannot graduate from lower middle-income into upper middle-income, and from the latter into high-income. Certainly, there must be a multiplicity of reasons that prevent these jumps, many of them interlinked. In recent years, developing countries have opened to the world economy, placed greater emphasis on macroeconomic stability, and many of them are better governed. While these are important to grow, they are not enough. Fast growth like that experienced by the East Asian countries that moved fast across the income spectrum did many other things. Instead of trying to identify all the possible reasons that may underlie fast transitions, this paper concentrates its analysis on one that is theoretically sound and encompassing: the role played by the changing structure of the economy (from low-productivity activities into high-productivity activities), the types of products exported (not all products have the same consequences for growth and development), and the diversification of the economy.

Development economists in the tradition of Lewis (1955), Rostow (1959), Kuznets (1966), Kaldor (1967), and Chenery and Taylor (1968), among others, viewed development and growth as a process of structural transformation of the productive structure, whereby resources were transferred from activities of lower productivity into activities of higher productivity. This literature also acknowledged that different activities played different roles in the economy: some products are subject to increasing returns to scale, they have high income elasticities of demand, and their markets are imperfect. Countries know that once they manage to put a foot into them, they are on an “automatic upward trajectory” (Rodrik 2011, 4).

As argued earlier (Felipe 2012), the low-income countries stuck in a low-level equilibrium trap face a daunting task. They need a big push (investment) to start industrialization. But the countries that have attained lower and, especially, upper middle-income status have, for the most part, achieved some degree of industrialization (some of them relatively high, like Brazil or Malaysia). Their problem is different. Although many of them still display traces of dualism, their problem is not how to increase investment.

In a series of recent papers, Hidalgo et al. (2007) and Hidalgo and Hausmann (2009) revive these ideas and explain economic development as a process of learning how to produce (and export) more complex products. Using network theory methods, they show that the development path of a country is determined by its capacity to accumulate the capabilities that are required to produce varied and, in particular, more sophisticated goods. In Hidalgo and Hausmann's (2009) theory of capabilities, economic development is not only a process of continuously improving upon the production of the same set of goods, but more importantly, a process that requires acquiring more complex sets of capabilities to move toward new activities associated with higher levels of productivity. Specifically, capabilities refer to: (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. Therefore, capabilities are largely nontradable inputs. According to Sutton (2001 and 2005), capabilities manifest themselves as a quality–productivity combination. A given capability is embodied in the tacit knowledge of the individuals who comprise the firm's workforce. The quality–productivity combinations are not a continuum from zero; rather, there is a window with a "minimum threshold" below which the firm would be excluded from the market.

Moreover, becoming a rich country is about being able to earn higher real wages. In the same vein as Hidalgo et al. (2007), Sutton (2001 and 2005) argues that some economic activities are more lucrative than others. Countries that specialize in such activities enjoy a higher level of real wages. But unlike the traditional neoclassical model, where higher real wages are the result of an increasing capital–labor ratio, Sutton argues that the primary driver of growth is the gradual build-up of firms' capabilities.[1]

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[1] Sutton (2001 and 2005) argued that if two countries differ in their levels of capability, this will be reflected as a difference in their real wage levels. Low wages do not compensate for low quality, with the consequence that the low-quality firms will be excluded from the market. Indeed, one of the most important effects of globalization is competition in "capability building". This will lead to a shakeout of firms in low-capability countries. Can capabilities be transferred? Maybe yes, but this is a slow, expensive, and painstaking process. And from the point of view of a high-quality producer, moving to a low-wage country need not be optimal, first because it operates in an environment where the producer relies on suppliers of intermediate inputs that probably are not present in the low-wage country; and second, because the firm's capabilities are embodied in the tacit knowledge possessed jointly by those individuals who comprise the firm's workforce.

The analysis in the rest of this paper in divided into three parts. First, test the null hypothesis that countries in the middle-income trap are not different from those that have graduated, according to eight indicators of structural change. Second, divide products according to their sophistication and their proximity to other products and see what products the countries in the middle-income trap export. Third, compare the experiences of the Republic of Korea (a successful country), Malaysia (in the upper middle-income trap), and the Philippines (in the lower middle-income trap), and extract some lessons.

II. Comparing Countries in the Trap with Those Not in It

The study starts by studying eight characteristics of the products exported by countries that are in the trap today. The hypothesis that they are not different from those of the countries that have successfully made the transition is tested. Specifically, the following eight indicators of structural transformation are examined:[2]

(i) *diversification*: number of products that a country exports with revealed comparative advantage (RCA), i.e., RCA≥1. RCA is defined as:

$$RCA_{ci} = \left(xval_{ci} \Big/ \sum_i xval_{ci} \right) \Bigg/ \left(\sum_c xval_{ci} \Big/ \sum_i \sum_c xval_{ci} \right) \tag{1}$$

where $xval_{ci}$ is the value of country *c*'s export of commodity *i* (Balassa 1965).

(ii) *diversification_core*: number of products in the metals, machinery, and chemicals categories (referred to as "core" products) that a country exports with RCA.

(iii) *share_core*: ratio of the number of "core" products that a country exports with RCA≥1 to total diversification (i.e., *diversification_core / diversification*).

(iv) *expy*: index of sophistication of the export basket. This is defined as the weighted average of the level of sophistication of all the products that a country exports (Hausmann et al. 2007):

$$expy_c = \sum_i \left(\frac{xval_{ci}}{\sum_i xval_{ci}} \times PRODY_i \right) \tag{2}$$

[2] This paper tries to measure aspects of structural transformation such as: (i) how easy would it be to become good at exporting a new product?); (ii) how sophisticated is the product? (i.e., is there a wage advantage with respect to the competitors and how profitable would it be if one succeeds making it?); and (iii) how strategic is the product? (i.e., how will it improve my potential position by putting one closer to other products?)

where the sophistication of the products, PRODY, is calculated as:

$$PRODY_i = \sum_c \left[\left(xval_{ci} \Big/ \sum_i xval_{ci} \right) \Big/ \sum_c \left(xval_{ci} \Big/ \sum_i xval_{ci} \right) \right] \times GDPPC_c \tag{3}$$

both expy and PRODY are measured in 2005 purchasing power parity (PPP) dollars.

(v) *expy_rca*: sophistication of the products a country exports with RCA≥1.

(vi) *expy_core*: sophistication of core products

where both *expy_rca* and *expy_core* are measured in 2005 PPP dollars.

(vii) *openforest*: a measure of the potential of a country for further structural change (Hausmann and Klinger 2006). Open forest is calculated as the weighted average of the sophistication level of all potential exports of a country—i.e., goods not yet exported with RCA≥1—where the weight is the density or distance between each of these goods and those exported with comparative advantage:

$$Open\ Forest = \sum_j \left[\omega_{cj} \left(1 - x_{cj} \right) PRODY_j \right] \tag{4}$$

where $\omega_{cj} = \frac{\sum_i \varphi_{ij} x_{ci}}{\sum_i \varphi_{ij}}$ is the density; $x_{ci}, x_{cj} = \begin{cases} 1\ if\ RCA_{i,j} \geq 1\ for\ country\ c \\ 0\ if\ RCA_{i,j} < 1\ for\ country\ c \end{cases}$;

φ_{ij} denotes the *proximity* or probability that the country will shift resources into good *j* (not exported with comparative advantage) given that it exports good *i* with RCA. The sum of all proximities leading to *j*, $\sum_i \varphi_{ij}$, is called the *PATH* of *j* (Hidalgo et al. 2007); $PRODY_j$ (explained above) is a measure of the sophistication of product *j* (not exported with comparative advantage); and $\omega_{cj} PRODY_j$ is the expected value (in terms of the sophistication of exports) of good *j*. Open forest is measured in 2005 PPP dollars.

(viii) *standardness*: measures the uniqueness of the products a country exports (Hidalgo and Hausmann 2009). It is calculated as the average ubiquity of commodities exported with comparative advantage for each country:

$$standardness = \frac{1}{diversification_c} \sum_i ubiquity_{ic} \tag{5}$$

where *ubiquity* of commodity *i* is the number of countries exporting commodity *i* with RCA.

