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Tracking the Middle-income Trap: What Is It, Who Is in It, and Why?

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ABSTRACT

This paper provides a working definition of what the middle-income trap is. We start by defining four income groups of GDP per capita in 1990 PPP dollars: low-income below $2,000; lower-middle-income between $2,000 and $7,250; upper-middle-income between $7,250 and $11,750; and high-income above $11,750. We then classify 124 countries for which we have consistent data for 1950–2010. In 2010, there were 40 low-income countries in the world, 38 lower-middle-income, 14 upper-middle-income, and 32 high-income countries. Then we calculate the threshold number of years for a country to be in the middle-income trap: a country that becomes lower-middle-income (i.e., that reaches $2,000 per capita income) has to attain an average growth rate of per capita income of at least 4.7 percent per annum to avoid falling into the lower-middle-income trap (i.e., to reach $7,250, the upper-middle-income threshold); and a country that becomes upper-middle-income (i.e., that reaches $7,250 per capita income) has to attain an average growth rate of per capita income of at least 3.5 percent per annum to avoid falling into the upper-middle-income trap (i.e., to reach $11,750, the high-income level threshold). Avoiding the middle-income trap is, therefore, a question of how to grow fast enough so as to cross the lower-middle-income segment in at most 28 years, and the upper-middle-income segment in at most 14 years. Finally, the 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 from it, 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 Korea, Malaysia, and the Philippines according to the number of products that each exports with revealed comparative advantage. We find that while Korea was able to gain comparative advantage in a significant number of sophisticated products and was well connected, Malaysia and the Philippines were able to gain comparative advantage in electronics only.

Keywords: Middle-income Trap

JEL Classifications: C33, O40, O54

EXECUTIVE SUMMARY

There is no clear and accepted definition of what the "middle-income trap" is, despite the attention that the phenomenon is getting. In this paper, we provide a working definition of the term. First, we define four income groups of GDP per capita in 1990 PPP dollars: low-income below $2,000; lower-middle-income between $2,000 and $7,250; upper-middle-income between $7,250 and $11,750; and high-income above $11,750. Then we classify 124 countries for which we have consistent data for 1950-2010. In 2010, there were 40 low-income countries in the world (37 of them have been in this group for the whole period); 52 middle-income countries (38 lower-middle-income and 14 upper-middle-income); and 32 high-income countries.

Second, by analyzing historical income transitions, we calculate the threshold number of years for a country to be in the middle-income trap. This cut-off is the median number of years that countries spent in the lower-middle-income and in the upper-middle-income groups, before graduating to the next income group (for the countries that made the jump to the next income group after 1950). These two thresholds are 28 and 14 years, respectively. They imply that a country that becomes lower-middle-income (i.e., that reaches $2,000 per capita income) has to attain an average growth rate of per capita income of at least 4.7 percent per annum to avoid falling into the lower-middle-income trap (i.e., to reach $7,250, the upper-middle-income level threshold); and that a country that becomes upper-middle-income (i.e., that reaches $7,250 per capita income) has to attain an average growth rate of per capita income of at least 3.5 percent per annum to avoid falling into the upper-middle-income trap (i.e., to reach $11,750, the high-income level threshold).

The analysis indicates that, in 2010, 35 out of the 52 middle-income countries were in the middle-income trap, 30 in the lower-middle-income trap (9 of them can potentially graduate soon), i.e., they have been in this income group over 28 years; and 5 in the upper-middle-income trap (2 of them can potentially leave it soon), i.e., they have been in this income group over 14 years. 8 out of the remaining 17 middle-income countries (i.e., not in the trap in 2010) are at the risk of falling into the trap (3 into the lower-middle-income and 5 into the upper-middle-income).

Of the 35 countries in the middle-income trap in 2010, 13 are Latin American (11 in the lower-middle-income trap and 2 in the upper-middle-income trap), 11 are in the Middle East and North Africa (9 in the lower-middle-income trap and 2 in the upper-middle-income trap), 6

in Sub-Saharan Africa (all of them in the lower-middle-income trap), 3 in Asia (2 in the lower-middle-income trap and 1 in the upper-middle-income trap), and 2 in Europe (both in the lower-middle-income trap). Therefore, this phenomenon mostly affects Latin America, Middle East, and African countries.

Asia is different from the other developing regions, for some economies (4 plus Japan) are already high-income, and 5 have been low-income since 1950. We have concluded that 3 Asian countries were in the middle-income trap in 2010 (Sri Lanka and Malaysia may escape it soon). There are 8 Asian middle-income countries not in the lower or upper-middle-income trap (Indonesia and Pakistan are at risk of falling into the trap in the coming years). China has avoided the lower-middle-income trap and in all likelihood it will also avoid the upper-middle-income trap. India became recently a lower-middle-income country and it will probably avoid the lower-middle-income trap.

Using highly disaggregated trade data, 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. The results indicate that countries that made it into the upper-middle-income group had a more diversified, sophisticated, and non-standard 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. We also find 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.

Avoiding the middle-income trap is a question of how to grow fast enough so as to cross the lower-middle-income segment in at most 28 years (which requires a growth rate of at least 4.7 percent per annum); and the upper-middle-income segment in at most 14 years (which requires a growth rate of at least 3.5 percent per annum). In this context, we view today's development problem as one of how to accumulate productive capabilities and to be able to express them in (i) a more diversified export basket and (ii) in products that require more

capabilities (i.e., more complex). We conclude 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.

1. INTRODUCTION

Historically, the economic development of countries has been a more or less long sequence from low-income (poor) to high-income (rich). In the early stages of development, countries rely primarily on subsistence agriculture (with a few exceptions, such as Singapore, Hong Kong, or China). This sector, relatively unproductive at this stage, takes the largest share in both output and employment. At some point, and as a result of the mechanization (capital accumulation) of agriculture and the transfer of labor to industry and services, often located in the urban areas (where firms need workers for their new industries, more productive than agriculture), productivity starts increasing. As this process takes place, the structures of output and employment change. As a result, all sectors (including agriculture) can pay higher wages and the country's income per capita increases. Economic development is a very complex process that involves: (i) the transfer of resources (labor and capital) from activities of low productivity (typically agriculture) into activities of higher productivity (industry and services); (ii) capital accumulation; (iii) industrialization and the manufacture of new products using new methods of production; (iv) urbanization; and (v) changes in social institutions and beliefs (Kuznets 1971, p. 348).

Understanding how countries go through the economic development sequence is the unending quest of development economists. Most often, the sequence is from low-income to middle-income and, ideally, to high-income. In some cases, however, countries get stuck in the low- or middle-income groups for a long period of time and do not move up. In some other cases, reversals happen. Indeed, countries that have made it to the middle-income may slide back to the low-income group, perhaps due to a major shock, such as a war or a plunge in commodity prices if the country is excessively dependent on a narrow set of commodities.

The transition of an economy from low-income to middle-income status is a major leap towards attaining the coveted high-income status and eventually catching up with the richest (Spence 2011, chapter 16). During the last two and a half decades, an important debate has arisen around the observation that some countries that managed to cross the middle-income bar some time ago have not yet been able to make it into the high-income group. As a consequence, some authors claim that these countries are in a "middle-income trap." Naturally, this is a question of concern for these countries' policy makers, as they observe that other countries do manage to cross the high-income bar.

What will it take for these countries to escape this situation (and those not in it, to avoid it) and finally attain high-income status? The problem in answering this question is threefold. First, there is no clear and accepted definition of what the "middle-income trap" is, despite the attention that the phenomenon is getting. Some studies describe possible characteristics of countries that are in the "middle-income trap" and provide plausible explanations why these countries seem not to make it into the high-income group (see, for example, ADB 2011, Ohno 2009, and Gill and Kharas 2007). Moreover, countries that are said to be caught in the "middle-income trap" differ across studies, and references to the "middle-income trap" have qualifiers, e.g., "so-called middle-income trap" (Wheatley 2010), or "middle-income trap, if such traps exist" (World Bank 2010). Spence does not use the term "trap" but notes that the "middle-income transition […] turns out to be very problematic" (Spence 2011, p. 100). He defines the middle-income transition as "that part of the growth process that occurs when a country's per capita income gets into the range of $5,000 to $10,000" (Spence 2011, p. 100). Second, there has been some mystification on what this issue (i.e., the alleged trap) is about. After all, development is a continuum from low-income (agrarian) to high-income (industrial and service economy), not a dichotomy or even a process that takes place in discrete jumps. Therefore, it could be argued that not being stuck as a middle-income country is simply a problem of growth and, therefore, the fundamental question remains: *why do some countries grow faster than others?* Or, as Eichengreen et al. (2011) analyze it: *when do fast growing economies slow down?*[1] Third, the word "trap" is, to some extent, misleading for it is reminiscent of Nelson's (1956) concept of "low-level equilibrium trap," or of Myrdal's (1957) model of "cumulative causation." [2] These are models that explain features of the poor (low-income) countries rather

[1]In the simple neoclassical growth model, an economy that begins with a stock of capital per worker below its steady state value will experience growth in both its capital and output per worker along the transition path to the steady state. Over time, however, growth slows down as the economy approaches its steady state. Likewise, in the neoclassical growth model, an increase in the population growth rate leads to a decline in the growth rate of output (with respect to the old steady state growth rate) during the transition to the new (lower) steady state. This model can also easily incorporate the idea of a poverty trap by simply assuming a production function exhibits diminishing returns to capital at low levels of capital, increasing returns for a middle range of capital, and either constant or diminishing returns for high levels of capital.

[2] Nelson's (1956) low-level equilibrium trap is a model whose purpose is to demonstrate the difficulties that some poor countries may face in achieving a self-sustaining rise in living standards. The model contains three equations: (i) determination of net capital formation; (ii) population growth; and (iii) income growth. The low-level equilibrium trap refers to a situation in which per capita income is permanently depressed as a consequence of fast population growth, faster than the growth in national income. In dynamic terms, as long as this happens, per capita income is forced down to the subsistence level. The model is rather pessimistic in the absence of a critical minimum effort. It is a conceptual framework and still may apply to some countries, although it may not wholly accord with the historical experience. In Western Europe, for example, it was not until population started to grow

than those that have attained middle-income status. It is difficult to argue that countries that have attained middle-income status (especially those in the upper-middle-income segment, as defined later) are in what the literature refers to as a *poverty trap*.[3]

This does not mean that the notion of middle-income trap is entirely meaningless. After all, it is true that some countries that reached the middle-income group some time ago have not yet crossed the high-income bar, while some others did it in fewer years. The question of why some countries make this transition faster than others is an interesting and potentially important one.[4]

This paper attempts to fill some of these gaps by providing a working definition of the middle-income trap. To do this, we work with a consistent data set for 124 countries for 1950-2010. In section 2, we define the income thresholds using the GDP per capita (in 1990 PPP dollars) estimates of Maddison (2010), extended to 2010 using IMF data. This allows us to classify each of the 124 countries into low-income, lower-middle-income, upper-middle-income, and high-income. In section 3, we analyze historical income transitions and use them as a guide to define the middle-income trap as a state of being a middle-income country for over a certain number of years. In section 4, we identify the countries in the middle-income trap. We differentiate between those that are in the *lower-middle-income trap* and those that are in the *upper-middle-income trap*. We also provide a discussion of those countries that are not in either of these traps. In section 5, we characterize the countries in the middle-income trap according to key features of the products in their export basket. We argue that inducing structural

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rapidly that per capita income started to rise, and population growth preceded income growth. This, however, is probably not the experience of many developing countries in present times, where birth rates are falling faster than death rates. Myrdal (1957) argued that economic and social forces produce tendencies toward disequilibrium, which tends to persist and even widen over time. Myrdal argued that: (i) following an exogenous shock that generates disequilibrium between two regions, a multiplier-accelerator mechanism produces increasing returns in the favored region such that the initial difference, instead of closing as a result of factor mobility, remains and even increases; and that (ii) through trade, the developing countries have been forced into the production of goods with inelastic demand with respect to both price and income.

[3] Kremer (1993) or Snower (1996) can also be categorized as "poverty trap" models. Our assessment is that all these models refer to a stable steady state with low levels of per capita output and capital stock. Agents cannot break out of it because the economy has a tendency to return to the low-level steady state. Hence, they find themselves in a vicious cycle.

[4] In recent work, Kharas (2010) argues that the factor underpinning the good performance that exhibited the developed countries for decades was the existence of a large middle class (itself an ambiguous social classification). He estimates that in 2009 there were 1.8 billion people in the global middle class, most of them in the developed world. Development, therefore, can be understood as a process of generating a large middle class that drives entrepreneurship and innovation. Achieving this requires growing incomes, that is, not getting trapped in the middle.

transformation is essential for countries to avoid or escape the middle-income trap. Section 6 offers some conclusions.

2. DEFINING INCOME GROUPS

To define the middle-income trap, first we need to define what the middle-income is. For this, we need to provide a classification of countries that is relevant in the context of a specific period. Indeed, if one takes today's living standards (not only income but also poverty, mortality, schooling, etc.) as reference, all countries in the world were low-income in the 1700s. Table 1 shows Maddison's (2010) estimates of income per capita in 1990 PPP dollars between 1 AD and 1870. During all of this period, incomes varied relatively little, from a minimum of $400 to a maximum of $809 in 1 AD; and from also $400-500 to about $2,000 in 1820. In some countries in the table, including India and China, income per capita barely changed during these almost 1,900 years. The first country in history to reach $2,000 per capita income was the Netherlands in 1700. Before this, incomes were extremely low and, as we shall see later, they are comparable to those of many low-income countries today. Some take-off can be seen toward the end of the 19th century (1870), when several countries reached about $2,000 and above, and the United Kingdom and Australia reached $3,000 (six times the per capita income of India or China). The Industrial Revolution had arrived. It is obvious that the pace of growth of income per capita growth during these almost 1900 years was very slow when compared with recent growth experiences.

