THE ATLAS OF ECONOMIC COMPLEXITY

MAPPING PATHS TO PROSPERITY

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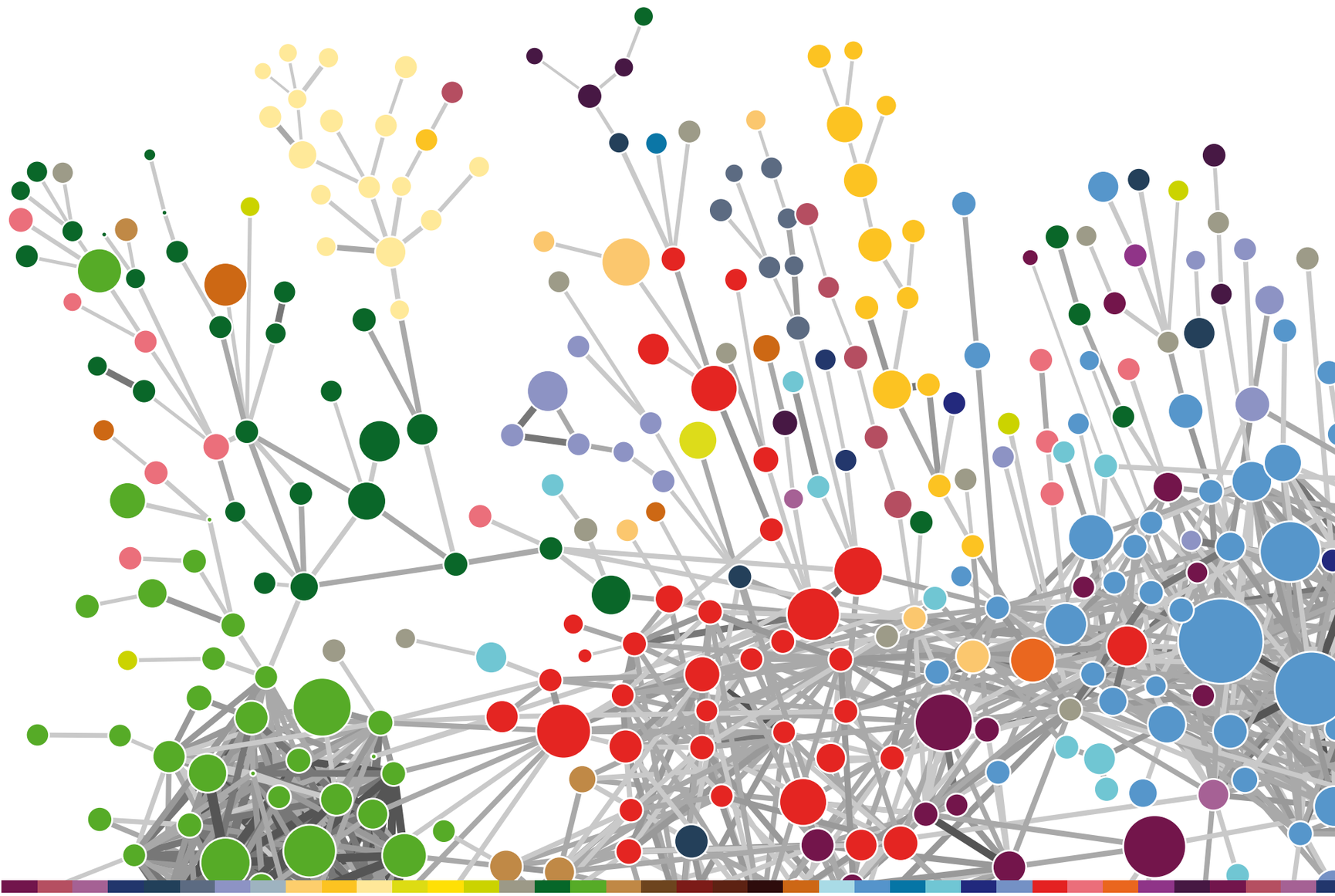