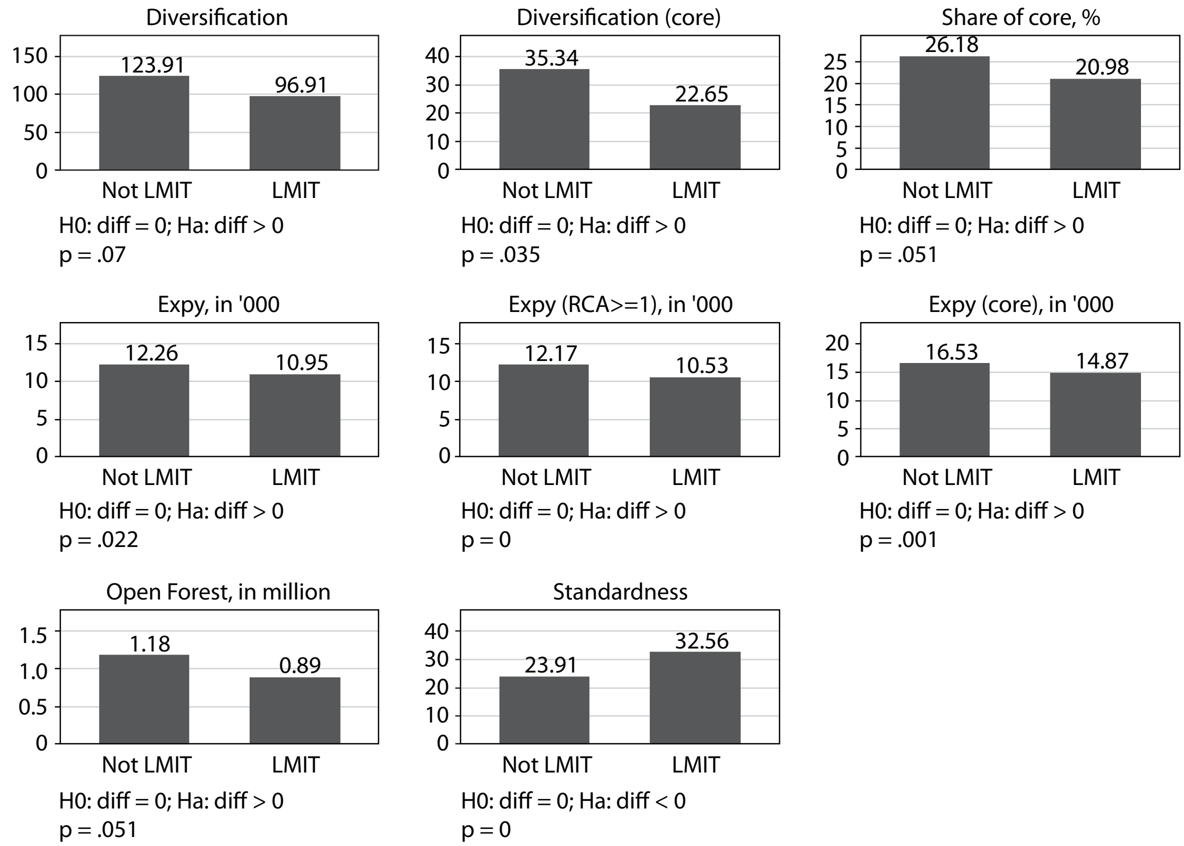
First, each of the eight indicators for each country are calculated using a highly disaggregated (SITC Rev. 2 4-digit level) trade data at the level of 779 products. The earliest data is for 1962 and the latest for 2007. Second, the 10-year (1998-2007) average of each indicator for countries in the lower middle-income and upper middle-income traps is calculated.[3] Third, for countries that made the transition into upper middle-income or high-income, the average of each indicator for the 10 years just before they made the transition is calculated (that is, the two groups of countries today are not compared). Since the earliest data is 1962, only those countries that made the transition after 1971 are considered.[4] Lastly, we test the null hypotheses that the average of each of the indicators *diversification, diversification_core, share_core, expy, expy_rca, expy_core*, *openforest,* and *standardness* for countries that have successfully made the transition is equal to that of countries in the trap (i.e., H_0: difference=0) against the alterative hypothesis that the average for countries that have successfully made the transition is larger (smaller in the case of *standardness*) than that of countries in the trap (i.e., H_A: difference > 0; difference < 0 for *standardness*).

Figure 1 shows the average of each indicator for countries in the lower middle-income trap and for countries that made it to upper middle-income. The results of the tests show that countries in the latter group had a more diversified, sophisticated, and nonstandard export basket at the time they were about to jump. Likewise, countries that have attained upper middle-income status had more opportunities for structural formation at the time of the transition than countries that are today in the lower middle-income trap, as indicated by their higher average Open Forest.

3 There is no data for Botswana, Namibia, and Swaziland, which are in the lower middle-income trap.

4 Countries in the lower middle-income trap are compared to the following 23 economies: Bulgaria; Chile; the People's Republic of China; Costa Rica; Spain; Greece; Hong Kong, China; Hungary; Ireland; the Republic of Korea; Kuwait; Mexico; Mauritius; Malaysia; Oman; Poland; Portugal; Qatar; Singapore; Syria; Thailand; Turkey; and Uruguay (Felipe 2012, Table 3 and Appendix Table 3). Countries in the upper middle-income trap are compared to the following 21 economies: Argentina; Austria; Belgium; Chile; Germany; Spain; Finland; Gabon; Greece; Hong Kong, China; Ireland; Israel; Italy; Japan; the Republic of Korea; Mauritius; Norway; New Zealand; Portugal; Singapore; and the United Kingdom (Felipe 2012, Table 4 and Appendix Table 4).

Figure 1: Countries in the Lower Middle-income Trap Versus Countries that Made it to Upper Middle-income



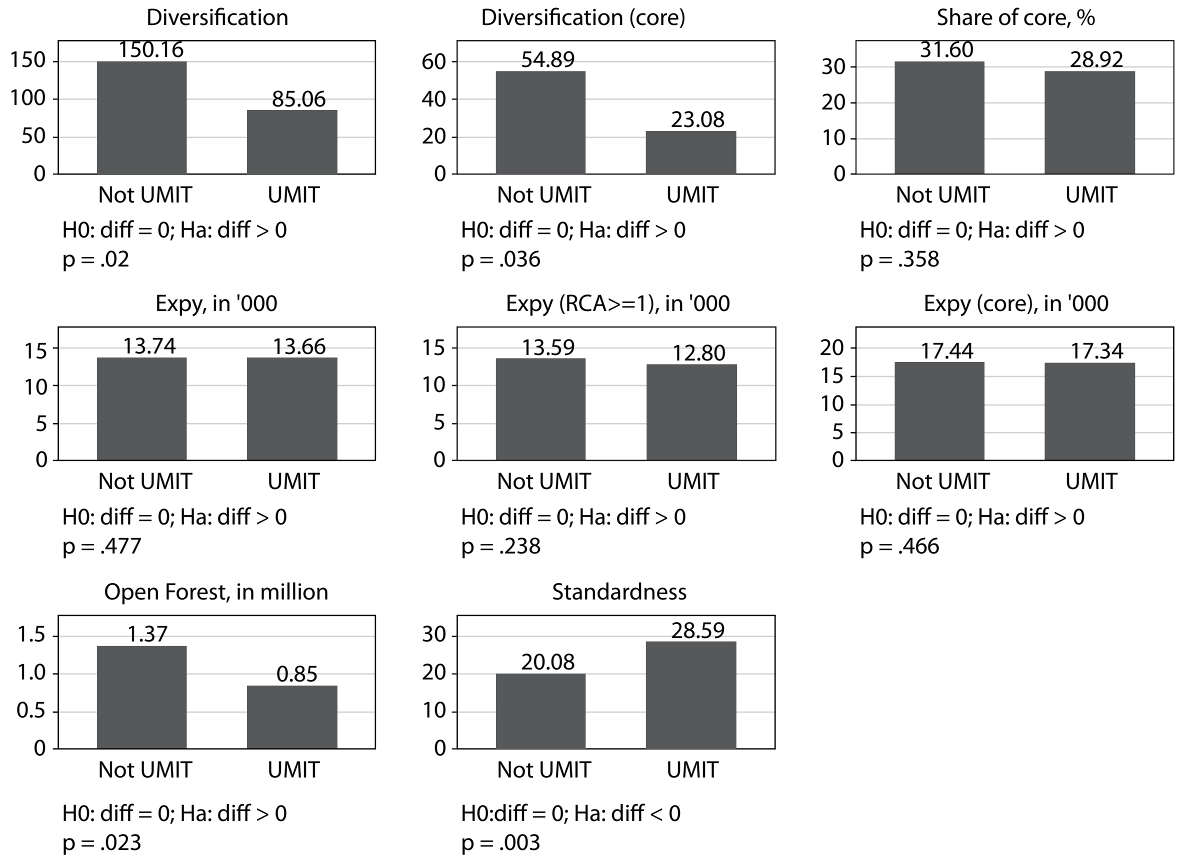
LMIT = countries in the lower middle-income trap, Not LMIT = countries that made it to upper middle-income.