Table 1 GDP per capita (in 1990 PPP $) in years 1, 1000, 1500, 1600, 1700, 1820, and 1870 (all AD)

Country	**1**	**1000**	**1500**	**1600**	**1700**	**1820**	**1870**
Australia	400	400	400	400	400	518	3,273
Austria	425	425	707	837	993	1,218	1,863
Belgium	450	425	875	976	1,144	1,319	2,692
Canada	400	400	400	400	430	904	1,695
China	450	466	600	600	600	600	530
Denmark	400	400	738	875	1,039	1,274	2,003
Egypt	600	500	475	475	475	475	649
Finland	400	400	453	538	638	781	1,140
France	473	425	727	841	910	1,135	1,876
Germany	408	410	688	791	910	1,077	1,839
Greece	550	400	433	483	530	641	880
India	450	450	550	550	550	533	533

Italy	809	450	1,100	1,100	1,100	1,117	1,499
Japan	400	425	500	520	570	669	737
Mexico	400	400	425	454	568	759	674
Morocco	450	430	430	430	430	430	563
Netherlands	425	425	761	1,381	2,130	1,838	2,757
Norway	400	400	610	665	722	801	1,360
Portugal	450	425	606	740	819	923	975
Spain	498	450	661	853	853	1,008	1,207
Sweden	400	400	651	700	750	819	1,359
Switzerland	425	410	632	750	890	1,090	2,102
Turkey	550	600	600	600	600	643	825
United Kingdom	400	400	714	974	1,250	1,706	3,190
United States	400	400	400	400	527	1,257	2,445

Source: Maddison (2010)

The World Bank income classification is the most widely used to divide countries into income groups. The World Bank classifies countries into low-income, lower-middle-income, higher middle-income, and high-income, based on the countries' Gross National Income (GNI) per capita in current prices. The World Bank set the original per capita income thresholds for the different income groups by looking at the relationship between measures of well-being, including poverty incidence and infant mortality, and GNI per capita. [5] By taking into consideration non-income aspects of welfare, each category of the World Bank's income classification reflects a level of well-being (not just income) characteristic of a set of countries when the original thresholds were established.[6]

The World Bank updates the original thresholds by adjusting them for international inflation, the average inflation of Japan, the UK, the US, and the eurozone. By adjusting for inflation, the thresholds remain constant in real terms over time.[7] Using thresholds that are constant over time implies that a country's status is independent of the status of other countries. This means that there is no preset distribution that specifies the proportion of countries in each category—i.e., countries can all be high-income or middle-income or low-income. For example, because the thresholds were set based on today's well-being standards, most, if not all, countries in the 19th century were "low-income." Based on Maddison's (2010) estimates of income per capita and our income thresholds, which will be discussed below, only Australia, the

[5] World Bank, "A Short History." http://data.worldbank.org/about/country-classifications/a-short-history.
[6] The year the original threshold was established is not explicitly identified in the World Bank website.
[7] World Bank, "A Short History." http://data.worldbank.org/about/country-classifications/a-short-history.

Netherlands, and the UK were lower-middle-income countries during the first half of the 19th century. The rest were all low-income countries.

The most recent World Bank classification with data for 2010 is as follows: a country is low-income if its GNI per capita is $1,005 or less, lower-middle-income if its GNI per capita lies between $1,006 and $3,975, upper-middle-income if its GNI per capita lies between $3,976 and $12,275, and high-income if its GNI per capita is $12,276 or above. Under this classification, 29 out of the 124 countries in our sample were considered low-income in 2010, 31 lower-middle-income, 30 upper-middle-income, and 34 high-income (see Appendix Table 1A and 1B). The World Bank's income classification series has only been available, however, since 1987. If we want to look at "traps," we need a longer data series. To do this, we use Maddison's (2010) historical gross domestic product (GDP) per capita estimates.[8] Maddison (2010) provides comparable GDP per capita data for 161 countries. However, we discard 37 of them: (i) 7 of which because they had populations below 1 million in 2009; (ii) 24 of which because they were ex-Soviet Republics, Yugoslavia and Czechoslovakia; and (iii) 6 of which because their GDP per capita is not reported in the IMF database.[9] This means that we have a complete data set for 124 countries from 1950 to 2008. We extended the series up to 2010 using growth rates of GDP per capita (in local currency) measured in constant prices from the IMF World Economic Outlook database[10].

The World Bank's thresholds, measured in current GNI per capita, cannot be applied directly to Maddison's data, as the latter uses GDP per capita measured in constant 1990 PPP dollars. Therefore, we need some adjustments to calculate our own income thresholds. This means looking for thresholds in 1990 PPP dollars that will give us an income classification that matches as much as possible that of the World Bank; that is, if countries A, B, C, and D are classified as high-income according to the World Bank classification, we would like most (if not

[8] We also tried to extend the World Bank income thresholds back to 1962 using GNI per capita data from the World Development Indicators. We adjusted the income per capita thresholds in 2000 using weighted inflation (by gross domestic product) of the US, UK, and Japan. However, there are data gaps for several countries during 1962-2009.

[9] These countries are: (i) those that had populations below 1 million people in 2009. These are Bahrain, Comoros, Cape Verde, Djibouti, Equatorial Guinea, Sao Tome and Principe, and Seychelles. The Pacific Islands are also excluded. All these islands, except Papua New Guinea, also have very small populations: (ii) the successor republics of the USSR (15), Yugoslavia (5), and Czechoslovakia (2) for which data is not complete for 1950-2008. We also exclude former Yugoslavia and Czechoslovakia (2); and (iii) Cuba, D.P.R. Korea, Puerto Rico, Somalia, West Bank and Gaza, and Trinidad and Tobago, whose GDP per capita estimates are not reported in the IMF database.

[10] April 2011 edition. Available at http://www.imf.org/external/pubs/ft/weo/2011/01/weodata/index.aspx (accessed 25 June 2011).

all) of them to be also high-income in our classification using 1990 PPP dollar values. By doing this, we maintain the underlying information (both income and non-income measures of well-being) that is encapsulated in each of the income categories. One issue that arises is that of potential inconsistencies. It is possible that a country classified as lower-middle-income according to the World Bank classification may have a lower GDP per capita in Maddison's data set than a country classified as low-income also by the World Bank classification.

We proceed as follows. First, we define sets of GDP per capita (in 1990 PPP $) thresholds. Each set *i* is composed of three thresholds $t_{0,i}$, $t_{1,i}$, and $t_{2,i}$, where $t_{0,i}<t_{1,i}<t_{2,i}$. t_0 is the threshold that separates low- from lower-middle-income; t_1 is the threshold that separates lower-middle-income from upper-middle-income; and t_2 is the threshold that separates upper-middle-income from high-income. Each set of thresholds *i* is a combination of t_0 from \$1,500 to \$4,750, t_1 from \$5,000 to \$8,750, and t_2 from \$9,000 to \$20,000, at \$250 intervals.[11] This gives a total of 14 (intervals of \$250 from \$1,500 to \$4,750) × 16 (intervals of \$250 from \$5,000 to \$8,750) × 45 (intervals of \$250 from \$9,000 to \$20,000) = 10,080 sets of thresholds. For example, set 1 is ($t_{0,1}$=\$1,500, $t_{1,1}$=\$5,000, and $t_{2,1}$=\$9,000), set 2 is ($t_{0,2}$=\$1,750, $t_{1,2}$=\$5,000, and $t_{2,2}$=\$9,000), and set 10,080 is ($t_{0,10080}$=\$4,750, $t_{1,10080}$ = \$8,750, and $t_{2,\,10080}$=\$20,000).

Second, using GDP per capita (1990 PPP $) for each set *i*, we categorize a country as low-income if its GDP per capita (in 1990 PPP $) in a particular year is less than $t_{0,\,i}$; lower middle- income if its GDP per capita is at least $t_{0,\,i}$, but less than $t_{1,\,i}$; upper-middle-income if its GDP per capita is at least $t_{1,\,i}$, but less than $t_{2,\,i}$; and high-income if its GDP per capita is larger than or equal to $t_{2,i}$. For each year, we code low-income countries as 0; lower-middle-income countries as 1; upper-middle-income countries as 2; and high-income countries as 3.

Third, we calculate the pairwise correlations of each of the resulting 10,080 classifications with the World Bank's—also coded as ordinal values 0 (low-income), 1 (lower-middle-income), 2 (upper-middle-income, and 3 (high-income). We use the polychoric correlation. This is the maximum likelihood estimate of the correlation between the unobservable continuous and normally distributed variables underlying the ordinal categories

[11] The range of t_0, t_1, and t_2, was decided based on the distribution of GDP per capita when the World Bank's 1990 income classification was applied to Maddison's data for 1990. Specifically, we use the mean plus one standard deviation (rounded off) of GDP per capita for each income group as bounds. The mean plus one standard deviation for the low, lower-middle-income, upper-middle-income, and high-income are \$1,542, \$5,011, \$9,104, and \$19,642, respectively. The upper bounds of each group are \$250 below the lower bound of the next threshold.

(Olsson 1979; Kolenikov and Angeles 2009).[12] All data from 1987 to 2010 were pooled and used in the calculation of the correlations.

The set of thresholds that yielded the highest correlation (0.9741) is t_0=$2,000, t_1=$7,250 and t_2=$11,750. Thus, our income classification is defined as follows: a country is low-income if its GDP per capita in 1990 PPP dollars is less than $2,000; lower-middle-income if its GDP per capita is at least $2,000 but less than $7,250; upper-middle-income if its GDP per capita is at least $7,250 but less than $11,750; and high-income if its GDP per capita is $11,750 or higher. [13] These thresholds are constant over time.[14] Appendix Tables 1A and 1B provide the classification for 2010.

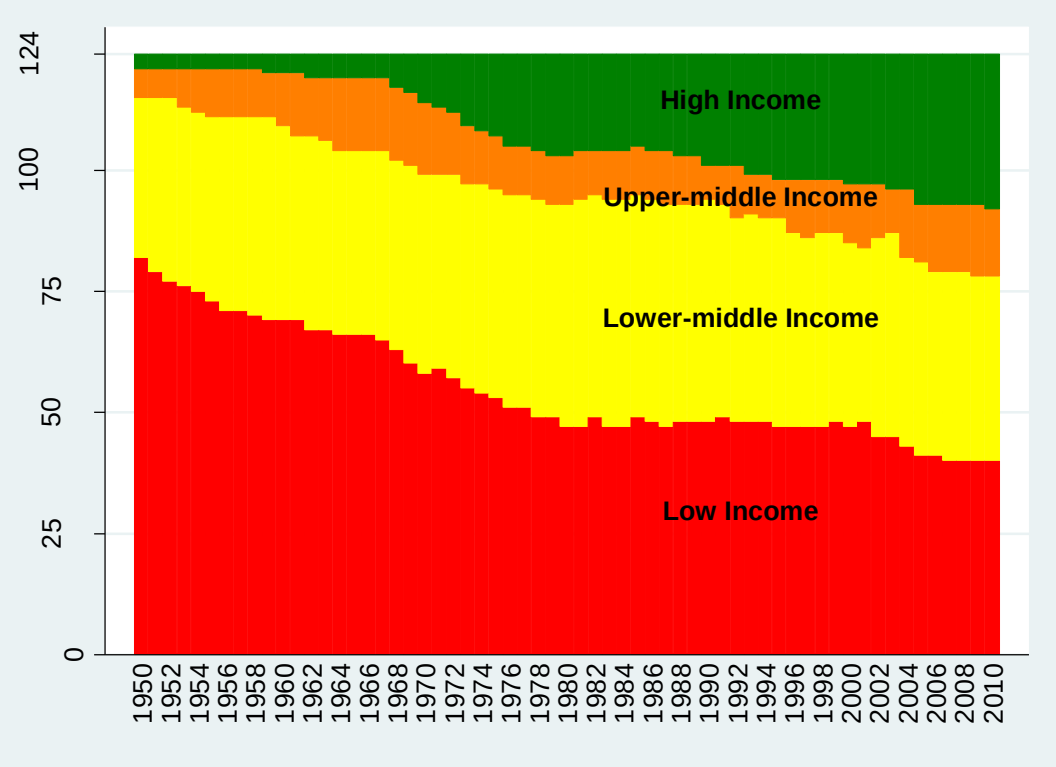
Using these thresholds, the distribution of the 124 countries by income class over time is shown in Figure 1. In 1950, 82 countries (66 percent of the total) were classified as low-income, 33 countries (27 percent) were lower-middle-income, 6 countries (5 percent) were upper-middle-income, and only 3 countries—Kuwait, Qatar, and United Arab Emirates—had income per capita above the high-income threshold. Maddison's (2010) per capita income estimates for these countries in 1950 (in 1990 PPPs) were $28,878, $30,387 and $15,798, respectively. The US reached the high-income threshold in 1944, but its income per capita slipped to upper-middle-income after the war in 1945 and it regained high-income status only in 1962. Together with the US, the other five upper-middle-income countries in 1950 were Australia, Canada, New Zealand, Switzerland, and Venezuela.

[12] The polychoric correlation provides a measure of the degree of agreement between two raters (in our case the World Bank's and ours) on a continuous variable (income) that has been transformed into ordered levels (several income levels), under the assumption of a continuous underlying joint distribution. The Spearman's rank correlation, which also measures the association between ordinal variables, implicitly assumes discrete underlying joint distribution (Ekstrom 2010). In our case, the use of the polychoric correlation is more appropriate since the unobserved variable underlying the ordinal values is the level of well-being, e.g., income level, poverty, etc.

[13] For example, Angola was classified as lower-middle-income and Egypt as low-income in 1990 under the World Bank classification. The GDP per capita of Angola in the same year, according to Maddison's estimates in 1990 PPP $, was $868, and that of Egypt was $2,523. This makes Angola a low-income country and Egypt a lower-middle-income country in 1990 based on the thresholds defined in this paper.

[14] The use of these constant thresholds is, in principle, equivalent to what the World Bank does. As discussed above, the World Bank's thresholds are inflation-adjusted and, therefore, remain constant in real terms.

Figure 1 Distribution by income class



Source: Authors' calculations

Figure 1 indicates that the number of countries in the low-income group has decreased over time, from 82 in 1950 to 40 in 2010. [15] By decade, the 1950s witnessed the largest decline in the number of low-income countries, when 13 made it into the lower-middle-income group. This was followed by another 11 countries during the 1960s, and 11 more countries during the 1970s. Between 1980 and the early 2000s, however, very few low-income countries did graduate. The number of low-income countries was still 48 (39 percent of the total) in 2001, almost the same as in 1980 (47 countries, or 38 percent of the total). This gradually fell after 2001 when 8 countries (Cambodia, Rep. of Congo, Honduras, India, Mozambique, Myanmar, Pakistan, and Vietnam) attained lower-middle-income status. In total, 42 out of the 82 low-income countries in 1950 had escaped from the low-income category by 2010. By region, 14 out of the 42 countries were in Asia (both East and South Asia), 10 in Latin America, 9 in the Middle East and North Africa, 5 in Europe, and 4 in Sub-Saharan Africa. There were also 3 countries that moved out of low-income sometime during 1950-2010 but fell back into this

[15] Note that many of these "countries" were in fact colonies during the 1950s and 1960s.

category, and in 2010 they were low-income again. These are the Cote d'Ivoire, Iraq, and Nicaragua.

There are 37 countries that have been low-income since 1950; 31 of them are in Sub-Saharan Africa, 5 in Asia, and 1 in the Caribbean. These are shown in Table 2. The 2010 income per capita of most of these countries is comparable to (or even lower than) that of Western Europe (and other countries for which data is available) in the 18th century or earlier (see Table 1). The Democratic Republic of Congo, for example, had an income per capita of $259 in 2010, well below the countries in Table 1 in 1 AD.

Table 2 Countries that have always been in the low-income group during 1950-2010

Asia	**Sub-Saharan Africa**	**Sub-Saharan Africa**
Afghanistan ($1068)	Central African Rep. ($530)	Mali ($1185)
Bangladesh ($1250)	Chad ($708)	Mauritania ($1281)
Lao PDR ($1864)	Congo, Dem. Rep. ($259)	Niger ($516)
Mongolia ($1015)	Eritrea ($866)	Nigeria ($1674)
Nepal ($1219)	Gambia ($1099)	Rwanda ($1085)
Caribbean	Ghana ($1736)	Senegal ($1479)
Haiti ($664)	Guinea ($607)	Sierra Leone ($707)
Sub-Saharan Africa	Guinea Bissau ($629)	Sudan ($1612)
Angola ($1658)	Kenya ($1115)	Tanzania ($813)
Benin ($1387)	Lesotho ($1987)	Togo ($615)
Burkina Faso ($1110)	Liberia ($806)	Uganda ($1059)
Burundi ($495)	Madagascar ($654)	Zambia ($921)
Cameroon ($1208)	Malawi ($807)	Zimbabwe ($900)

Note: 2010 GDP per capita (1990 PPP$) in parenthesis
Source: Authors, IMF (WEO, April 2011) and Maddison (2010)

We will not discuss these countries in detail, since this is not the purpose of this paper. We will mention only that these countries belong to Paul Collier's (2007) *bottom billion*, that they have very pronounced dualistic structures, and that they are in a "low-level equilibrium trap." The average share of agriculture in total output in these countries is 30 percent, whereas the world average is 15 percent; also, the share of agricultural employment in total employment is 64 percent, significantly higher than the world average (28 percent). These countries' problem is significantly different from that of the countries that have reached middle-income. The solution is a "big push" in terms of investment (or "critical minimum effort") to raise per capita income to that level beyond which any further growth of per capita income is not associated

with income-depressing forces (e.g., population growth) that exceed income-generating forces (e.g., capital formation).

In 1950, there were 39 countries classified as middle-income (33 lower-middle-income and 6 upper-middle-income). This number increased to 56 (46 lower-middle-income and 10 upper-middle-income) in 1980. [16] But the number of middle-income countries has remained at about 50 between the mid-1990s and 2010, as very few low-income countries reached the lower middle- income threshold, and also very few countries jumped from lower-middle-income into upper-middle-income. Colombia, Namibia, Peru, and South Africa, for example, have been lower-middle-income countries since 1950. In 2010, 52 countries were classified as middle-income (38 lower-middle-income and 14 upper-middle-income). By population, this is the largest income group, as countries like China, India, and Indonesia are in it.

Figure 1 also shows the sharp increase in the number of high-income countries between the late 1960s and 1980, and between the late 1980s and 2010. The former period overlaps with what Maddison (1982) referred to as the "Golden Age" (1950-1973), when productivity accelerated considerably. The latter period corresponds to the entry of a number of non-European countries into the high-income status, particularly East Asian (e.g., Korea, Singapore, and Taipei, China) and Latin American (e.g., Argentina and Chile) countries. The number of countries that reached the high-income threshold increased from 4 (3 percent of the total) in 1960 (Kuwait, Qatar, Switzerland, and United Arab Emirates) to 21 (17 percent) in 1980; and from 23 (19 percent) in 1990 to 32 (26 percent) in 2010.[17]

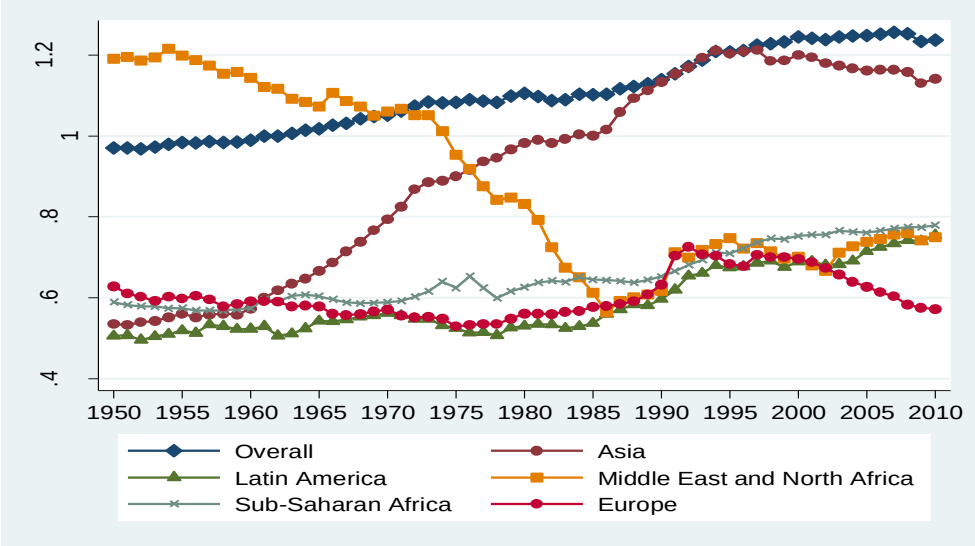
To summarize, our thresholds distribute the 124 countries in 2010 as follows: 40 countries were classified as low-income; 38 as lower-middle-income; 14 as upper-middle-income; and 32 as high-income countries. Appendix Table 1A shows the list of the 124 countries. Appendix Table 1B shows the 22 countries of the former USSR, Yugoslavia, and Czechoslovakia.[18] In the next sections, we identify which countries, among those in the lower-middle-income and upper-middle-income groups, are caught in the middle-income trap, those that are approaching it, and those that are likely to avoid it.

[16] Some countries transitioned from low-income to middle-income during 1980-2000, and others transitioned from middle-income to high-income, over the same period. The net increase in the number of countries in the middle-income group is 17 (i.e., 56-39).
[17] Only the United Arab Emirates has remained high-income during 1950-2010 (Kuwait fell to the upper-middle-income category in 1981 and regained high-income status in 1993; Qatar fell to upper-middle-income in 1985 and regained high-income status in 2005).
[18] Our 2010 classification and that of the World Bank differ in 44 countries (see Appendix Tables 1A and 1B.).

We close this section with a brief reference to two related questions that Figure 1 triggers. The first one is whether the dispersion of income per capita across the world is decreasing. The second one is whether developing countries are catching up with the leader.

Figure 2 shows the standard deviation of the 124 countries' income per capita for 1950-2010. The figure shows that world income per capita has become much more unequal than it was 60 years ago. This is a by-product of the fact that development does not occur equally in all countries: some move up fast while others remain poor. This is obvious in the case of Asia. The standard deviation of income per capita increased very fast throughout the 1960s, 1970s, and 1980s and only tapered off around 1995. This was due to the fast development of a group of countries in East Asia. The dispersion of income among the other groups is much smaller.[19]

Figure 2 Standard Deviation of (the log of) Income per capita



Source: Authors' calculations, IMF (WEO, April 2011) and Maddison (2010)

The other question is whether countries are catching up, that is, whether the (absolute) income gap between a country's income per capita and that of the economic leader is declining. In other words: given that the number of low-income countries has halved since 1950, can it be inferred from Figure 1 that the world is catching up to the leader? Both Hong Kong, China and Singapore already surpassed the US income per capita in 2008 and 2010, respectively, and Norway's income per capita was about 90 percent that of the US in 2010. Is this a generalized phenomenon? Due to technology diffusion from the leading economy to the followers and other

[19] Note that although income dispersion within Europe, Latin America, and Sub-Saharan Africa is similar, income levels across these three groups are very different, which is reflected in the overall (world) standard deviation.

mechanisms, the catch up hypothesis predicts that, eventually, GDP per capita of most countries will approximate that of the leader. Gerschenkron (1962) argued that development required certain prerequisites on top of government policies, but that there were forces which, in the absence of such prerequisites, could operate as substitutes. In particular, he hypothesized that that the more backward a country, the more rapid will be its industrialization. He called this the "advantage of economic backwardness." Likewise, in the neoclassical framework, low-capital countries should catch up to the level of the developed countries because: (i) higher interest rates should induce higher domestic savings; (ii) higher growth rates should attract foreign investment; and (iii) the marginal productivity of a unit of invested capital is higher. Evidence shows that these mechanisms operated in the post-WWI period, and that they permitted Europe and Japan to catch up to the US level. The idea is best explained in the following terms:

> When a leader discards old stock and replaces it, the accompanying productivity increase is governed and limited by the advance of knowledge between the time when the old capital was installed and the time it is replaced. Those who are behind, however, have the potential to make a larger leap. New capital can embody the frontier of knowledge, but the capital it replaces was technologically superannuated. So, the larger the technological and, therefore, the productivity gap between leader, and follower, the stronger the follower's potential for growth in productivity; and, other things being equal, the faster one expects the follower's growth rate to be. Followers tend to catch up faster if they are initially more backward. (Abramovitz 1986, pp. 386-387)

Some people think, however, that spillovers take place automatically and that the living standards of the poor countries are catching up to those of the rich countries, as the former speedily adopt the technologies, know-how, and policies that made the rich counties rich. In practice, this seems to be incorrect (Hobday 1995; Freeman and Soete 1997).

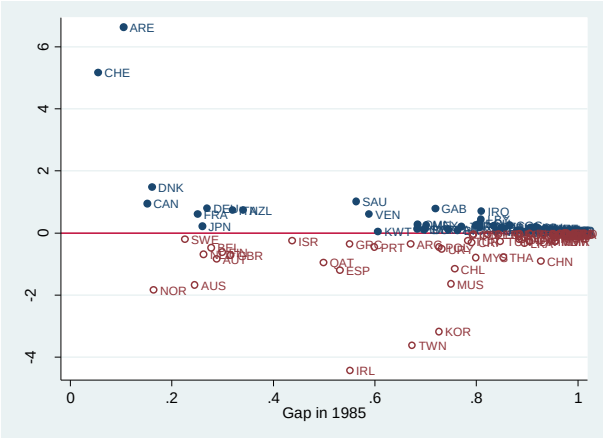
To address the question of whether the world is catching up to the leader, we compute a measure of income gap as $GAP = 1 - (Y_i / Y_{US})$, where Y_i denotes the income per capita of country i, and Y_{US} denotes the income per capita of the world's leader (the US in 2010). Therefore, $0 \leq GAP \leq 1$. Figure 3 shows the rate at which GAP changed during the period 1985-2010 against the GAP in 1985.[20] A negative rate (i.e., below the zero line) means that the country has reduced its GAP with the US, and a positive rate implies that the country's GAP with the US widened during 1985-2010.

[20] Panel A contains 121 countries: 124 countries minus the US and minus Singapore and Hong Kong, China whose GDP per capita was higher than that of the US in 2010. Panel B contains 92 non high-income countries.

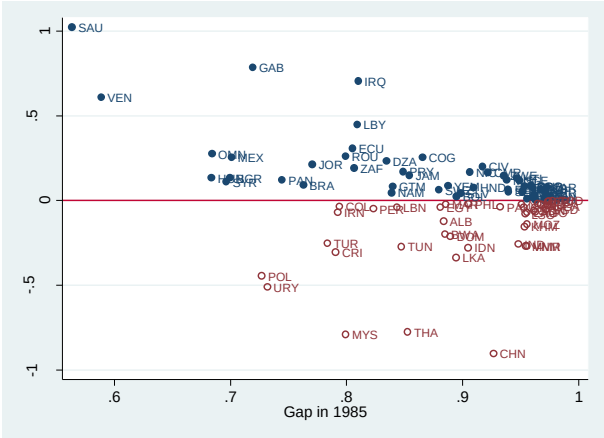
Is the (absolute) income GAP diminishing? The evidence that GAP has declined and that countries are catching up to the US income level is not conclusive. We find negative GAP rates for 58 countries (13 low-income, 19 lower-middle-income, 7 upper-middle-income, and 19 high-income) and positive rates for 63 (27 low-income, 19 lower-middle-income, 7 upper-middle-income, and 10 high-income). Figure 3A shows that Ireland (IRL), Taipei, China (TWN), and Korea (KOR) closed the GAP the fastest, while the GAP between the US and the United Arab Emirates (ARE) and Switzerland (CHE) widened. It is important to note that in 2010, 88 countries out of the 123 had incomes below 30 percent that of the US. Among non-high-income countries (Figure 3B), China (CHN), Malaysia (MYS), and Thailand (THA) closed the GAP the fastest. Appendix Table 2 provides the list of countries, the GAP with the US in 2010, and their GAP growth rates for 1985-2010. The Table shows that GAP (during 1985-2010) increased for about half of the countries, and that in 2010, GAP was 0.95 or higher (i.e., income per capita was at most 5 percent that of the US) in a significant number of countries. This result casts some doubt on the idea that the world at large is catching up to the leader.