Note: The equality of the means between the two groups is also tested using the Kruskall-Wallis test. The p-values are: *diversification* (p=0.202), *diversification_core* (p=0.164), *share_core* (p=0.092), *expy* (p=0.022), *expy_rca* (p=0.000), *expy_core* (p=0.002), *openforest* (p=0.131), and *standardness* (p=0.000).

Source: Author's calculations.

Figure 2 shows the average of each indicator for countries in the upper middle-income trap and for countries that became high-income. The sophistication of the export basket of countries in the upper middle-income trap is not statistically different from that of the countries that made it to high-income at the time they were about to make the transition. However, countries in the upper middle-income trap are less diversified, are exporters of more standard products, and had fewer opportunities for further structural transformation than the countries that made it into the high-income group.

Figure 2: Countries in the Upper Middle-income Trap versus Countries that Made it to Upper Middle-income



UMIT = countries in the upper middle-income trap, Not UMIT = countries that made it to upper middle-income .

Note: The equality of the means between the two groups is also tested using the Kruskall-Wallis test. The p-values are: *diversification* (p=0.040), *diversification_core* (p=0.069), *share_core* (p=0.820), *expy* (p=0.580), *expy_rca* (p=0.416), *expy_core* (p=0.757), *openforest* (p=0.040), and *standardness* (p=0.007).

Source: Author's calculations.

These results indicate that countries in the trap have not accumulated enough capabilities so as to be able to jump into a more sophisticated and diversified export basket and, consequently, into a higher income level. The countries that were able to jump could exported a more diversified and unique set of products. Consequently, they have more opportunities for further structural transformation.

III. Not All Products have the Same Consequences for Growth: The Product Trap

As noted above, a probabilistic measure of how close a product is to others (not exported with RCA) is used, which therefore shows whether it is likely that the country acquires RCA in them. This is the *proximity*. The sum of all proximities is the *PATH*. Table 1 shows the average sophistication (*PRODY*) and *proximity* of major export groups. Metals and machinery have the highest *proximity* and petroleum the lowest. It is worth noting that the *proximity* of electronics, a much-sought cluster by many developing countries, is lower than that of labor- or capital-intensive products, and even than forest products and tropical agriculture; although its *PRODY* level is higher.

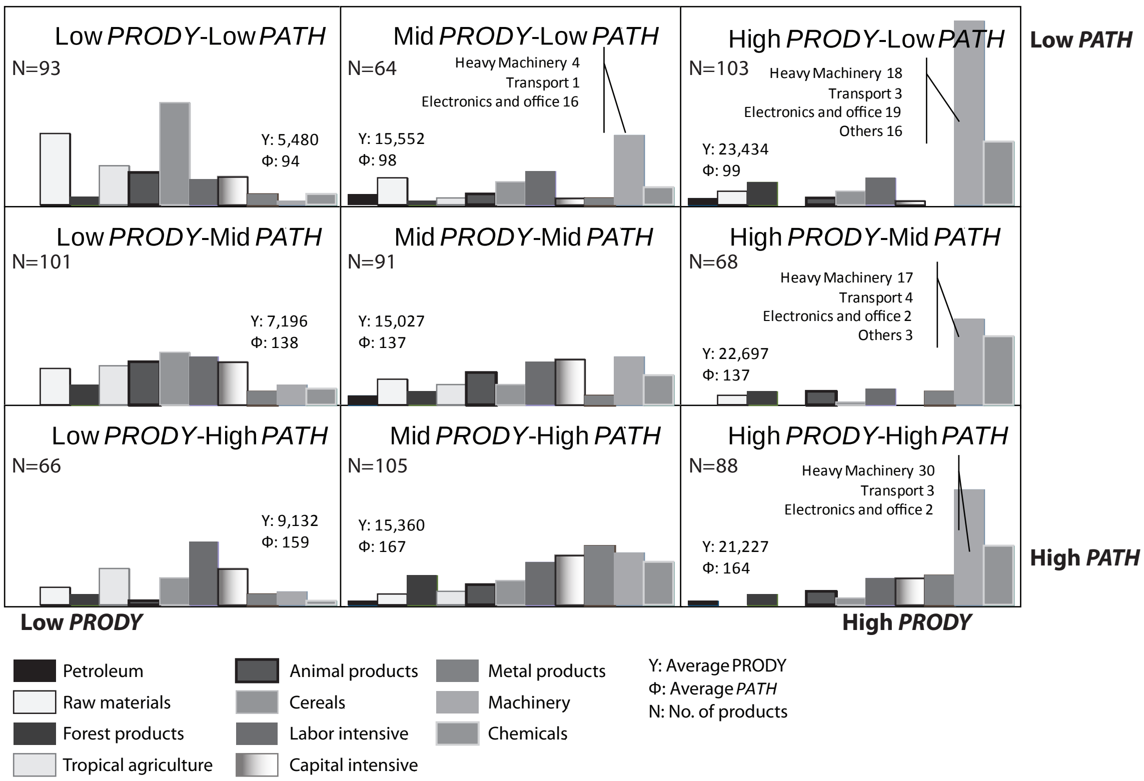
Table 1: Average *Prody* and *Proximity*

Leamer's Classification	Number of Products	Average *PRODY*	Average *Proximity*
Petroleum	10	16,352	0.118
Raw materials	62	11,228	0.142
Forest products	39	15,593	0.175
Tropical agriculture	46	8,755	0.160
Animal products	52	12,701	0.162
Cereals	80	9,089	0.141
Labor-intensive	98	13,691	0.183
Capital-intensive (excluding metals)	72	12,693	0.185
Core Products			
Metal products	46	15,307	0.204
Machinery	180	19,745	0.190
Heavy machinery	*81*	*21,107*	*0.196*
Transportation	*29*	*18,854*	*0.173*
Electronics and Office	*48*	*16,001*	*0.154*
Others	*22*	*22,179*	*0.142*
Chemicals	94	19,872	0.188
	779	14,942 *	0.171 *

* Denotes averages.
Note: Classification of products is based on Leamer (1984) and Hidalgo et al. (2007).
Source: Author's estimates.

Figure 3 shows the distribution of exports according to their level of sophistication (*PRODY*) and connectedness (*PATH*). As defined above, *PRODY* reflects the income associated with a particular product. A product with a higher *PRODY* is a product exported by relatively richer countries and a product with a lower *PRODY* is a product exported by relatively poorer countries. *PATH*, on the other hand, reflects the transferability of capabilities associated with the product. It is calculated as the sum of the proximities leading to the product. A product with higher *PATH* is more connected to other products, i.e., its capabilities are similar to the capabilities required for producing other products, than a product with a lower *PATH*. The figure provides summary information of the products in each of the nine cells: the number of products in each cell (out of the 779), the average *PRODY* and average *PATH* of the products in each cell. Out of the 779 products that we work with, 352 (45% of the total) are in the four mid- or high- *PRODY-PATH* cells ("good" products) and 427 (55% of the total) in the other five cells ("bad" products).

Figure 3: Distribution of Products According to PRODY and PATH



Note: Total number of products is 779 (SITC Rev. 24-digit level). Products are classified 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, each product is classified as being high-*PATH*, mid-*PATH*, or low-*PATH*.

Source: Felipe et al. (2010).

Figure 3 indicates, for example, that most of the 48 electronics products are in the low *PATH* cells (first row). This means that although many of these products are of a considerable sophistication (medium-and-high *PRODY*), they are not well connected outside the cluster. Countries that get into electronics (e.g., some East and Southeast Asian countries) get a boost in the sophistication level of their exports, but should be careful. Section IV the cases of the Republic of Korea, Malaysia, and the Philippines.

What kind of products do countries in the trap export with RCA (i.e., RCA≥1)? Tables 2 and 3 show the shares of the products in each of the nine cells for the countries in the lower middle-income and upper middle-income traps, respectively. For each country, the cell with the largest share is highlighted. The total number of products that each country exports with RCA (i.e., diversification) is also shown in the last column. The largest share for most of the countries in the lower middle-income trap is the Low *PRODY*-Mid *PATH* group (Table 2).[5] This indicates that countries in the lower middle-income trap are in a "low-product trap".

Table 2: Countries in the LMIT: Distribution of Exports According to *PRODY* and *PATH* (percentage of products exported with RCA≥1), Average 2003–2007

Country	High *PRODY* - High *PATH*	High *PRODY* - Mid *PATH*	High *PRODY* - Low *PATH*	Mid *PRODY* - High *PATH*	Mid *PRODY* - Mid *PATH*	Mid *PRODY* - Low *PATH*	Low *PRODY* - High *PATH*	Low *PRODY* - Mid *PATH*	Low *PRODY* - Low *PATH*	Number of Products with RCA≥1
Albania	7.3	2.4	4.2	14.6	9.7	3.6	18.8	**33.3**	6.1	165
Algeria	0.0	0.0	10.0	5.0	**30.0**	5.0	5.0	**30.0**	15.0	20
Bolivia	3.5	1.2	5.8	5.8	9.2	2.3	9.2	**40.2**	23.0	87
Brazil	8.0	5.5	8.0	16.9	13.4	4.5	9.5	**17.4**	16.9	201
Colombia	6.1	3.4	2.7	**21.6**	13.5	3.4	18.2	18.2	12.8	148
Congo, Rep.	0.0	3.3	6.7	0.0	0.0	13.3	10.0	26.7	**40.0**	30
Dominican Rep.	5.1	5.1	4.3	12.8	8.6	1.7	19.7	**29.9**	12.8	117
Ecuador	2.6	1.3	3.9	9.1	10.4	6.5	16.9	**24.7**	**24.7**	77
Egypt	4.5	2.3	2.3	18.0	12.9	4.5	18.5	**25.8**	11.2	178
El Salvador	2.5	2.5	4.1	24.0	9.1	3.3	22.3	**24.8**	7.4	121
Gabon	0.0	4.2	8.3	0.0	8.3	8.3	20.8	**29.2**	20.8	24
Guatemala	2.7	2.7	0.7	23.2	8.0	1.3	**24.5**	23.8	13.3	151
Iran	0.0	2.6	6.5	7.8	20.8	6.5	7.8	**27.3**	20.8	77
Jamaica	3.4	6.8	5.1	6.8	17.0	6.8	13.6	**27.1**	13.6	59
Jordan	4.0	3.3	4.6	22.5	15.9	4.0	15.9	**22.5**	7.3	151
Lebanon	8.6	4.8	6.7	19.1	10.0	6.2	13.3	**21.4**	10.0	210
Libya	5.0	5.0	15.0	0.0	**30.0**	15.0	5.0	5.0	20.0	20
Morocco	3.9	0.0	4.6	6.9	11.5	7.7	22.3	**35.4**	7.7	130
Panama	5.2	3.3	6.5	13.1	13.7	13.1	13.1	**22.2**	9.8	153
Paraguay	1.1	1.1	3.2	13.8	6.4	2.1	13.8	**36.2**	22.3	94
Peru	1.5	3.8	3.0	12.0	15.0	5.3	14.3	**27.8**	17.3	133
Philippines	3.0	3.0	14.9	6.9	6.9	12.9	14.9	**24.8**	12.9	101
Romania	11.0	3.4	3.4	**22.0**	9.1	3.4	19.6	21.1	7.2	209
South Africa	6.3	4.3	4.3	18.8	13.0	7.7	10.1	**21.2**	14.4	208
Sri Lanka	2.3	3.0	1.5	11.4	9.1	5.3	20.5	**28.0**	18.9	132
Tunisia	2.0	2.6	4.6	16.5	9.2	5.3	25.0	**27.6**	7.2	152
Yemen, Rep.	1.4	2.8	4.2	2.8	14.1	11.3	8.5	**35.2**	19.7	71

LMIT = lower middle-income trap.
Source: Felipe et al. (2010).

5 Appendix Table 1 shows all countries.

The largest share in the cases of Syria and Uruguay in the upper middle-income trap is also the Low *PRODY*-Mid *PATH* (Table 3). Both Saudi Arabia and Venezuela export Mid *PRODY*-Mid *PATH* products the most, but they are significantly less diversified than the other countries in Table 11. Malaysia's exports, on the other hand, largely belong to the High *PRODY*-Low *PATH* (20%) and Mid *PRODY*-Low *PATH* (18%). Note that although Malaysia's exports are relatively sophisticated, they are Low *PATH* (e.g., electronics).

Table 3: Countries in the UMIT: Distribution of Exports According to PRODY and PATH (% of the number of products exported with RCA≥1), Average 2003–2007

Country	High *PRODY* - High *PATH*	High *PRODY* - Mid *PATH*	High *PRODY* - Low *PATH*	Mid *PRODY* - High *PATH*	Mid *PRODY* - Mid *PATH*	Mid *PRODY* - Low *PATH*	Low *PRODY* - High *PATH*	Low *PRODY* - Mid *PATH*	Low *PRODY* - Low *PATH*	Number of Products with RCA≥1
Malaysia	4.7	1.9	**19.8**	11.3	11.3	17.9	7.6	11.3	14.2	106
Saudi Arabia	3.6	10.7	14.3	12.5	**19.6**	10.7	8.9	10.7	8.9	56
Syria	2.7	0.7	4.1	14.2	13.5	4.1	19.6	**27.0**	14.2	148
Uruguay	6.0	4.7	8.7	15.3	16.7	4.7	10.7	**20.7**	12.7	150
Venezuela	1.7	5.1	8.5	11.9	**20.3**	6.8	13.6	15.3	17.0	59

UMIT = upper middle-income trap,
Source: Felipe et al. (2010).

This analysis leads to the conclusion that there is something that could be labeled a *product trap* that causes countries get stuck in the middle income for a long time. Countries in the lower middle-income trap in particular export a significant share of products that are both unsophisticated and not especially well connected to other products (Mid or Low PATH). Countries in the upper middle-income trap are better positioned, but nevertheless, the share of well-connected products in their overall export basket is small.

Another way to explain what may be happening to some middle-income countries is that they never fully industrialized the way most developed countries did (i.e., their lower sophistication, diversification, and product connectedness); and, moreover, now they may be undergoing some early deindustrialization, that is, a decline in the share of manufacturing employment, with an increase in the share of services (a phenomenon observed in a significant number of developing countries). Baumol et al. (1989) argue that deindustrialization is the result of the differential in labor productivity between manufacturing and services. While for the developed countries deindustrialization is the product of successful economic development, for developing countries this is a problem because, according to Baumol et al. (1989), economies end up in a situation of "asymptotic stagnancy", where the long-run growth is essentially determined by the growth of productivity in the service sector, lower than that in manufacturing. If some middle-income countries have entered this phase of lower growth prematurely, then it will be necessary to implement policies to reverse it.

IV. The Republic of Korea, Malaysia, and the Philippines: Three Different Stories

What can countries in the trap learn from those that jumped from low income to high income during the past half century? Let us analyze the cases of the Republic of Korea, which made it to lower middle-income in 1969, upper middle-income in 1988, and high-income in 1995; Malaysia, which made it to the lower middle-income the same year as the Republic of Korea, but turned upper middle-income only in 1996, a year after the Republic of Korea attained high-income status. It is in the upper middle-income trap; and the Philippines, a country that has been in the lower middle-income group for over 3 decades and with no prospects of escaping it in the short term. Tables 4a, 4b, and 4c show the (net) number of products exported with RCA by each country by type, in 5-year intervals.