Figure 3 Initial GAP with the US (1985) and its growth rate (1985-2010)

A. All countries



B. Non-high-income countries in 2010



Source: Authors' calculations.

3. *WHAT* IS THE MIDDLE-INCOME TRAP (MIT)?

As noted in Section 1, there is no precise definition of what the middle-income trap (MIT) is, and without one it is very difficult to undertake policy discussions about how to avoid it. Most references to the MIT do it in terms of the possible characteristics of the countries that are presumably in it. For example, ADB (2011, p.54, Box 5.1) refers to countries "unable to

compete with low-income, low-wage economies in manufactured exports and with advanced economies in high-skill innovations…such countries cannot make a timely transition from resource-driven growth, with low cost labor and capital, to productivity-driven growth."

Spence (2011) refers to the middle-income transition as countries in the $5,000-$10,000 per capita income range. He argues: "at this point, the industries that drove the growth in the early period start to become globally uncompetitive due to rising wages. These labor-intensive sectors move to lower-wage countries and are replaced by a new set of industries that are more capital-, human capital-, and knowledge-intensive in the way they create value" (Spence 2011, p.100).

Gill and Kharas (2007, p. 5) note that:

> The idea that middle-income countries have to do something different if they are to prosper is consistent with the finding that middle-income countries have grown less rapidly than either rich or poor countries, and this accounts for the lack of economic convergence in the twentieth century world. Middle-income countries, it is argued, are squeezed between the low-wage poor-country competitors that dominate in mature industries and the rich-country innovators that dominate in industries undergoing rapid technological change.

And Ohno (2009, p.28) indicates that:

> A large number of countries that receive too little manufacturing FDI stay at stage zero. Even after reaching the first stage, climbing up the ladders becomes increasingly difficult. Another group of countries are stuck in the second stage because they fail to upgrade human capital. It is noteworthy that none of the ASEAN countries, including Thailand and Malaysia, has succeeded in breaking through the invisible 'glass ceiling' in manufacturing between the second and the third stage. A majority of Latin American countries remain middle-income even though they had achieved relatively high-income as early as in the nineteenth century. This phenomenon can be collectively called the *middle-income trap*.

Also, as noted in the Introduction, Eichengreen et al. (2011) studied the question of *when do fast growing economies slow down?* They studied middle-income countries (with earnings per person of at least $10,000 in 2005 constant international prices) which, in the past half century, had enjoyed average GDP growth of at least 3.5 percent for several years, and define a slowdown as a decline in the seven-year average growth rate by at least 2 percentage points. Eichengreen et al. (2011) conclude that countries undergo a reduction in the growth rate of GDP by at least 2 percentage points (i.e., slow down) when per-capita incomes reach about $17,000. They also find that high growth slows down when the share of employment in manufacturing is 23 percent; and when per capita income of the late-developing country reaches 57 percent that

of the technological frontier. China's income per capita in 2007 was about $8,500, Brazil's $9,600, and India's about $3,800. The authors conclude that these countries' growth rates will unavoidably have to decline as per capita income reaches the estimated threshold. Hence the possibility of ending up stuck in the middle-income trap.

All these statements are not, strictly speaking, definitions of the middle-income trap. Rather, they are summaries of the plausible reasons why at some point some countries seem not to make it into the high-income group. In this section, we provide a working definition of the MIT. It is based on the income thresholds identified in the previous section and on an analysis of historical income transitions.

Given the lack of definition and theoretical background of what the middle-income trap is, we adopt a simple procedure: we determine the minimum number of years that a country has to be in the middle-income group so that, beyond this threshold, one can argue that it is the middle-income trap. In this paper, we determine this number of years by examining the historical experience of the countries that graduated from lower- to upper-middle-income and from the latter to high-income: how many years were they in the two middle-income groups? We argue that a country is in the lower/upper-middle-income trap today if it has been in lower/upper-middle-income group longer than the historical experience. This method entails an unavoidable element of subjectivity, and therefore one has to be careful in taking the threshold number of years literally. It is only a guide. Since the challenge of graduating to the high-income group is more relevant for the upper-middle-income countries, we will look at both lower-middle-income and upper-middle-income separately.

3.1 Determining the Threshold Number of Years to Be in the Middle-Income Trap

First, we determine the number of years that countries remained in the lower-middle-income group before they graduated to upper-middle-income. 44 countries from our list of 124 have graduated from lower-middle-income to upper-middle-income since 1820.[21] We divide them into two groups: (i) the 9 countries that became lower-middle-income after 1950 and then graduated (Table 3); and (ii) the 35 countries that became lower-middle-income before 1950 and then graduated (Appendix Table 3). This allows us to compare recent transitions with those that

[21] A few more countries may have gone through the same phase during this time period, but they are not considered because of missing data. For example, the US was lower-middle-income between 1870 and 1940, but data is sparse prior to 1870. Thus, we do not know the exact year it became lower-middle-income. Other examples are Hong Kong, China and Singapore, which were lower-middle-income in 1950, but there is no data prior to 1950.

took place earlier. The tables give the year these countries attained lower-middle-income (LM) status; the year they attained upper-middle-income (UM) income status; the number of years they were LM; and their average income per capita growth rates during their transition from LM to UM.

Table 3 Economies that became lower-middle-income after 1950 and graduated to upper-middle-income

Country	Region	Year country turned LM (Y_{LM})	Year country turned UM (Y_{UM})	No. of years as LM	Ave. GDP per capita growth rate (%) (Y_{LM} to Y_{UM})
China	Asia	1992	2009	17	7.5
Malaysia	Asia	1969	1996	27	5.1
Rep. of Korea	Asia	1969	1988	19	7.2
Taipei, China	Asia	1967	1986	19	7.0
Thailand	Asia	1976	2004	28	4.7
Bulgaria	Europe	1953	2006	53	2.5
Turkey	Europe	1955*	2005	50	2.6
Costa Rica	Latin America	1952*	2006	54	2.4
Oman	Middle East	1968	2001**	33	2.7

*This refers to the second time Turkey and Costa Rica attained lower-middle-income status. Turkey became lower-middle-income in 1953, but slipped back to low-income in 1954; Costa Rica became lower-middle-income in 1947, but slipped back to low-income in 1950.
**This refers to the second time Oman attained upper-middle-income status. It became upper-middle-income in 1997, but fell back to lower-middle-income in 1998.
Source: Authors' estimates

The time spent as lower-middle-income for the 9 countries in Table 3 ranges from 17 years for China to over 50 years for Bulgaria, Turkey, and Costa Rica. This is lower than the time spent as lower-middle-income by the countries that had crossed the lower-middle-income threshold before 1950 (see Appendix Table 3). The time spent as lower-middle-income for countries in Appendix Table 3 ranges from 23 years for Venezuela to 128 for the Netherlands (compared to 17 years for China). The Netherlands was the first country to become lower-middle-income (in 1827, over 100 years earlier than Japan), but spent 128 years, until 1955, in this category. Maddison (1982) pointed out that the acceleration of productivity growth happened during what he referred to as the "Capitalist era" that began in 1820. The Netherlands, being the economic leader during the 1700s, was the richest country during that time until the United Kingdom overtook it in the late 18th century. Also Japan (a latecomer with respect to other advanced countries), the country that led the Asian Miracle, spent 35 years as a lower-

middle-income country. This is about twice as long the time China, Korea, or Taipei, China spent in this income group.[22]

We set the threshold that determines whether a country is in the lower-middle-income trap as the median number of years that the countries in Table 3 spent in this group. This is 28 years. Thus, we say that a country is in the lower-middle-income trap if it has been in that group for 28 years or more. There are two important caveats with this number. First, certainly there is some element of arbitrariness behind this criterion and we admit that it could be a different number of years (e.g., the average is 33 years). However, it seems reasonable, if the notion of trap makes any sense. Indeed, the idea of a middle-income trap was conceived relatively recently by analyzing recent development experiences, not those of the 19th century, or earlier. The number of years that the countries in Appendix Table 3 spent as lower-middle-income is very high. And if we go back in time (see Table 1), the threshold would be a very high number of years. The median number of years as lower-middle-income of the countries in Appendix Table 3 is 69 years. And the median of all countries combined in Table 3 and Appendix Table 3 is 58 years. If this were the guide, very few countries would be in the lower-middle-income trap today. Second, Table 3 contains only 9 countries. This means that during the last six decades, very few countries have been able to jump from low-income into lower-middle-income and from the latter into upper-middle-income.

Second, we determine the number of years that countries remained in the upper middle-income group before they graduated to high-income. There are 29 such countries. Again, we split them into two groups: (i) those that made the transition from lower-middle-income to upper-middle-income after 1950 (23 countries, see Table 4), and then graduated to high-income; and (ii) those that made the transition from lower-middle-income to upper-middle-income before 1950 (6 countries, see Appendix Table 4).

Looking at the list of countries in Table 4, the number of years spent in the upper-middle-income category ranges from 7 years for Hong Kong, China; Korea; and Taipei, China to 40 years for Argentina; and from 14 years for Switzerland to 32 years for the UK, for the countries in Appendix Table 4. The difference between the maximum number of years spent as upper-middle-income country before graduating to high-income between these two groups is

[22] Schuman (2009) provides a fascinating account of how East Asian countries became rich during the second half of the 20th century. Rapid growth and export orientation were the top priorities of policy makers.

smaller than in the case of lower-middle-income before graduating to upper-middle-income (compare Tables 3 and Appendix Table 3 with Table 4 and Appendix Table 4).

Table 4 Economies that became upper-middle-income after 1950 and graduated to high-income

Country	Region	Year country turned UM (Y_{UM})	Year country turned H (Y_H)	No. of years as UM	Ave. GDP Per capita growth rate (%) (Y_{UM} to Y_H)
Hong Kong, China	Asia	1976	1983	7	5.9
Japan	Asia	1968	1977	9	4.7
Rep. of Korea	Asia	1988	1995	7	6.5
Singapore	Asia	1978	1988	10	5.1
Taipei, China	Asia	1986	1993	7	6.9
Austria	Europe	1964	1976	12	4.1
Belgium	Europe	1961	1973	12	4.4
Denmark	Europe	1953	1968	15	3.3
Finland	Europe	1964	1979	15	3.6
France	Europe	1960	1971	11	4.4
Germany	Europe	1960	1973	13	3.4
Greece	Europe	1972	2000	28	1.8
Ireland	Europe	1975	1990	15	3.2
Italy	Europe	1963	1978	15	3.4
Netherlands	Europe	1955	1970	15	3.3
Norway	Europe	1961	1975	14	3.5
Portugal	Europe	1978	1996	18	2.8
Spain	Europe	1973	1990	17	2.7
Sweden	Europe	1954	1968	14	3.6
Argentina	Latin America	1970	2010	40	1.2
Chile	Latin America	1992	2005	13	3.7
Israel	Middle East	1969	1986	17	2.6
Mauritius	Sub-Saharan Africa	1991	2003	12	4.0

Source: Authors' estimates

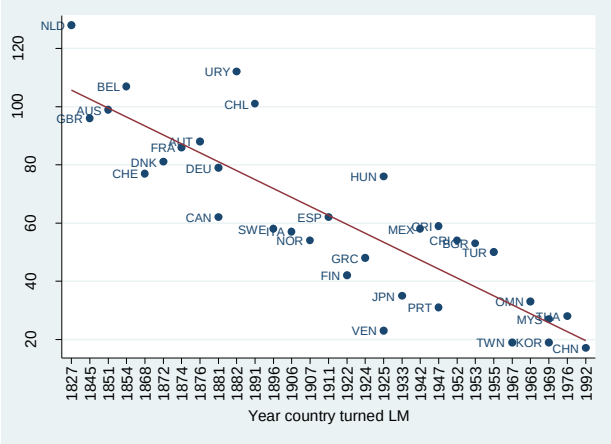
Note that more than half of the countries in Table 4 are European and 5 are Asian. We set the threshold that determines whether a country is in the upper-middle-income trap as the median number of years that the countries in Table 4 spent in this group. This is 14 years. [23] Thus, we say that a country is in the upper-middle-income trap if it has been in this income group for 14 years or longer.

[23] The median number of years as upper-middle-income of the countries in Appendix Table 4 is 26 years. And the median of all countries combined in Table 4 and in Appendix Table 4 is 15 years.

Figure 4 documents the statistically significant negative relationship between the year a country turned lower- or upper-middle-income and the number of years it spent in that income group, until it graduated to the next one (i.e., upper-middle-income or high-income). This indicates that transitions, i.e., for the relatively small group of countries that make them, today are significantly faster than those in the past. This is evidence of convergence within this group. This is more obvious in the case of the number of years countries stay in lower-middle-income group (Figure 4A, which combines the countries in Tables 3 and Appendix Table 3) than as upper-middle-income country (Figure 4B, which combines the countries in Tables 4 and Appendix Table 4): a country that became lower-middle-income in year t spent 0.6 more years (or about 7 more months) in this income group than a country that became lower-middle-income in year t+1; and likewise, a country that became upper-middle-income in year t spent 0.24 more years (or about 3 more months) in this income group than a country that became upper-middle-income in year t+1.