Table 4a: Republic of Korea: Number of Products Exported with Revealed Comparative Advantage (N = 779)

Year	1962	1965	1970	1975	1980	1985	1990	1995	2000	2005	2007
Animal products	10	9	10	9	9	10	9	6	5	1	0
Capital intensive	2	13	14	30	34	35	41	36	33	32	26
Cereals	6	4	6	6	9	5	5	7	8	5	5
Chemicals	3	1	2	4	10	11	8	13	14	18	20
Forest products	1	2	2	6	9	6	1	1	1	0	0
Labor-intensive	4	16	16	45	54	54	51	31	24	14	8
Machinery	2	3	6	24	43	39	43	49	49	50	49
Metal products	2	11	3	18	30	28	20	16	18	13	15
Petroleum products	0	0	1	1	1	3	3	2	6	3	3
Raw materials	8	11	8	12	5	3	3	5	6	8	6
Tropical agriculture	3	3	4	7	7	4	3	2	2	3	2
CORE products	**7**	**15**	**11**	**46**	**83**	**78**	**71**	**78**	**81**	**81**	**84**
Total RCA>=1	**41**	**73**	**72**	**162**	**211**	**198**	**187**	**168**	**166**	**147**	**134**

Note: The table shows the "net" number of products. This is the difference between the total number of products in which a country acquired comparative advantage and those in which it lost it.
Source: Author's calculations.

Table 4b: Malaysia: Number of Products Exported with Revealed Comparative Advantage (N = 779)

Year	1962	1965	1970	1975	1980	1985	1990	1995	2000	2005	2007
Animal products	4	4	6	10	6	7	10	8	8	9	9
Capital-intensive	1	2	1	3	3	7	8	7	6	3	4
Cereals	6	7	9	12	9	9	12	10	10	9	13
Chemicals	2	3	1	1	1	1	5	4	7	7	9
Forest products	3	5	7	9	9	13	13	13	9	9	11
Labor-intensive	1	1	2	6	6	12	21	13	13	10	10
Machinery	1	1	1	7	6	14	27	32	33	36	39
Metal products	0	0	0	0	0	1	4	2	2	3	3
Petroleum products	1	3	0	1	3	2	2	3	0	1	1
Raw materials	4	6	5	6	3	8	8	6	7	6	9
Tropical agriculture	6	5	8	7	7	8	10	6	5	6	6
CORE products	**3**	**4**	**2**	**8**	**7**	**16**	**36**	**38**	**42**	**46**	**51**
Total RCA>=1	**29**	**37**	**40**	**62**	**53**	**82**	**120**	**104**	**100**	**99**	**114**

Note: The table shows the "net" number of products. This is the difference between the total number of products in which a country acquired comparative advantage and those in which it lost it.

Source: Author's calculations.

Table 4c: Philippines: Number of Products Exported with Revealed Comparative Advantage (N = 779)

Year	1962	1965	1970	1975	1980	1985	1990	1995	2000	2005	2007
Animal products	4	4	2	8	8	12	10	9	6	9	9
Capital-intensive	1	3	4	5	9	11	14	14	5	4	5
Cereals	9	9	8	13	14	13	16	10	4	5	7
Chemicals	1			2	1	7	4	2	1	2	5
Forest products	4	6	7	10	10	15	9	7	4	4	4
Labor-intensive	4	3	7	27	39	40	45	41	34	29	24
Machinery	0	0	1	0	11	10	18	29	27	27	29
Metal products	0	0	0	0	1	1	2	2	2	0	0
Petroleum products	0	0	1	0	0	1	2	0	0	1	0
Raw materials	3	4	5	6	7	10	13	9	7	6	7
Tropical agriculture	7	7	8	8	14	15	14	12	8	8	8
CORE	**1**	**0**	**1**	**2**	**13**	**18**	**24**	**33**	**30**	**29**	**34**
RCA>=1	**33**	**36**	**43**	**79**	**114**	**135**	**147**	**135**	**98**	**95**	**98**

Note: The table shows the "net" number of products. This is the difference between the total number of products in which a country acquired comparative advantage and those in which it lost it.

Source: Author's' calculations.

Table 5 shows the (total) number of products in which each country gained RCA during each 5-year period, classified according to the "distance" from the basket of products exported with comparative advantage at the beginning of the period. Recall that distance measures the likelihood that a country gains RCA in a new product (not exported with comparative advantage). All the products that a country does not export with RCA at a point in time into three groups: *far* (least likely), *middle*, and *near* (most likely).[6] To give an example, in 1965, the Republic of Korea exported with RCA 73 products (see Table 4a). This means that it did not export with comparative advantage 779 – 73 = 706 products. And similarly for Malaysia and the Philippines (see Tables 4b and 4c). These 706 products (potential exports in which the country can acquire RCA) are classified by distance to the 1965 basket (i.e., to the 73 products exported with RCA). The dilemma that developing countries face is whether to jump from where they are now (in general, exports of products not highly sophisticated and not well connected to other products) to far away core products (which in general are more sophisticated and better connected, but countries do not have the capabilities to export them successfully); or to jump to nearby products (which in general are less sophisticated and not so well connected, but countries have the capabilities to export them successfully).

Generalizing, the products that were not exported with comparative advantage are counted in year *t*, and those that were exported with comparative advantage in year *t+5*. Are these new exports *near*, *middle,* or *far* from year *y's basket*? In 1970, the Republic of Korea had gained RCA in one product that was *far* from its 1965 export basket; in five products that were *middle* distance; and in 11 that were *near*. Similarly, in 1970 Malaysia had acquired RCA in one product that was *far* from its 1965 export basket; in six products that were *middle* distance; and in nine that were *near*. And in the case of the Philippines, in 1970 it had gained RCA in two products that were *middle* from its export basket in 1965; in eight products that were *near* distance; and in zero that were *far*. We do the same thing for every 5-year period.

Table 5 reveals that in the succeeding periods, the Republic of Korea made more jumps, particularly into products that were *middle* and *far*. Malaysia and the Philippines, however, jumped mostly into nearby products.

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6 The "distance" of a product (not exported with comparative advantage) from the products exported with comparative advantage is measured by the inverse of the density. The density of product *j*, ω_{cj} is the sum of the proximities between product *j* and all products that are exported with comparative advantage, scaled by the sum of all proximities leading to product *j*: $\omega_{cj} = \frac{\sum_i \varphi_{ij} x_{ci}}{\sum_i \varphi_{ij}}$, where $x_{ci} = \begin{cases} 1 \; if \; RCA_i \geq 1 \; for \; country \; c \\ 0 \; if \; RCA_{i,} < 1 \; for \; country \; c \end{cases}$ and φ_{ij} denotes the proximity. By definition, density ranges between 0 and 1. The closer the density of a product is to 1, the "nearer" the product (i.e., the smaller the distance) is to the country's current export basket. A product is *near* if it belongs to the first tercile of the distance distribution; *middle* if it belongs to the second tercile; and *far* if it belongs to the third tercile (i.e., the farthest from the set of products currently exported with comparative advantage).

Table 5: 5-year Jumps (new products exported with revealed comparative advantage) Republic of Korea, Malaysia, and the Philippines

	Republic of Korea			Malaysia			Philippines		
	Far	**Middle**	**Near**	**Far**	**Middle**	**Near**	**Far**	**Middle**	**Near**
1965–1970	1	5	11	1	6	9	-	2	8
1970–1975	9	13	24	3	6	15	2	6	11
1975–1980	6	18	19	2	4	7	-	7	24
1980–1985	5	6	12	2	7	18	2	6	18
1985–1990	4	7	23	2	15	34	5	9	18
1990–1995	3	18	21	-	5	18	3	4	19
1995–2000	2	10	25	-	4	15	-	5	9
2000–2005	6	10	11	3	6	13	2	8	12

Note: The table shows the "total" or "new" products in which a country acquired comparative advantage during the 5-year period.
Source: Author's calculations.

Although the Republic of Korea and Malaysia became lower middle-income at the same time (in 1969), the Republic of Korea was already more diversified than Malaysia during this time. Malaysia's jump from low income into lower middle-income does not coincide with a significant change that can be appreciated in Table 4b. However, the Republic of Korea experienced a significant increase in the number of capital- and labor-intensive products exported with RCA between 1962 and 1965–1970. Malaysia's jump into the electronics sector (included in the machinery group) took place during the 1980s (1985 is the first year when a significant increase can be appreciated). The country, nevertheless, remained lower middle-income for another decade until 1996 (see Schuman 2009, chapter 10).[7] As was seen earlier (Table 1), the electronics sector provided Malaysia with a boost in export sophistication. However, this cluster is not well connected to other products outside the cluster.

The Republic of Korea's progression during the 1970s and 1980s was meteoric. This was done through deliberate policy (the targeting of specific sectors), an obsession of President Park Chung Hee, who thought that economic development had to be a national effort and used "industrial policy" extensively (see Schuman 2009, chapter 2). By 1975, it had gained comparative advantage in 162 products (46 in the core, mainly machinery and metals). The progression in capital- and labor-intensive products continued. By the mid-1980s, the Republic of Korea exported with RCA about 200 products. The country continued making serious inroads into machinery, metals, and capital- and labor-intensive products. Some chemical products were also exported with RCA. The Republic of Korea became upper middle-income country in 1988, 8 years ahead of Malaysia. Between the early 1980s and the early 2000s, the Republic of Korea developed a formidable car

[7] Schuman (2009, chapter 10) argues that although Malaysia tried to imitate Japan; the Republic of Korea; and Taipei,China, it did not succeed to the same extent, and even produced questionable results. Schuman argues that one reason is that Malaysia's projects "had a much heavier state role than MITIs' targeted industries or Park's *chaebol-led* enterprises, which drained away some of the discipline important in making the "Asian model" work" (Schuman 2009, 248).

industry that today competes in the world market. How this was done is a clear case of painful development of capabilities (see Schuman 2009, 313–314). Kim (1997) described Hyundai's efforts to produce a car after it had purchased the foreign equipment, hired expatriate consultants, and signed licensing agreements with foreign firms, as follows:

> Despite the training and consulting services of experts, Hyundai engineers repeated trials and errors for fourteen months before creating the first prototype. But the engine block broke into pieces at its first test. New prototype engines appeared almost every week, only to break in testing. No one on the team could figure out why the prototypes kept breaking down, casting serious doubts even among Hyundai management, on its capability to develop a competitive engine. The team had to scrap eleven more broken prototypes before one survived the test. There were 2,888 engine design changes… Ninety seven test engines were made before Hyundai refined its natural aspiration and turbocharger engines… In addition, more than 200 transmissions and 150 test vehicles were created before Hyundai perfected them in 1992" (Kim 1997, 129).

Although in 1998, Hyundai's cars were considered "shoddy" in the US market, by 2004 they had climbed the quality rankings and matched Honda at number 2 (Schuman 2009, 313–14).

Since 1996, Malaysia has not been able to make further inroads into other core products. It has maintained its RCA in electronics (not a high *PATH* sector). The Republic of Korea has not increased the total number of products exported with RCA either, but it has increased the number of core products, while lost comparative advantage in capital and, especially, labor-intensive products. In 1995 it became a high-income country. [8]

Finally, in 1950, the Philippines' GDP per capita was only below (in East and Southeast Asia) those of Japan; Hong Kong, China; Singapore; and Malaysia. In 2010, however, it was higher only than that of Cambodia and the Lao People's Democratic Republic. Although the country developed a quite sophisticated manufacturing sector during the 1950s and 1960s through protection and a well-developed human capital base, the record during the last 30 years has been disappointing (Hill 2003). By 1975, the Philippines had acquired comparative advantage in labor-intensive products (as well as in cereals and forest products). The number of products exported with RCA increased until 1990, and

8 A quick summary of what the Republic of Korea's policies is as follows (Schuman 2009, chapter 10). In 1965, the Republic of Korea's government targeted 13 products it considered winners for special promotion. The list included silk, textiles, rubber, and radios. Exporters of these products obtained low-interest loans, tax credits on income, and tariff reductions on imported inputs. In 1967, it started exploring the development of the steel sector. It was advised by the World Bank not to do it. President Park pursued his project and in 1973, POSCO's furnace was ignited. In 1973, President Park also announced his heavy industrialization program. Six sectors were selected for special focus: shipbuilding, electronics, steel, metals, machinery, and chemicals. Hyundai Motor was launched in 1967. It began assembling a Ford model, and in 1973 it inked a deal with Mitsubishi Motors. By 1990, Hyundai companies produced cars, trucks, ships, semiconductors, electronics, and heavy equipment; and operated shipping lines and department stores.

since then, the country has suffered a net loss in labor-intensive products. Something similar occurred to capital-intensive products. The country did well between 1980 and 1995, but then lost its comparative advantage in a significant number of capital-intensive products. The Philippines, like Malaysia, went into electronics between 1980 and 1990 (the significant jump occurred in 1995). But like Malaysia, no major changes have taken place afterward.

V. Conclusions

This paper has shed light on why it may take countries many years to make it into the high-income group. It has analyzed some characteristics of countries in the middle-income trap and compared them to the countries not in the trap. What do countries have to do to avoid the middle-income trap? Today's development problem is how to accumulate productive capabilities and how to express them as (i) more products and (ii) in products that require more, and more complex, capabilities. Therefore, the aspect that sets countries apart from each other is their productive structure 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 generating new activities and letting others disappear. The primary driver of growth is the gradual build-up in firms' capabilities, which raises the economywide real wage. Capital accumulation is a complementary effect: the higher real wage makes it profitable for each firm to shift to more capital-intensive techniques. As the firm makes that shift, the rise in its capital–labor ratio further raises the marginal revenue product of labor at the firm level; and so underpins the rising real wage.

Our analysis indicates that the countries that have attained upper middle-income (i.e., that jumped from lower middle-income) status or high-income (i.e., that jumped from upper middle-income) had, in general, more diversified, sophisticated, and nonstandard export baskets at the time they were about to make the jump than the countries stuck in the middle-income trap today.

What makes growth difficult? We believe that most developing countries face a "chicken and egg" problem: (i) a country cannot make new products because it lacks the necessary capabilities; (ii) a country does not want to accumulate the required capabilities because the products that need them are not being made (because of other missing capabilities). How do many developing countries deal with this problem? By moving toward "nearby" products, that is, products that use capabilities similar to the ones the country already possesses. These tend to be relatively unsophisticated products and often not very well connected to other products (so as to favor further jumps). A comparison between the experiences of the Republic of Korea, Malaysia, and the Philippines reveals that the former made clear and deliberate efforts toward acquiring

RCA in sophisticated and well-connected products (machinery, metals, and chemicals). Malaysia and the Philippines, on the other hand, have always moved to nearby products. Although they made good progress by getting into the electronics cluster in the 1990s, they have not been able to set foot in the most advanced and well-connected products.

This paper concludes that it will be very difficult for countries in the middle-income trap to become high-income countries without developing comparative advantage in these well-connected types of products. These are the ones that place a country on an automatic upward trajectory. Most often, these products require capabilities that the country does not possess, and this is what policy efforts should be directed to.