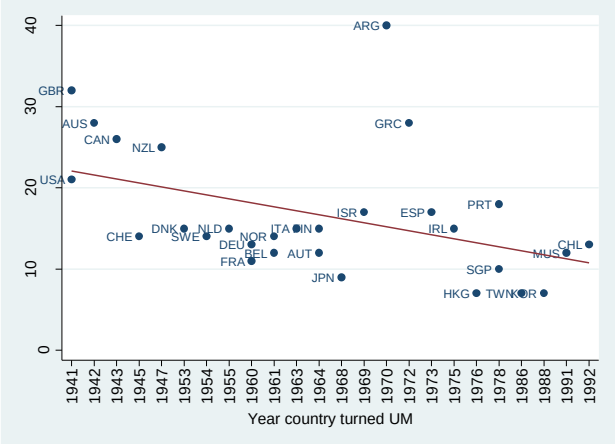
Figure 4 Year country turned lower-middle-income (LM) or upper-middle-income (UM) and number of years in that income group

A. Year country turned LM and No. of years as lower-middle-income



Note: Equation for the fitted line is:
No. of years in LM = 1210 – 0.60*(year turned LM)
t-stat: (13.5) (-14.2)
No. Obs: 33
Source: Authors' calculations

B. Year country turned UM and No. of years as upper-middle-income



Note: Equation for the fitted line is:
No. of years in UM = 488 – 0.24*(year turned UM)
t-stat: (3.5) (-3.6)
No. Obs: 29

The thresholds of 28 and 14 years for the lower-middle-income and upper-middle-income traps, respectively, allow us to calculate the average income per capita growth required to avoid these traps. A country that reaches $2,000 (1990 PPP $) per capita income, i.e., the

lower-middle-income threshold, must sustain an average income per capita growth of at least 4.7 percent per annum for 28 years to avoid the lower-middle-income trap.[24] Similarly, a country that reaches an income per capita of $7,250 (1990 PPP $), i.e., the upper-middle-income threshold, must sustain an average growth rate of at least 3.5 percent for 14 years to avoid the upper-middle-income trap.[25]

The last columns of Tables 3 and 4 (and of Appendix Tables 3 and 4) show the average growth rates of countries during their transition from lower-middle-income to upper-middle-income (Table 3 and Appendix Table 3), and from upper-middle-income to high-income (Table 4 and Appendix Table 4). As already pointed in Section 1, the question of why some countries are not able to escape the trap is the same as that of why some countries are not able to grow fast enough and sustain growth for a long period. The East Asian economies (China, Korea, and Taipei, China) stand out, especially China. China spent only 17 years as a lower-middle-income country. During this period, income per capita grew at an average rate of over 7 percent per annum. The transitions of Hong Kong, China; Korea; and Taipei, China from upper-middle-income into high-income countries were even faster, 7 years, at annual rates also close to 7 percent per annum.

In sum, our criteria are as follows: a country is in the lower-middle-income trap if it has been a lower-middle-income country for 28 or more years. And it is in the upper-middle-income trap if it has been an upper-middle-income country 14 or more years. [26] [27]

[24] 4.7% = {[(7250/2000)^(1/28)]-1}*100
[25] 3.5% = {[(11750/7250)^(1/14)]-1}*100
[26] It should be obvious that the threshold number of years as lower-middle-income and upper-middle-income that will determine whether a country is in the trap or not will change as new countries graduate.
[27] According to these criteria, Bulgaria, Turkey, and Costa Rica (Table 3) were in the lower-middle-income trap before they reached the upper-middle-income threshold, while the East Asian countries managed to avoid this trap. Thailand, with 28 years, and Oman with 33 are borderline cases. Similarly, Greece and Argentina were in the upper-middle-income trap before becoming high-income countries. The growth rates of these countries during the transition to the next income group were lower than the 4.7 percent and 3.5 percent estimated above. The East Asian countries that made it from upper-middle-income to high-income (Hong Kong, China; Japan; Korea; Singapore; and Taipei, China) avoided the upper-middle-income trap.

4. *WHO* IS IN THE MIDDLE-INCOME TRAP (MIT) TODAY?

We can now determine who in 2010 was in the middle-income trap from among the 52 middle-income countries (38 lower-middle-income and 14 upper-middle-income); who is at risk of getting into it; and who are likely to avoid it. Tables 5 and 6 list the countries that were in the lower- and in the upper-middle-income traps, respectively. And Tables 7 and 8 list those that were not in the middle-income trap in 2010. We find that 35 out of the 52 countries are in the middle-income trap: 30 of them are in the lower-middle-income trap (9 of them can potentially escape it in less than a decade) and 5 are in the upper-middle-income trap (2 of them can potentially escape in, at most, 5 years). We also find 8 of the remaining 17 middle-income countries that are at risk of getting into the trap if they continue to grow at their current pace.

Table 5 also shows the number of years each has stayed as a lower-middle-income country, the country's annual average income per capita during the period 2000-2010, and the number of years that it will take each country to reach the upper-middle-income threshold of $7,250 if its income per capita continues growing at the rate achieved during 2000-2010.

Table 5 Economies in the lower-middle-income trap in 2010

Country	Region	2010 GDP per capita (1990 PPP $)	No. of years as LM until 2010	Ave. growth (%) 2000-2010	No. of years to reach $7,250*
Philippines	Asia	3,054	34	2.5	35
Sri Lanka	Asia	5,459	28	4.3	7
Albania	Europe	4,392	37	4.8	11
Romania	Europe	4,507	49	4.1	12
Bolivia	Latin America & Caribbean	3,065	45	1.8	49
Brazil	Latin America & Caribbean	6,737	53	2.0	4
Colombia	Latin America & Caribbean	6,542	61	2.6	5
Dominican Republic	Latin America & Caribbean	4,802	38	2.8	15
Ecuador	Latin America & Caribbean	4,010	58	2.2	27
El Salvador	Latin America & Caribbean	2,818	47	0.4	251
Guatemala	Latin America & Caribbean	4,381	60	1.1	47
Jamaica	Latin America & Caribbean	3,484	56	-0.3	-
Panama	Latin America & Caribbean	7,146	56	2.4	1
Paraguay	Latin America & Caribbean	3,510	38	1.5	48
Peru	Latin America & Caribbean	5,733	61	4.2	6
Algeria	Middle East & North Africa	3,552	42	2.2	34

Egypt	Middle East & North Africa	3,936	31	3.0	21
Iran	Middle East & North Africa	6,789	52	3.4	2
Jordan	Middle East & North Africa	5,752	55	3.5	7
Lebanon	Middle East & North Africa	5,061	58	4.1	10
Libya	Middle East & North Africa	2,924	43	2.4	39
Morocco	Middle East & North Africa	3,672	34	3.3	21
Tunisia	Middle East & North Africa	6,389	39	3.5	4
Yemen, Rep.	Middle East & North Africa	2,852	35	0.9	109
Botswana	Sub-Saharan Africa	4,858	28	1.7	24
Congo, Rep.	Sub-Saharan Africa	2,391	33	1.8	63
Gabon	Sub-Saharan Africa	3,858	56	0.0	-
Namibia	Sub-Saharan Africa	4,655	61	2.4	19
South Africa	Sub-Saharan Africa	4,725	61	2.0	23
Swaziland	Sub-Saharan Africa	3,270	41	2.2	37

* No. of years to reach $7250 = ln(7250/gdp2010) / ln(1 + avegr), where avegr is the average growth rate of income per capita during 2000-2010.
Source: Authors' calculations

Of the 30 countries in the lower-middle-income trap, 11 are in Latin America; 9 are in the Middle East and North Africa; 6 in Sub-Saharan Africa; 2 in Europe; and 2 in Asia. This indicates that the lower-middle-income trap is a phenomenon that affects mostly Latin American and African countries. Countries like Brazil, Colombia, Iran, Panama, and Tunisia are close to the upper-middle-income threshold of $7,250. In contrast, El Salvador, Libya, Yemen, and Rep. of Congo with per capita incomes below $3,000, are still far behind. It is important to note that 19 of these countries—like Colombia, Jamaica, Panama, Peru, Jordan, Lebanon, Namibia, South Africa, Brazil, or Ecuador—have already been lower-middle-income countries for over 4 decades. They are clearly in this trap. Botswana and Sri Lanka, on the other hand, are borderline cases, but the former is expected to be in the lower-middle-income trap for the next two decades.

Some countries in the lower-middle-income trap will most likely leave it in the next few years if they maintain their recent income per capita growth performance. Most of the countries, however, will likely remain there for a long time (and a few might *never* be able to leave) if their lackluster growth performance of recent years persists. Table 5 shows that Panama, Iran, Tunisia, Brazil, Colombia, Peru, Iran, Jordan, and Sri Lanka can leave the lower-middle-income trap in less than 10 years if their income per capita continues growing at the 2000-2010 average growth rate.

In contrast, El Salvador and Yemen will remain in the lower-middle-income trap for more than a century (2 in the case of El Salvador) if their income per capita continues to grow by less than 1 percent per year. Countries like Albania, Botswana, Ecuador, and the Philippines will likely be there for another 2 to 3 decades; and Bolivia, Rep. of Congo, and Paraguay for more than 4 decades. At the extreme are Gabon and Jamaica, countries that will never move on to the upper-middle-income if their income per capita continues stagnating or contracting.

Table 6 shows the countries in the upper-middle-income trap, as well as the number of years they were lower-middle-income, and the number of years until 2010 as upper-middle-income countries. The last column of Table 6 also provides the number of years that it will take each country to reach the high-income threshold of $11,750 if income per capita continues to grow at the 2000-2010 average rate.

Table 6 Economies in the upper-middle-income trap in 2010

Country	Region	2010 GDP per capita (1990 PPP $)	No. of years as LM	No. of years as UM until 2010	Ave. growth (%) 2000-2010	No. of years to reach $11,750
Malaysia	Asia	10,567	27	15	2.6	5
Uruguay	Latin America	10,934	112	15	3.3	3
Venezuela	Latin America	9,662	23	60	1.4	15
Saudi Arabia	Middle East	8,396	20	32	0.9	37
Syria	Middle East	8,717	46	15	1.7	18

* No. of years to reach $11750 = ln(11750/gdp2010) / ln(1 + avegr), where avegr is the average growth rate of income per capita during 2000-2010.
Source: Authors' calculations

Venezuela and Saudi Arabia are clearly in the upper-middle-income trap. Venezuela is a disappointing case, for it was a country that transited the lower-middle-income group in only 23 years (see Appendix Table 3), much faster than any other country that became lower-middle-income before 1950. Saudi Arabia has been an upper-middle-income country for 32 years. Finally, Malaysia, Uruguay, and Syria are borderline cases. They have been upper-middle-income countries for 15 years. Syria and Uruguay were previously in the lower-middle-income group for a long period, in the case of Uruguay, over a century. It was the first country in Latin America to attain lower-middle-income status. We raise a red flag in both cases.

The last column of Table 6 indicates that it should take only a few years for Malaysia and Uruguay to attain the high-income status if their income per capita continues to grow at

around 3 percent. Venezuela, Saudi Arabia, and Syria, on the other hand, will need to grow above their 2000-2010 average growth rates to make it into the rich club earlier than they would if they continue to grow sluggishly.

To summarize, 35 out of the 52 middle-income countries today are in the middle-income trap—30 countries in the lower-middle-income trap and 5 countries in the upper-middle-income trap. 13 of those in the trap are in Latin America, 11 are in the Middle East and North Africa, 6 in Sub-Saharan Africa, 3 in Asia, and 2 in Europe. The transition through the middle-income may not be a trap in the same sense it is used to describe the problem of the poor low-income countries, but it can be a long walk for many countries.

4.1 Who Is Not In the Middle-Income Trap Today?

What about the other 17 middle-income countries? Will they avoid the trap or are they at risk of getting into it? Tables 7 and 8 list these countries.

Among the 8 lower-middle-income countries that were not in the trap in 2010, 6 are in Asia. Asian countries in the lower-middle-income category have been there for a varying number of years. Cambodia, India, Myanmar, Pakistan, and Vietnam attained lower-middle-income status only during the last decade. Indonesia, on the other hand, has been in the same category for over two decades (Table 7). Its per capita income must grow at an annual average rate of 15 percent during 2011-2013 to avoid the trap. This is very unlikely, and therefore the country will be in the MIT. In the case of Pakistan, although it has just attained lower-middle-income status, its income per capita must grow faster, double the 2000-2010 average growth, to avoid the trap.

Table 7 Lower-middle-income economies *not* in the trap in 2010

Country	Region	2010 GDP per capita (1990 PPP$)	No. of years in LM until 2010	No. of years before falling into the lower-middle-income trap *	Ave. growth (%) 2000-2010	Ave. GDP per capita growth (%) to reach $7,250 **
Cambodia	Asia	2,529	6	22	8.2	4.9
India	Asia	3,407	9	19	6.1	4.1
Indonesia	Asia	4,790	25	3	3.9	14.8
Myanmar	Asia	3,301	7	21	9.0	3.8
Pakistan	Asia	2,344	6	22	2.6	5.3

Vietnam	Asia	3,262	9	19	6.1	4.3
Honduras	Latin America	2,247	11	17	1.6	7.1
Mozambique	Sub-Saharan Africa	2,362	4	24	5.8	4.8

Note: * calculated as (28 years - Number of years in LM until 2010); **Average growth needed to reach $7,250 from the income level in 2010 over the years before falling into the lower-middle-income trap.
Source: Authors' calculations

In addition to the two Asian countries that are at risk of getting into the trap is Honduras. Although Honduras has just recently become a lower-middle-income country, it may fall into the trap if it continues to grow at an average income per capita growth of 1.6 percent. At this rate, it will not graduate out of low-income until 2083, that is, it will follow the footsteps of most Latin American countries that stayed in the lower-middle-income category for a very long period before moving out of it.

Cambodia, India, Myanmar, Vietnam, and Mozambique became lower-middle-income countries less than a decade ago. These countries can avoid the lower-middle-income trap if their per capita income grows at the rates achieved during 2000-2010. If they achieve this, they can become upper-middle-income countries in two decades or less—Myanmar in 2020, India in 2023, Cambodia and Vietnam in 2024, and Mozambique in 2030.

Table 8 lists the 9 upper-middle-income countries that were not in the upper-middle-income trap in 2010. It is worth noting that, except for China and Thailand (the latter borderline), all these countries were trapped in the lower-middle-income class before they attained the upper-middle-income status. These countries were lower-middle-income countries for half a century. Among the countries in Table 8, 5 face the risk of getting into the trap. These are Hungary, Turkey, Costa Rica, Mexico, and Oman. The case of Mexico particularly stands out. Mexico's income per capita barely moved from the threshold of $7,250 after 8 years in the upper-middle-income category. At its 2000-2010 average growth rate, it will not attain high-income status until 2074.

On the other hand, China, Thailand, Bulgaria, and Poland should be able to avoid the upper-middle-income trap and will make it in time into the high-income group if they sustain their income per capita growth. At the rates their income per capita is growing, Poland can make it to high- income in 2013, China in 2015, and Thailand and Bulgaria in 2018.

Table 8 Upper-middle-income economies not in the trap in 2010

Country	Region	2010 GDP per capita (1990 PPP$)	No. of years in LM	No. of years in UM until 2010	No. of years before falling into the upper-middle-income trap *	Ave. growth (%) 2000-2010	Ave. growth (%) to reach $11,750 **
China	Asia	8,019	17	2	12	8.9	3.2
Thailand	Asia	9,143	28	7	7	3.6	3.6
Bulgaria	Europe	8,497	53	5	9	4.7	3.7
Hungary	Europe	9,000	51	10	4	2.4	6.9
Poland	Europe	10,731	50	11	3	3.9	3.1
Turkey	Europe	8,123	51	6	8	2.3	4.7
Costa Rica	Latin America	8,207	54	5	9	2.9	4.1
Mexico	Latin America	7,763	53	8	6	0.7	7.2
Oman	Middle East	8,202	33	10	4	1.4	9.4

Note: * calculated as (15 years - Number of years in UM until 2010); **Average growth needed to reach $11,750 from the income level in 2010 over the years before falling into the upper-middle-income trap.
Source: Authors' calculations

We close this section with the following question: does the MIT affect especially the resource-rich countries? The evidence we have gathered indicates that not all resource-rich countries do necessarily end up in the MIT. Member countries of the Organization of the Petroleum Exporting Countries (OPEC) like Kuwait, Qatar, and the United Arab Emirates have already attained high-income status. Likewise, Kazakhstan, a resource-rich country, attained high-income status in 2010 (see Appendix Table 1B). But the countries in the middle-income trap are OPEC members—Algeria, Ecuador, Iran, and Libya are in the lower-middle-income trap, while Saudi Arabia and Venezuela are in the upper-middle-income trap. Angola, Iraq, and Nigeria, however, are still low-income countries. Angola and Nigeria have been low-income since 1950, while Iraq fell back into the low-income group (from the lower-middle-income group) in 1991. As Van der Ploeg and Venables (2009) indicate, what matters for these countries is how well or how poorly resource revenues are managed.

5. WHAT CHARACTERIZES THE COUNTRIES IN THE MIDDLE-INCOME TRAP? THE ROLE OF STRUCTURAL TRANSFORMATION

Becoming a high-income country is not an easy walk. 37 economies of the 124 analyzed in this paper have always been in the low-income group since 1950. And we have seen that 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 we have used and are, therefore, in the middle-income trap.

In this section, we shed 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, we concentrate our 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, p.4).

As argued earlier, 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, like Brazil or Malaysia, relatively high). 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 towards 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 non-tradable inputs. According to Sutton (2001, 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, 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.[28]

[28] Sutton (2001, 2005) has 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

The analysis in the rest of this section is divided into three parts. First, we test the null hypothesis that countries in the middle-income trap are not different from those that graduated, according to eight indicators of structural change. Second, we divide products according to their sophistication and their proximity to other products and see what products the countries in the middle-income trap export.

5.1 Comparing Countries in the Trap with Those Not in It

We start by studying eight characteristics of the products exported by countries that are in the trap today. We test the hypothesis that they are not different from those of the countries that have successfully made the transition. Specifically, we look at the following eight indicators of structural transformation:[29]

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

$$RCA_{ci} = \left(xval_{ci} \Big/ \sum_{i} xval_{ci} \right) \Big/ \left(\sum_{c} xval_{ci} \Big/ \sum_{i}\sum_{c} xval_{ci} \right)$$

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

(ii) *diversification_core*: the 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*: the 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):

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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 she 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.

[29] We try 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? 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 me closer to other products?)

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

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

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

Both expy and PRODY are measured in 2005 PPP dollars.

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

(vi) *expy_core*: the 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:

$$Open\ Forest = \sum_j \omega_{cj}\ 1 - x_{cj}\ PRODY_j$$

where $\omega_{cj} = \frac{\sum_i \varphi_{ij} x_{ci}}{\sum_i \varphi_{ij}}$ is the density; $x_{ci}, x_{cj} =$

$1\ if\ RCA_{i,j} \geq 1\ for\ country\ c$
$0\ if\ RCA_{i,j} < 1\ for\ country\ c$;

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 revealed comparative advantage. 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 dollar.

(viii) *standardness*: It 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:

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

where *ubiquity* of commodity *i* is the number of countries exporting commodity *i* with revealed comparative advantage.

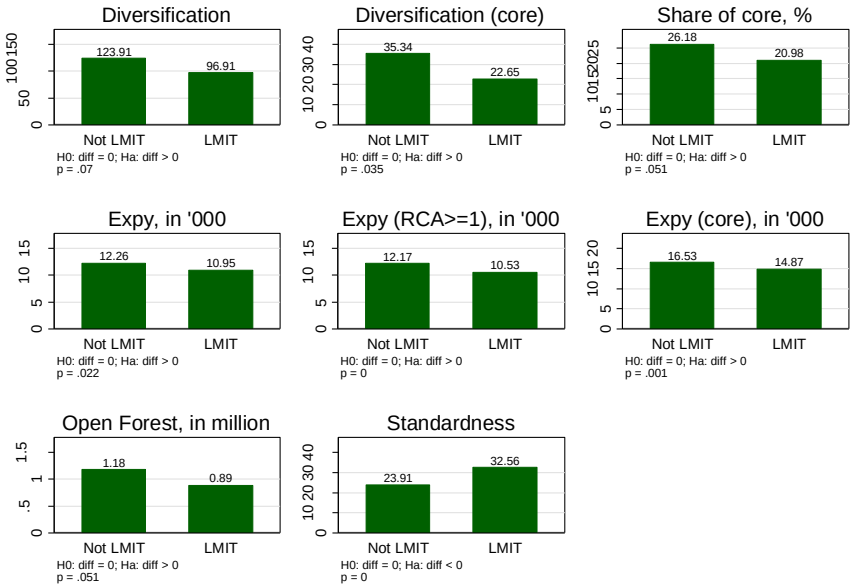
First, we calculate each of the eight indicators for each country using a highly disaggregated (SITC Rev. 2 4-digit level) trade data at the level of 779 products. The earliest data is for 1962 and the latest for 2007. Second, we calculate the 10-year (1998-2007) average of each indicator for countries in the lower-middle-income and upper-middle-income traps.[30] Third, for countries that made the transition into upper-middle-income or high-income, we calculate the average of each indicator for the 10-year just before they made the transition (that is, we do not compare the two groups of countries today). Since the earliest data is 1962, we only consider countries that made the transition after 1971.[31] 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 5 shows the average of each indicator for countries in the lower-middle-income trap (LMIT) and for countries that made it to upper-middle-income (Not LMIT). The results of the tests show that the latter group had a more diversified, sophisticated, and non-standard 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.

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

[31] Countries in the lower-middle-income trap are compared to the following 23 countries: Bulgaria; Chile; China; Costa Rica; Spain; Greece; Hong Kong, China; Hungary; Ireland; Korea; Kuwait; Mexico; Mauritius; Malaysia; Oman; Poland; Portugal; Qatar; Singapore; Syria; Thailand; Turkey; and Uruguay (Table 3 and Appendix Table 3). Countries in the upper-middle-income trap are compared to the following 21 countries: Argentina; Austria; Belgium; Chile; Germany; Spain; Finland; Gabon; U.K; Greece; Hong Kong, China; Ireland; Israel; Italy; Japan; Korea; Mauritius; Norway; New Zealand; Portugal; and Singapore (Table 4 and Appendix Table 4).

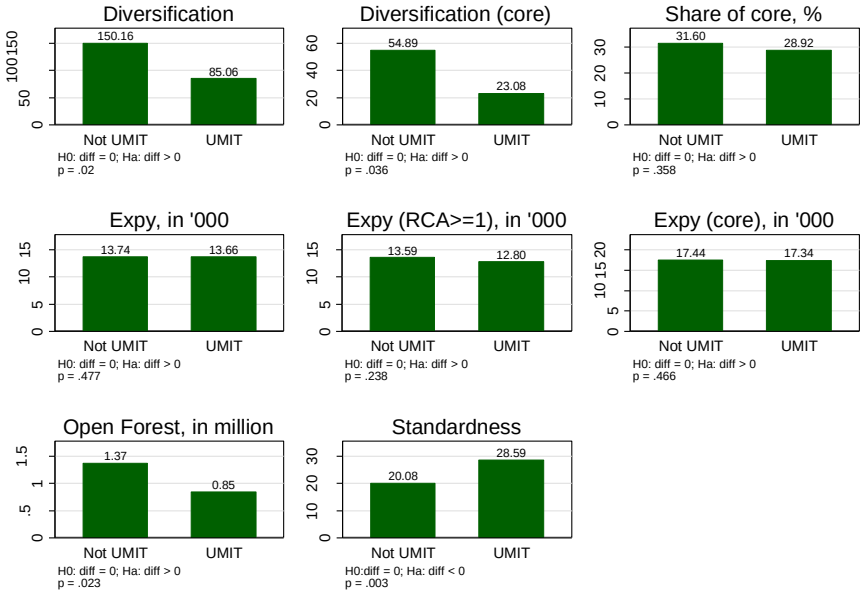
Figure 5 Countries in the lower-middle-income trap (LMIT) vs. countries that made it to upper-middle-income (Not LMIT)



Note: We also test the equality of the means between the 2 groups 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: Authors' calculations

Figure 6 shows the average of each indicator for countries in the upper-middle-income trap (UMIT) and for countries that became high-income (not UMIT). 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 6 Countries in the upper-middle-income trap (UMIT) vs. countries that made it to upper-middle-income (not UMIT)



Note: We also test the equality of the means between the 2 groups 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: Authors' 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 exported a more diversified and unique set of products. Consequently, they have more opportunities for further structural transformation.

5.2 Not All Products Have the Same Consequences for Growth: The Product Trap

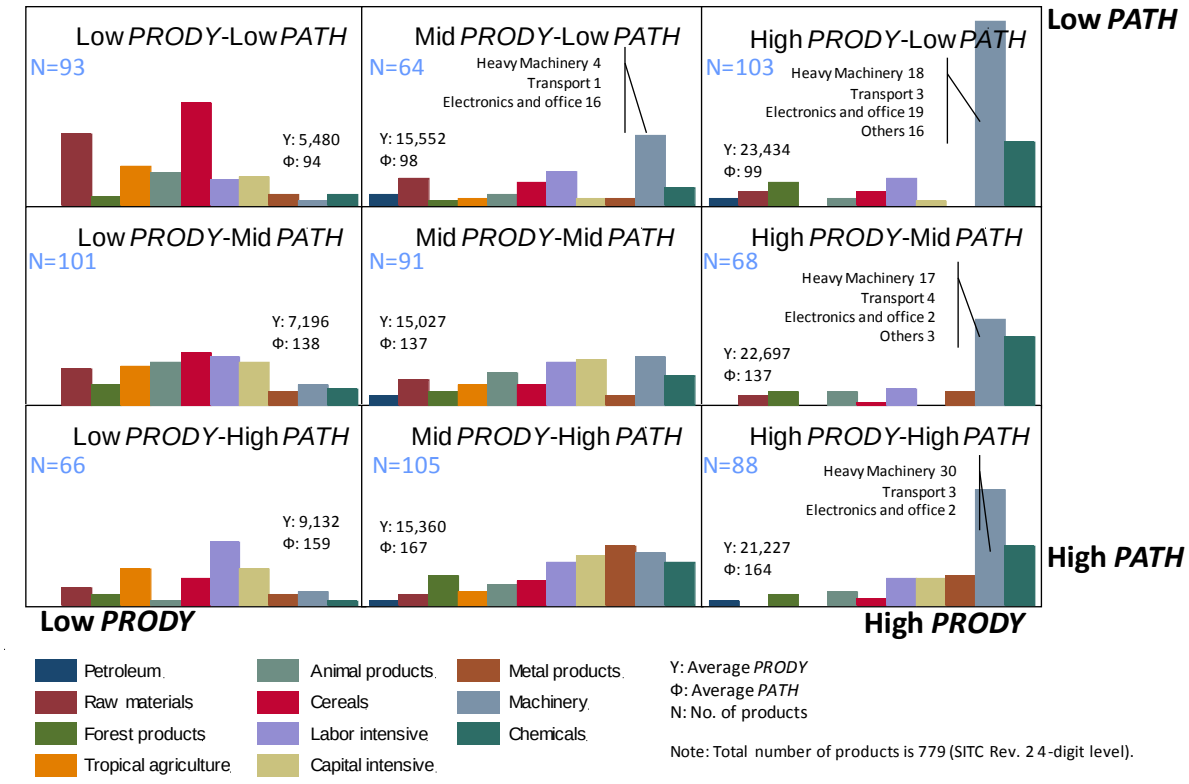
As noted above, we use a probabilistic measure of how close a product is to others, (not exported with RCA) and therefore, whether it is likely that the country acquires RCA in them. This is the *proximity*. The sum of all proximities is the *PATH*. Table 9 shows the average sophistication (*PRODY*) 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 9 Average *Prody* and *Proximity*

Leamer's Classification	No. of products	Ave. *PRODY*	Ave. *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 (exc. 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 *

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

Figure 7 Distribution of Products According to *PRODY* and *PATH*



Note: 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. (2010a)

Figure 7 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 percent of the total) are in the four mid- or high- *PRODY-PATH* cells ("good" products) and 427 (55 percent of the total) are in the other five cells ("bad" products).