Appendix Table 1: Distribution of Exports According to *PRODY* and *PATH* (percentage of products exported with RCA≥1), Average 2003–2007

Country	High *PRODY* - High *PATH*	High *PRODY* - Mid *PATH*	High *PRODY* - Low *PATH*	Mid *PRODY* - High *PATH*	Mid *PRODY* - Mid *PATH*	Mid *PRODY* - Low *PATH*	Low *PRODY* - High *PATH*	Low *PRODY* - Mid *PATH*	Low *PRODY* - Low *PATH*	Number of Products with RCA≥1
Albania	7.3	2.4	4.2	14.6	9.7	3.6	18.8	33.3	6.1	165
Algeria	0.0	0.0	10.0	5.0	30.0	5.0	5.0	30.0	15.0	20
Angola	14.3	0.0	28.6	0.0	14.3	14.3	0.0	14.3	14.3	7
Argentina	6.4	2.9	7.0	21.6	12.9	5.3	9.9	21.6	12.3	171
Armenia	11.6	7.4	7.4	17.4	9.1	4.1	11.6	19.8	11.6	121
Australia	2.9	5.0	6.4	10.7	18.6	7.1	7.1	22.9	19.3	140
Austria	25.5	14.3	6.2	23.9	8.5	3.1	10.0	6.6	1.9	259
Azerbaijan	1.5	4.4	10.1	1.5	11.6	4.4	14.5	33.3	18.8	69
Bangladesh	0.0	0.0	0.0	3.7	11.1	2.5	28.4	37.0	17.3	81
Belarus	17.8	3.3	2.6	29.0	13.2	4.6	17.8	9.2	2.6	152
Belgium	18.4	11.5	6.8	22.3	13.3	4.3	9.7	9.4	4.3	278
Benin	3.3	1.1	2.2	8.8	11.0	2.2	13.2	36.3	22.0	91
Bolivia	3.5	1.2	5.8	5.8	9.2	2.3	9.2	40.2	23.0	87
Bosnia and Herzegovina	9.0	3.0	3.6	24.0	13.8	1.8	19.8	18.6	6.6	167
Brazil	8.0	5.5	8.0	16.9	13.4	4.5	9.5	17.4	16.9	201
Bulgaria	10.3	3.4	3.9	20.6	11.2	1.7	21.9	21.9	5.2	233
Burkina Faso	5.2	0.0	0.0	13.0	11.7	3.9	13.0	32.5	20.8	77
Burundi	8.9	6.3	3.8	16.5	10.1	3.8	10.1	20.3	20.3	79
Cambodia	0.0	1.4	0.0	5.6	9.7	5.6	26.4	38.9	12.5	72
Cameroon	0.0	0.0	0.0	4.1	6.1	4.1	14.3	40.8	30.6	49
Canada	13.2	7.8	9.3	22.0	15.1	5.4	6.3	13.2	7.8	205
Central African Republic	2.1	8.5	2.1	17.0	8.5	2.1	10.6	21.3	27.7	47
Chad	6.7	0.0	13.3	13.3	13.3	13.3	13.3	6.7	20.0	15
Chile	2.8	0.9	9.2	14.7	16.5	6.4	15.6	22.0	11.9	109
China, People's Rep. of	6.6	4.7	9.3	13.6	11.2	13.2	14.3	17.4	9.7	258
Colombia	6.1	3.4	2.7	21.6	13.5	3.4	18.2	18.2	12.8	148
Congo, Dem. Rep.	4.4	2.2	2.2	2.2	4.4	8.9	6.7	28.9	40.0	45
Congo, Rep.	0.0	3.3	6.7	0.0	0.0	13.3	10.0	26.7	40.0	30
Costa Rica	1.1	3.2	5.3	25.3	10.5	6.3	15.8	20.0	12.6	95
Cote d'Ivoire	2.5	0.0	3.7	11.1	3.7	4.9	16.1	27.2	30.9	81
Croatia	17.0	3.6	4.9	23.2	11.6	1.3	19.6	15.6	3.1	224
Czech Republic	19.5	11.9	4.3	24.9	11.9	5.4	13.0	7.6	1.4	277
Denmark	23.7	11.4	8.3	21.1	11.8	4.4	7.9	8.8	2.6	228
Dominican Republic	5.1	5.1	4.3	12.8	8.6	1.7	19.7	29.9	12.8	117
Ecuador	2.6	1.3	3.9	9.1	10.4	6.5	16.9	24.7	24.7	77
Egypt	4.5	2.3	2.3	18.0	12.9	4.5	18.5	25.8	11.2	178
El Salvador	2.5	2.5	4.1	24.0	9.1	3.3	22.3	24.8	7.4	121

continued.

Appendix Table 1: *continued.*

Country	High *PRODY -* High *PATH*	High *PRODY -* Mid *PATH*	High *PRODY -* Low *PATH*	Mid *PRODY -* High *PATH*	Mid *PRODY -* Mid *PATH*	Mid *PRODY -* Low *PATH*	Low *PRODY -* High *PATH*	Low *PRODY -* Mid *PATH*	Low *PRODY -* Low *PATH*	Number of Products with RCA≥1
Estonia	14.4	4.6	6.7	19.5	9.7	5.6	15.9	14.4	9.2	195
Finland	26.7	14.0	13.4	16.3	11.1	2.3	7.6	6.4	2.3	172
France	19.8	10.8	10.8	23.3	12.7	2.2	8.6	8.6	3.2	314
Gabon	0.0	4.2	8.3	0.0	8.3	8.3	20.8	29.2	20.8	24
Gambia	7.8	3.9	11.7	9.1	10.4	6.5	9.1	23.4	18.2	77
Georgia	4.4	3.6	8.0	9.4	15.9	8.0	14.5	22.5	13.8	138
Germany	24.3	16.3	12.8	21.4	11.3	4.2	5.6	3.0	1.2	337
Ghana	0.9	1.8	1.8	12.4	8.9	2.7	15.9	30.1	25.7	113
Greece	11.2	3.0	1.3	21.0	12.5	5.2	16.7	20.2	9.0	233
Guatemala	2.7	2.7	0.7	23.2	8.0	1.3	24.5	23.8	13.3	151
Guinea	0.0	0.0	2.1	10.4	10.4	8.3	8.3	22.9	37.5	48
Guinea Bissau	4.0	5.0	18.8	11.9	5.0	8.9	15.8	16.8	13.9	101
Haiti	0.0	1.5	1.5	7.6	7.6	4.6	24.2	37.9	15.2	66
Honduras	0.0	3.8	1.9	13.2	7.6	0.9	19.8	35.9	17.0	106
Hong Kong, China	3.8	6.5	12.4	11.3	14.0	15.6	11.3	15.6	9.7	186
Hungary	17.4	4.4	9.2	25.0	11.4	6.0	14.7	9.2	2.7	184
India	7.4	6.2	5.0	12.4	12.0	3.5	14.0	22.9	16.7	258
Indonesia	4.0	5.8	5.8	12.6	12.6	8.5	13.9	20.2	16.6	223
Iran	0.0	2.6	6.5	7.8	20.8	6.5	7.8	27.3	20.8	77
Ireland	11.6	12.8	24.4	10.5	11.6	8.1	4.7	9.3	7.0	86
Israel	11.7	11.0	14.1	13.5	11.0	4.9	8.6	16.6	8.6	163
Italy	20.7	11.6	6.7	21.3	10.1	3.1	11.6	11.3	3.7	328
Jamaica	3.4	6.8	5.1	6.8	17.0	6.8	13.6	27.1	13.6	59
Japan	19.4	18.4	22.9	11.4	11.0	9.0	3.0	3.0	2.0	201
Jordan	4.0	3.3	4.6	22.5	15.9	4.0	15.9	22.5	7.3	151
Kazakhstan	5.4	0.0	3.3	8.7	16.3	9.8	6.5	25.0	25.0	92
Kenya	1.2	2.4	3.0	18.3	9.5	3.6	14.8	30.2	17.2	169
Kuwait	8.3	8.3	20.8	8.3	20.8	12.5	4.2	8.3	8.3	24
Kyrgyz Republic	4.3	3.1	4.9	12.8	12.2	3.1	21.3	26.2	12.2	164
Lao PDR	3.2	1.1	1.1	5.4	12.9	1.1	19.4	35.5	20.4	93
Latvia	12.8	5.9	3.7	19.6	10.5	5.5	21.0	16.9	4.1	219
Lebanon	8.6	4.8	6.7	19.1	10.0	6.2	13.3	21.4	10.0	210
Liberia	10.3	3.5	0.0	3.5	13.8	6.9	13.8	20.7	27.6	29
Libya	5.0	5.0	15.0	0.0	30.0	15.0	5.0	5.0	20.0	20
Lithuania	9.8	4.0	3.6	20.5	13.8	4.0	18.8	21.4	4.0	224
Macedonia, FYR	6.5	0.0	0.7	18.2	11.7	2.0	26.0	28.6	6.5	154
Madagascar	0.0	0.0	6.7	9.6	7.7	4.8	18.3	38.5	14.4	104
Malawi	3.7	1.2	0.0	6.1	11.0	3.7	23.2	37.8	13.4	82
Malaysia	4.7	1.9	19.8	11.3	11.3	17.9	7.6	11.3	14.2	106

continued.