Figure 7 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. We discuss in section 5.3 the cases of Korea, Malaysia, and the Philippines.

What kind of products do countries in the trap export with revealed comparative advantage (i.e., RCA≥1)? Tables 10 and 11 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, we highlight the cell with the largest share. We also show the total number of products that each country exports with revealed comparative advantage (i.e., diversification) 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 10).[32] This indicates that countries in the lower-middle-income trap are in a "low-product trap."

Table 10 Countries in the LMIT: Distribution of exports according *PRODY* and *PATH* (% 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*	#. of prods. 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

Source: Felipe et al. (2010a)

The largest share in the cases of Syria and Uruguay in the upper-middle-income trap is also the Low *PRODY*-Mid *PATH* (Table 11). Both Saudi Arabia and Venezuela export Mid *PRODY*-Mid *PATH* products the most, but they are significantly less diversified than the other

[32] Appendix Table 5 shows all countries.

countries in Table 11. Malaysia's exports, on the other hand, largely belong to the High *PRODY*-Low *PATH* (20 percent) and Mid *PRODY*-Low *PATH* (18 percent). Note that although Malaysia's exports are relatively sophisticated, they are Low *PATH* (e.g., electronics).

Table 11 Countries in the UMIT: Distribution of exports according *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*	#. of prods. 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

Source: Felipe et al. (2010a)

This analysis leads to the conclusion that there is something that could be labeled a *product trap* that causes countries to get stuck in the middle-income trap 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.

6. CONCLUSIONS

During the last two decades, both the press and economists have dedicated increasing attention to the so-called "middle-income trap." This refers to a group of countries that became middle-income some time ago, but which have not been able to cross the high-income threshold. The problem with the debate of what prevents these countries from becoming high-income economies is that it is not clear what the trap refers to, as there is no accepted definition. And moreover, the word "trap" is, to some extent, misleading for it is difficult to argue that countries that have attained middle-income status (especially those in the upper-middle-income segment) are in a trap, as understood in the development literature (e.g., Nelson 1956, Myrdal 1957).

In this paper, we have provided a working (empirical) definition of what the middle-income trap is; we have identified the countries in the trap in 2010; and have shed light on why it may take countries many years to make it into the high-income group.

First, we have used a consistent data set for 124 countries for 1950-2010. We have defined four income groups of GDP per capita in 1990 PPP dollars: (i) low-income up to $2,000; (ii) lower-middle-income between $2,000 and $7,250; (iii) upper-middle-income between $7,250 and $11,750; and (iv) high-income above $11,750. These thresholds are constant in time. In 1950, there were 82 low-income countries, 39 middle-income, and 3 high-income. In 2010, there were 40 low-income countries (37 of them have been in this group for the whole period); 52 middle-income countries (38 lower-middle-income and 14 upper-middle-income); and 32 high-income countries. Our research uncovers the important fact that most of the world's poor live in countries that today are in the middle-income group (China, India, Indonesia, and Pakistan). While the decrease in the number of low-income countries is good news, the dispersion of the world's income per capita has increased significantly and many countries are not closing their income gap with the US. But income transitions (i.e., for the countries that make them) today are significantly faster than those in the past: a country that became lower-middle-income in year t spent about 7 more months in this income group than a country that became lower-middle-income in year t+1. This translates into a difference of one century spent as a lower-middle-income country between the Netherlands (the first country to become lower-middle-income, in 1827, and to graduate to upper-middle-income 128 years later, in 1955) and China (which became lower-middle-income country in 1992 and graduated to upper-middle-income 17 years later, in 2009); and likewise, a country that became upper-

middle-income in year t spent about 3 more months in this income group than a country that became upper-middle-income in year t+1. This is evidence of convergence within the group of countries that make the transitions.

Second, by analyzing historical income transitions, we have determined the number of years that a country has to be in the lower- and upper-middle-income groups to fall into the middle- income trap: more than 28 years in the lower-middle-income group and more than 14 years in the upper-middle-income group. These imply that a country that becomes lower-middle-income has to attain an average growth rate of at least 4.7 percent to avoid falling into the lower-middle-income trap; and that a country that becomes upper-middle-income has to attain an average growth rate of at least 3.5 percent to avoid falling into the upper-middle-income trap.

Results indicate that 35 out of the 52 middle-income countries in 2010 (over two thirds of the total) were in the middle-income trap—30 in the lower-middle-income trap (9 of them can potentially graduate soon) and 5 in the upper-middle-income trap (2 of them can potentially leave it soon). 8 out of the remaining 17 countries (i.e., not in the trap) are at risk of falling into the trap (3 into the lower-middle-income and 5 into the upper-middle-income).

By region, 35 countries are in the trap today—13 are in Latin America (11 in the lower-middle-income trap and 2 in the upper-middle-income trap), 11 are in the Middle East and North Africa (9 in the lower-middle-income trap and 2 in the upper-middle-income trap), 6 are in Sub-Saharan Africa (all of them in the lower-middle-income trap), 3 in Asia—the Philippines and Sri Lanka are in the lower-middle-income trap, although the latter should get out of it soon, and Malaysia is in the upper-middle-income trap, although it should also get out of it soon. Indonesia and Pakistan will most likely fall into the lower-middle-income trap soon, and 2 are in Europe (both in the lower-middle-income trap). The middle-income trap occurs mostly at the low level of the middle-income range (30 out of the 35 countries are in the lower-middle-income trap) and mostly affects countries in Latin America and the Middle East and North Africa (30 out of the 35 countries). On top of this, we have to add the 31 Sub-Saharan countries that have been in the low-income group since 1950.

Asia is different from the other developing regions. Of the 29 economies for which complete data was available, 5 are already high-income (Hong Kong, China; Japan; Korea; Singapore; and Taipei, China). There are also 5 Asian economies that have been low-income since 1950. We have not classified the 8 Asian ex-Soviet Republics (see Appendix Table 1B)

given that there is data for only 21 years (some of these countries are already high-income). We have concluded that 3 Asian countries were in the middle-income trap in 2010 (Sri Lanka and Malaysia may escape it soon). The other 8 Asian economies are middle-income but are not (as of today) in the lower or upper-middle-income traps (Indonesia and Pakistan are at risk of falling into the lower-middle-income trap in the coming years). Although these countries are not in the middle-income trap, they should make sure that they do not fall into it. China has avoided the lower-middle-income trap and, although there is no guarantee, in all likelihood it will also avoid the upper-middle-income trap (it has been an upper-middle-income country only for 2 years). Therefore, claims that it may be approaching the trap are unwarranted.[33] Even at a modest (relative to its 8.9 percent annual growth from 2000 to 2010) income per capita growth of 5 percent, China should be able to avoid the upper-middle-income trap.[34] India became recently a lower-middle-income country and it will also probably avoid the lower-middle-income trap (although, again, there is no guarantee).[35]

We have analyzed some characteristics of the countries in the middle income trap and compared them to the countries not the in 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 economy-wide 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 non-standard export

[33] e.g., *The Economist*, June 25, 2011, p.9 of the *Special Report on China*.
[34] For a specific analysis of China, see Felipe, Kumar, Usui and Abdon (2010).
[35] For a specific analysis of India, see Felipe et al. (2010b).

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). We conclude that it will be very difficult for countries in the middle-income trap to become high-income countries without developing a 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.

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APPENDIX

Table 1A 2010 Income Classification (124 countries)

Country	WB Class 2010	GDPpc 2010	Our Class 2010	No. of years (1950-2010)				Status
				L	LM	UM	H	
Afghanistan	L	1,068	L	61	-	-	-	-
Albania	UM*	4,392	LM	24	37	-	-	LMIT
Algeria	UM*	3,552	LM	19	42	-	-	LMIT
Angola	LM*	1,658	L	61	-	-	-	-
Argentina	UM*	11,872	H	-	28	32	1	-
Australia	H	25,754	H	-	-	20	41	-
Austria	H	23,534	H	-	14	12	35	-
Bangladesh	L	1,250	L	61	-	-	-	-
Belgium	H	23,123	H	-	11	12	38	-
Benin	L	1,387	L	61	-	-	-	-
Bolivia	LM	3,065	LM	16	45	-	-	LMIT
Botswana	UM*	4,858	LM	33	28	-	-	LMIT
Brazil	UM*	6,737	LM	8	53	-	-	LMIT
Bulgaria	UM	8,497	UM	3	53	5	-	-
Burkina Faso	L	1,110	L	61	-	-	-	-
Burundi	L	495	L	61	-	-	-	-
Cambodia	L*	2,529	LM	55	6	-	-	-
Cameroon	LM*	1,208	L	61	-	-	-	-
Canada	H	24,808	H	-	-	19	42	-
Central African Republic	L	530	L	61	-	-	-	-
Chad	L	708	L	61	-	-	-	-
Chile	UM*	13,294	H	-	42	13	6	-
China	UM	8,019	UM	42	17	2	-	-
Colombia	UM*	6,542	LM	-	61	-	-	LMIT
Congo, Dem. Rep.	L	259	L	61	-	-	-	-
Congo, Rep.	LM	2,391	LM	28	33	-	-	LMIT
Costa Rica	UM	8,207	UM	2	54	5	-	-
Cote d'Ivoire	LM*	1,098	L	58	3	-	-	-
Denmark	H	23,569	H	-	3	15	43	-
Dominican Republic	UM*	4,802	LM	23	38	-	-	LMIT
Ecuador	UM*	4,010	LM	3	58	-	-	LMIT
Egypt	LM	3,936	LM	30	31	-	-	LMIT
El Salvador	LM	2,818	LM	14	47	-	-	LMIT
Eritrea	L	866	L	61	-	-	-	-
Finland	H	22,825	H	-	14	15	32	-
France	H	21,750	H	-	10	11	40	-
Gabon	UM*	3,858	LM	-	56	4	1	LMIT
Gambia	L	1,099	L	61	-	-	-	-
Germany	H	20,628	H	-	10	13	38	-
Ghana	LM*	1,736	L	61	-	-	-	-
Greece	H	15,232	H	1	21	28	11	-
Guatemala	LM	4,381	LM	1	60	-	-	LMIT
Guinea	L	607	L	61	-	-	-	-
Guinea Bissau	L	629	L	61	-	-	-	-
Haiti	L	664	L	61	-	-	-	-
Honduras	LM	2,247	LM	50	11	-	-	-
Hong Kong, China	H	32,434	H	-	26	7	28	-
Hungary	H*	9,000	UM	-	51	10	-	-

Country	WB Class 2010	GDPpc 2010	Our Class 2010	No. of years (1950-2010)				Status
				L	LM	UM	H	
India	LM	3,407	LM	52	9	-	-	-
Indonesia	LM	4,790	LM	36	25	-	-	-
Iran	UM*	6,789	LM	9	52	-	-	LMIT
Iraq	LM*	1,046	L	23	38	-	-	-
Ireland	H	25,238	H	-	25	15	21	-
Israel	H	18,108	H	-	19	17	25	-
Italy	H	18,887	H	-	13	15	33	-
Jamaica	UM*	3,484	LM	5	56	-	-	LMIT
Japan	H	22,260	H	1	17	9	34	-
Jordan	UM*	5,752	LM	6	55	-	-	LMIT
Kenya	L	1,115	L	61	-	-	-	-
Kuwait	H	11,900	H	-	1	20	40	-
Lao PDR	LM*	1,864	L	61	-	-	-	-
Lebanon	UM*	5,061	LM	3	58	-	-	LMIT
Lesotho	LM*	1,987	L	61	-	-	-	-
Liberia	L	806	L	61	-	-	-	-
Libya	UM*	2,924	LM	12	43	6	-	LMIT
Madagascar	L	654	L	61	-	-	-	-
Malawi	L	807	L	61	-	-	-	-
Malaysia	UM	10,567	UM	19	27	15	-	UMIT
Mali	L	1,185	L	61	-	-	-	-
Mauritania	LM*	1,281	L	61	-	-	-	-
Mauritius	UM*	15,424	H	-	41	12	8	-
Mexico	UM	7,763	UM	-	53	8	-	-
Mongolia	LM*	1,015	L	61	-	-	-	-
Morocco	LM	3,672	LM	27	34	-	-	LMIT
Mozambique	L*	2,362	LM	57	4	-	-	-
Myanmar	L*	3,301	LM	54	7	-	-	-
Namibia	UM*	4,655	LM	-	61	-	-	LMIT
Nepal	L	1,219	L	61	-	-	-	-
Netherlands	H	23,912	H	-	5	15	41	-
New Zealand	H	18,147	H	-	-	22	39	-
Nicaragua	LM*	1,679	L	31	30	-	-	-
Niger	L	516	L	61	-	-	-	-
Nigeria	LM*	1,674	L	61	-	-	-	-
Norway	H	27,522	H	-	11	14	36	-
Oman	H*	8,202	UM	18	33	10	-	-
Pakistan	LM	2,344	LM	55	6	-	-	-
Panama	UM*	7,146	LM	5	56	-	-	LMIT
Paraguay	LM	3,510	LM	23	38	-	-	LMIT
Peru	UM*	5,733	LM	-	61	-	-	LMIT
Philippines	LM	3,054	LM	27	34	-	-	LMIT
Poland	H*	10,731	UM	-	50	11	-	-
Portugal	H	14,249	H	-	28	18	15	-
Qatar	H	18,632	H	-	4	16	41	-
Rep. of Korea	H	20,724	H	19	19	7	16	-
Romania	UM*	4,507	LM	12	49	-	-	LMIT
Rwanda	L	1,085	L	61	-	-	-	-
Saudi Arabia	H*	8,396	UM	-	20	32	9	UMIT
Senegal	LM*	1,479	L	61	-	-	-	-
Sierra Leone	L	707	L	61	-	-	-	-