Appendix Table 1: *continued.*

Country	High *PRODY* - High *PATH*	High *PRODY* - Mid *PATH*	High *PRODY* - Low *PATH*	Mid *PRODY* - High *PATH*	Mid *PRODY* - Mid *PATH*	Mid *PRODY* - Low *PATH*	Low *PRODY* - High *PATH*	Low *PRODY* - Mid *PATH*	Low *PRODY* - Low *PATH*	Number of Products with RCA≥1
Mali	4.1	6.8	2.7	8.1	12.2	5.4	5.4	31.1	24.3	74
Mauritania	3.6	0.0	3.6	0.0	14.3	17.9	0.0	21.4	39.3	28
Mauritius	5.1	3.4	7.6	11.0	7.6	11.0	16.1	27.1	11.0	118
Mexico	10.7	7.3	12.7	14.0	9.3	8.0	15.3	19.3	3.3	150
Moldova	9.4	3.4	3.4	12.8	10.7	3.4	23.5	27.5	6.0	149
Mongolia	1.9	1.0	2.9	6.8	16.5	2.9	23.3	30.1	14.6	103
Morocco	3.9	0.0	4.6	6.9	11.5	7.7	22.3	35.4	7.7	130
Mozambique	5.1	4.1	2.0	5.1	13.3	5.1	8.2	31.6	25.5	98
Nepal	2.4	3.5	3.5	19.4	9.4	4.1	20.6	24.1	12.9	170
Netherlands	13.5	12.2	15.1	18.5	12.2	4.2	5.9	10.5	8.0	238
New Zealand	10.6	5.6	8.1	19.9	13.0	5.6	11.8	17.4	8.1	161
Nicaragua	3.0	1.0	3.0	7.1	8.1	4.0	23.2	34.3	16.2	99
Niger	5.6	4.4	4.4	11.1	8.9	7.8	6.7	26.7	24.4	90
Nigeria	0.0	0.0	3.6	3.6	7.1	7.1	3.6	35.7	39.3	28
Norway	16.8	10.5	14.7	11.6	16.8	6.3	5.3	9.5	8.4	95
Oman	6.7	4.4	2.2	17.8	22.2	6.7	8.9	20.0	11.1	45
Pakistan	2.0	0.7	2.0	9.5	12.2	4.7	20.3	35.1	13.5	148
Panama	5.2	3.3	6.5	13.1	13.7	13.1	13.1	22.2	9.8	153
Paraguay	1.1	1.1	3.2	13.8	6.4	2.1	13.8	36.2	22.3	94
Peru	1.5	3.8	3.0	12.0	15.0	5.3	14.3	27.8	17.3	133
Philippines	3.0	3.0	14.9	6.9	6.9	12.9	14.9	24.8	12.9	101
Poland	18.7	4.9	3.4	24.7	10.1	4.9	18.7	12.4	2.3	267
Portugal	12.4	6.2	6.2	23.0	9.6	4.3	19.1	13.4	5.7	209
Qatar	3.5	10.3	31.0	6.9	10.3	17.2	13.8	3.5	3.5	29
Republic of Korea	13.5	10.1	12.2	18.2	18.9	9.5	6.1	8.1	3.4	148
Romania	11.0	3.4	3.4	22.0	9.1	3.4	19.6	21.1	7.2	209
Russian Federation	3.8	5.7	8.6	13.3	15.2	11.4	8.6	15.2	18.1	105
Rwanda	1.5	2.9	4.4	8.7	14.5	7.3	10.1	33.3	17.4	69
Saudi Arabia	3.6	10.7	14.3	12.5	19.6	10.7	8.9	10.7	8.9	56
Senegal	4.3	5.5	4.9	15.2	10.4	4.9	12.2	28.7	14.0	164
Sierra Leone	15.0	7.5	3.3	18.3	10.8	6.7	9.2	14.2	15.0	120
Singapore	10.7	14.3	28.6	7.1	11.6	9.8	1.8	8.0	8.0	112
Slovak Republic	20.3	7.0	1.6	34.2	9.1	3.2	12.8	10.2	1.6	187
Slovenia	22.6	11.1	4.5	26.3	9.1	2.5	12.4	9.5	2.1	243
South Africa	6.3	4.3	4.3	18.8	13.0	7.7	10.1	21.2	14.4	208
Spain	19.2	9.6	5.6	23.2	11.9	4.3	10.9	11.3	4.0	302
Sri Lanka	2.3	3.0	1.5	11.4	9.1	5.3	20.5	28.0	18.9	132
Sudan	2.0	0.0	6.1	2.0	8.2	4.1	4.1	42.9	30.6	49
Sweden	23.4	12.9	15.9	21.4	11.0	4.5	6.5	3.0	1.5	201

continued.

Appendix Table 1: *continued.*

Country	High *PRODY* - High *PATH*	High *PRODY* - Mid *PATH*	High *PRODY* - Low *PATH*	Mid *PRODY* - High *PATH*	Mid *PRODY* - Mid *PATH*	Mid *PRODY* - Low *PATH*	Low *PRODY* - High *PATH*	Low *PRODY* - Mid *PATH*	Low *PRODY* - Low *PATH*	Number of Products with RCA≥1
Switzerland	22.8	17.5	16.5	15.1	7.8	3.9	6.8	6.8	2.9	206
Syrian Arab Republic	2.7	0.7	4.1	14.2	13.5	4.1	19.6	27.0	14.2	148
Tajikistan	3.0	0.0	6.0	11.9	10.5	4.5	14.9	35.8	13.4	67
Tanzania	3.8	2.5	3.8	4.4	12.0	4.4	10.7	35.9	22.6	159
Thailand	7.4	2.0	9.4	18.3	14.9	9.9	11.4	18.3	8.4	202
Togo	2.1	1.4	1.4	19.9	9.2	3.6	19.2	26.2	17.0	141
Tunisia	2.0	2.6	4.6	16.5	9.2	5.3	25.0	27.6	7.2	152
Turkey	7.6	2.1	0.8	28.3	11.8	3.0	18.6	21.5	6.3	237
Turkmenistan	0.0	0.0	2.5	5.0	10.0	2.5	12.5	42.5	25.0	40
Uganda	2.9	3.7	1.5	13.2	7.4	5.2	12.5	31.6	22.1	136
Ukraine	9.4	3.7	3.7	17.8	16.2	6.3	17.8	15.7	9.4	191
United Arab Emirates	1.6	3.3	13.1	14.8	18.0	8.2	14.8	13.1	13.1	61
United Kingdom	18.6	14.1	17.3	18.2	12.5	4.0	6.5	4.0	4.8	248
United States	20.0	13.1	18.4	15.6	10.0	5.0	5.0	9.4	3.4	320
Uruguay	6.0	4.7	8.7	15.3	16.7	4.7	10.7	20.7	12.7	150
Uzbekistan	4.8	2.4	2.4	7.2	14.5	2.4	13.3	31.3	21.7	83
Venezuela	1.7	5.1	8.5	11.9	20.3	6.8	13.6	15.3	17.0	59
Viet Nam	2.5	0.0	3.8	10.1	10.7	6.9	21.4	22.6	22.0	159
Yemen, Rep.	1.4	2.8	4.2	2.8	14.1	11.3	8.5	35.2	19.7	71
Zambia	6.3	3.2	4.2	13.7	9.5	6.3	9.5	29.5	17.9	95

Source: Felipe et al. (2010).

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About the Paper

Jesus Felipe provides empirical evidence that supports the hypothesis that some countries get stuck in the middle-income trap as a result of not being able to increase the diversification and sophistication of their export packages. A comparison of the Republic of Korea, Malaysia, and the Philippines shows that the Republic of Korea diversified into more and more sophisticated products than the other two countries.

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