Country	WB Class 2010	GDPpc 2010	Our Class 2010	No. of years (1950-2010)				Status
				L	LM	UM	H	
Singapore	H	30,830	H	-	28	10	23	-
South Africa	UM*	4,725	LM	-	61	-	-	LMIT
Spain	H	18,643	H	-	23	17	21	-
Sri Lanka	LM	5,459	LM	33	28	-	-	LMIT
Sudan	LM*	1,612	L	61	-	-	-	-
Swaziland	LM	3,270	LM	20	41	-	-	LMIT
Sweden	H	24,107	H	-	4	14	43	-
Switzerland	H	24,795	H	-	-	9	52	-
Syrian Arab Republic	LM*	8,717	UM	-	46	15	-	UMIT
Taipei, China	H	22,461	H	17	19	7	18	-
Tanzania	L	813	L	61	-	-	-	-
Thailand	UM	9,143	UM	26	28	7	-	-
Togo	L	615	L	61	-	-	-	-
Tunisia	UM*	6,389	LM	22	39	-	-	LMIT
Turkey	UM	8,123	UM	4	51	6	-	-
Uganda	L	1,059	L	61	-	-	-	-
United Arab Emirates	H	14,691	H	-	-	-	61	-
United Kingdom	H	22,555	H	-	3	20	38	-
United States	H	30,686	H	-	-	12	49	-
Uruguay	UM	10,934	UM	-	46	15	-	UMIT
Venezuela	UM	9,662	UM	-	1	60	-	UMIT
Vietnam	LM	3,262	LM	52	9	-	-	-
Yemen, Rep.	LM	2,852	LM	26	35	-	-	LMIT
Zambia	LM*	921	L	61	-	-	-	-
Zimbabwe	L	900	L	61	-	-	-	-

Note: WB class – World Bank income classification; GDPpc – GDP per capita (second column) is measured in 1990 PPP dollars; L – low-income; LM – lower-middle-income; UM – upper-middle-income; H – high-income; LMIT – lower-middle-income trap; UMIT – upper-middle-income trap; Our Class – income classification as defined in this paper.
*Countries for which the World Bank classification differs from ours.
Source: World Bank and authors' calculations.

Table 1B 2010 Income Classification (former USSR, Yugoslavia, and Czechoslovakia)

Country	WB Class 2010	GDPpc 2010	Our Class 2010	No. of years (1950-2010)			
				L	LM	UM	H
Armenia	LM*	10,042	UM	-	14	7	-
Azerbaijan	UM	9,137	UM	3	14	4	-
Belarus	UM*	13,674	H	-	13	5	3
Bosnia and Herzegovina	UM*	7,132	LM	2	18	1	-
Croatia	H*	8,307	UM	-	13	8	-
Czech Republic	H	12,469	H	-	-	16	5
Estonia	H	17,841	H	-	-	11	10
Georgia	LM	6,115	LM	-	20	1	-
Kazakhstan	UM*	12,150	H	-	12	8	1
Kyrgyz Republic	L*	2,840	LM	3	18	-	-
Latvia	UM*	12,236	H	-	8	7	6
Lithuania	UM	9,993	UM	-	10	11	-
Macedonia, FYR	UM*	4,041	LM	-	21	-	-
Moldova	LM	3,567	LM	-	21	-	-
Russian Federation	UM	8,828	UM	-	13	8	-

Serbia and Montenegro	UM*	3,562	LM	-	21	-	-
Slovak Republic	H	12,866	H	-	5	12	4
Slovenia	H	16,845	H	-	-	9	12
Tajikistan	L	1,633	L	19	2	-	-
Turkmenistan	LM	4,920	LM	2	19	-	-
Ukraine	LM	4,486	LM	-	21	-	-
Uzbekistan	LM	6,046	LM	-	21	-	-

Notes: See Appendix Table 1A.
Source: World Bank and authors' calculations

Table 2 GAP in 2010 and annual growth rate of GAP with the US (1985-2010, %)

Countries whose GAP with the US widened during 1985-2010								
Country	GAP with US (2010)	GAP growth rate (1985-2010, %)	Country	GAP with US (2010)	GAP growth rate (1985-2010, %)	Country	GAP with US (2010)	GAP growth rate (1985-2010, %)
Afghanistan	0.97	0.02	Guatemala	0.86	0.08	New Zealand	0.41	0.73
Algeria	0.88	0.23	Guinea	0.98	0.02	Nicaragua	0.95	0.17
Benin	0.95	0.07	Guinea Bissau	0.98	0.08	Niger	0.98	0.05
Bolivia	0.90	0.02	Haiti	0.98	0.13	Oman	0.73	0.28
Brazil	0.78	0.09	Honduras	0.93	0.08	Panama	0.77	0.12
Bulgaria	0.72	0.13	Hungary	0.71	0.13	Paraguay	0.89	0.17
Burkina Faso	0.96	0.01	Iraq	0.97	0.71	Romania	0.85	0.26
Burundi	0.98	0.07	Italy	0.38	0.74	Rwanda	0.96	0.05
Cameroon	0.96	0.17	Jamaica	0.89	0.15	Saudi Arabia	0.73	1.02
Canada	0.19	0.95	Japan	0.27	0.22	Senegal	0.95	0.05
Central African Rep.	0.98	0.06	Jordan	0.81	0.21	Sierra Leone	0.98	0.12
Congo, Dem. Rep.	0.99	0.08	Kenya	0.96	0.05	South Africa	0.85	0.19
Congo, Rep.	0.92	0.25	Kuwait	0.61	0.04	Swaziland	0.89	0.06
Cote d'Ivoire	0.96	0.20	Liberia	0.97	0.09	Switzerland	0.19	5.16
Denmark	0.23	1.47	Libya	0.90	0.45	Syrian Arab Republic	0.72	0.11
Ecuador	0.87	0.31	Madagascar	0.98	0.07	Togo	0.98	0.09
El Salvador	0.91	0.04	Malawi	0.97	0.01	United Arab Emirates	0.52	6.63
France	0.29	0.61	Mauritania	0.96	0.01	Venezuela	0.69	0.61
Gabon	0.87	0.78	Mexico	0.75	0.25	Yemen, Rep.	0.91	0.09
Gambia	0.96	0.01	Mongolia	0.97	0.12	Zambia	0.97	0.03
Germany	0.33	0.79	Namibia	0.85	0.05	Zimbabwe	0.97	0.15

Countries whose GAP with the US decreased during 1985-2010								
Country	GAP with US (2010)	GAP growth rate (1985-2010, %)	Country	GAP with US (2010)	GAP growth rate (1985-2010, %)	Country	GAP with US (2010)	GAP growth rate (1985-2010, %)
Albania	0.86	-0.12	India	0.89	-0.26	Philippines	0.90	-0.02
Angola	0.95	-0.07	Indonesia	0.84	-0.28	Poland	0.65	-0.44
Argentina	0.61	-0.35	Iran	0.78	-0.07	Portugal	0.54	-0.45

Australia	0.16	-1.67	Ireland	0.18	-4.43	Qatar	0.39	-0.95
Austria	0.23	-0.84	Israel	0.41	-0.25	Rep. of Korea	0.32	-3.17
Bangladesh	0.96	-0.05	Lao PDR	0.94	-0.07	Spain	0.39	-1.20
Belgium	0.25	-0.47	Lebanon	0.84	-0.04	Sri Lanka	0.82	-0.34
Botswana	0.84	-0.20	Lesotho	0.94	-0.08	Sudan	0.95	-0.06
Cambodia	0.92	-0.15	Malaysia	0.66	-0.79	Sweden	0.21	-0.20
Chad	0.98	0.00	Mali	0.96	-0.02	Taipei, China	0.27	-3.62
Chile	0.57	-1.15	Mauritius	0.50	-1.63	Tanzania	0.97	0.00
China	0.74	-0.90	Morocco	0.88	-0.02	Thailand	0.70	-0.77
Colombia	0.79	-0.04	Mozambique	0.92	-0.14	Tunisia	0.79	-0.27
Costa Rica	0.73	-0.30	Myanmar	0.89	-0.27	Turkey	0.74	-0.25
Dominican Republic	0.84	-0.21	Nepal	0.96	-0.02	Uganda	0.97	-0.03
Egypt	0.87	-0.04	Netherlands	0.22	-0.69	United Kingdom	0.26	-0.71
Eritrea	0.97	-0.01	Nigeria	0.95	-0.02	Uruguay	0.64	-0.51
Finland	0.26	-0.62	Norway	0.10	-1.84	Vietnam	0.89	-0.27
Ghana	0.94	-0.04	Pakistan	0.92	-0.04			
Greece	0.50	-0.35	Peru	0.81	-0.05			

Note: Hong Kong, China is not in the Table because in 2010 its GDP per capita was above that of the US.
Source: Authors' calculations, IMF (WEO, April 2011) and Maddison (2010)

Table 3 Economies that became lower-middle-income on or before 1950 and graduated to upper-middle-income

Country	Region	Year country turned LM (Y_{LM})	Year country turned UM (Y_{UM})	No. of years as LM	Ave. growth rate (Y_{LM} to Y_{UM})
Australia	Pacific	1848	1942	94	1.35
Hong Kong, China	Asia	1950**	1976	-	-
Japan	Asia	1929*	1968	39	3.58
New Zealand	Pacific	1860**	1947	-	-
Singapore	Asia	1950**	1978	-	-
Austria	Europe	1876	1964	88	1.52
Belgium	Europe	1854	1961	107	1.18
Denmark	Europe	1870	1953	83	1.57
Finland	Europe	1912	1964	52	2.50
France	Europe	1869	1960	91	1.44
Germany	Europe	1874	1960	86	1.51
Greece	Europe	1924	1972	48	2.70
Hungary	Europe	1910	2001	91	1.45
Ireland	Europe	1913**	1975	-	-
Italy	Europe	1906	1963	57	2.25
Netherlands	Europe	1827	1955	128	1.02
Norway	Europe	1907	1961	54	2.47
Poland	Europe	1929**	2000	-	-
Portugal	Europe	1947	1978	31	4.17
Spain	Europe	1911	1973	62	2.18
Sweden	Europe	1896	1954	58	2.22
Switzerland	Europe	1858*	1945	87	1.49
United Kingdom	Europe	1839*	1941	102	1.27
Argentina	Latin America & Caribbean	1890**	1970	-	-
Chile	Latin America & Caribbean	1891	1992	101	1.27

Costa Rica	Latin America & Caribbean	1952	2006	54	2.37
Mexico	Latin America & Caribbean	1942	2000	58	2.22
Uruguay	Latin America & Caribbean	1882*	1994	112	1.16
Venezuela	Latin America & Caribbean	1925	1948	23	5.67
Israel	Middle East & North Africa	1950**	1969	-	-
Saudi Arabia	Middle East & North Africa	1950**	1970	-	-
Syrian Arab Republic	Middle East & North Africa	1950**	1996	-	-
Canada	North America	1881	1943	62	2.07
United States	North America	1860**	1941	81	1.65
Mauritius	Sub-Saharan Africa	1950**	1991	-	-

* This refers to the year these countries regained lower-middle-income status. Australia was low middle- income in 1848 but fell back to low-income; Denmark in 1870; Finland in 1912; France in 1869; Germany in 1874; Hungary in 1910; Japan in 1929; Switzerland in 1858; United Kingdom in 1839; and Uruguay in 1870. Japan fell to low-income once again from 1945 to 1950.

** Sparse or no data prior to this year. We only know that these countries made it to LM on or before 1950, but we do not know when exactly. Thus, we cannot count the number of years they have stayed as LM.

Source: Author's calculations

Table 4 Economies that became upper-middle-income before 1950 and graduated to high-income

Country	Region	Year country turned UM (Y_{UM})	Year country turned H (Y_H)	No. of years as UM	Ave. growth rate (Y_{UM} to Y_H)
Australia	Pacific	1942	1970	28	1.7
New Zealand	Pacific	1947	1972	25	1.7
Switzerland	Europe	1945	1959	14	3.1
United Kingdom	Europe	1941	1973	32	1.5
Canada	North America	1943	1969	26	1.9
United States	North America	1941	1962*	21	1.8

*This refers to the year the US regained high-income status. The US reached the high-income threshold in 1944, but its income per capita slipped to upper-middle-income in 1945.

Source: Authors' calculations

Table 5 Distribution of exports according PRODY and PATH (% 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*	#. of prods. 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

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*	#. of prods. with RCA≥ 1
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	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
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

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*	#. of prods. with RCA≥ 1
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
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

Country	High *PROD Y* - High *PATH*	High *PROD Y* - Mid *PATH*	High *PROD Y* - Low *PATH*	Mid *PROD Y* - High *PATH*	Mid PROD Y - Mid *PATH*	Mid *PROD Y* - Low *PATH*	Low *PROD Y* - High *PATH*	Low *PROD Y* - Mid *PATH*	Low *PROD Y* - Low *PATH*	#. of prods. with RCA≥ 1
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
Rep. 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
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
Vietnam	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. (2010a)