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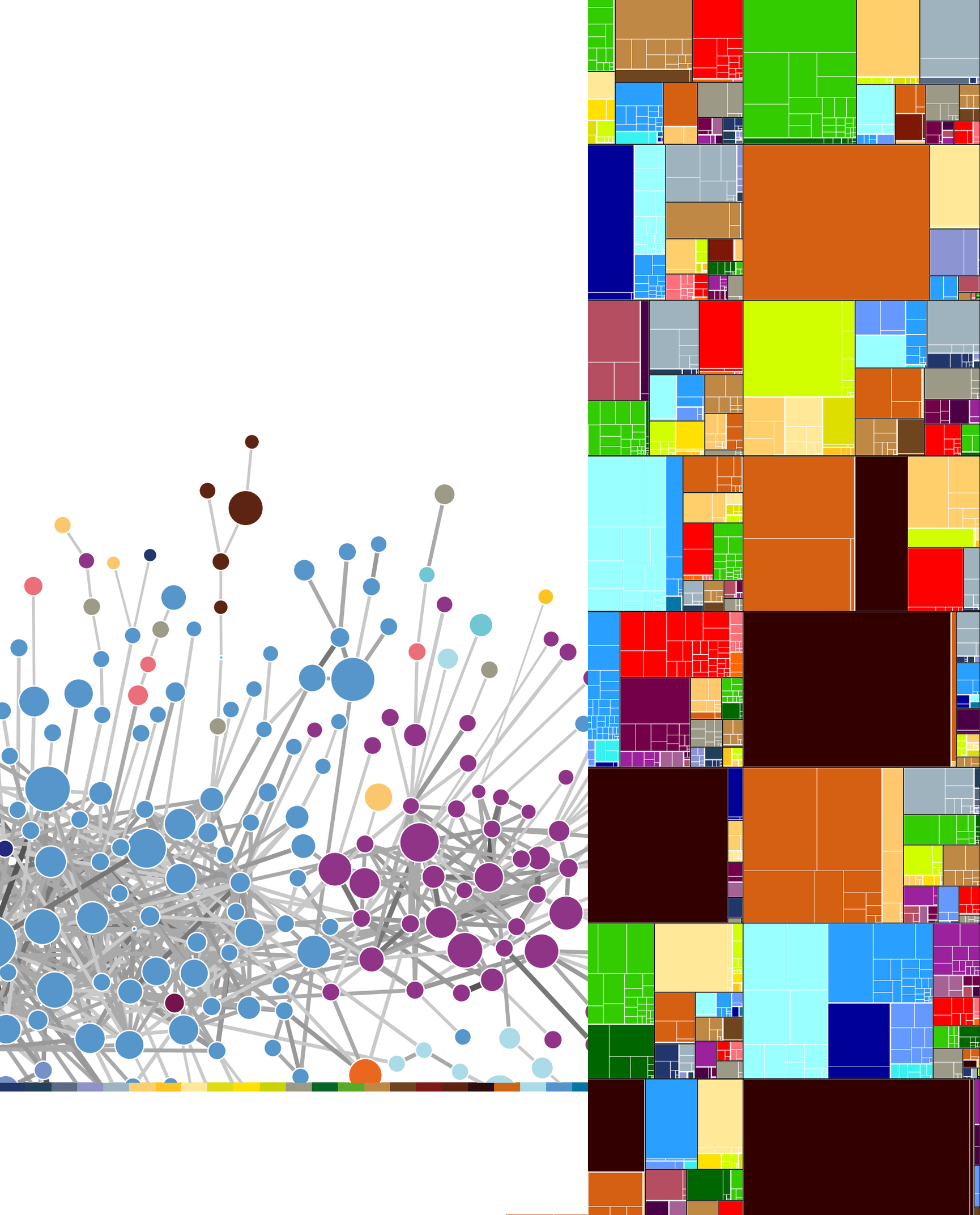

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PREFACE

Over the past two centuries, mankind has accomplished what used to be unthinkable. When we look back at our long list of achievements, it is easy to focus on the most audacious of them, such as our conquest of the skies and the moon. Our lives, however, have been made easier and more prosperous by a large number of more modest, yet crucially important feats. Think of electric bulbs, telephones, cars, personal computers, antibiotics, TVs, refrigerators, watches and water heaters. Think of the many innovations that benefit us despite our minimal awareness of them, such as advances in port management, electric power distribution, agrochemicals and water purification. This progress was possible because we got smarter. During the past two centuries, the amount of productive knowledge we hold expanded dramatically. This was not, however, an individual phenomenon. It was a collective phenomenon. As individuals we are not much more capable than our ancestors, but as societies we have developed the ability to make all that we have mentioned – and much, much more.

Modern societies can amass large amounts of productive knowledge because they distribute bits and pieces of it among its many members. But to make use of it, this knowledge has to be put back together through organizations and markets. Thus, individual specialization begets diversity at the national and global level. Our most prosperous modern societies are wiser, not because their citizens are individually brilliant, but because these societies hold a diversity of knowhow and because they are able to recombine it to create a larger variety of smarter and better products.

The social accumulation of productive knowledge has not been a universal phenomenon. It has taken place in some parts of the world, but not in others. Where it has happened, it has underpinned an incredible increase in living standards. Where it has not, living standards resemble those of centuries past. The enormous income gaps between rich and poor nations are an expression of the vast differences in productive knowledge amassed by different nations. These differences are expressed in the diversity and sophistication of the things that each of them makes, which we explore in detail in this Atlas.

Just as nations differ in the amount of productive knowledge they hold, so do products. The amount of knowledge that is required to make a product can vary enormously from one good to the next. Most modern products require more knowledge than what a single person can hold. Nobody in this world, not even the saviest geek nor the most knowledgeable entrepreneur knows how to make a computer. He has to rely on others who know about battery technology, liquid crystals, microprocessor design, software development, metallurgy, milling, lean manufacturing and human resource management, among many other skills. That is why the average worker in a rich country works in a firm that is much larger and more connected than firms in poor countries. For a society to operate at a high level of total productive knowledge, individuals must know different things. Diversity of productive knowledge, however, is not enough. In order to put knowledge into productive use, societies need to reassemble these distributed bits through teams, organizations and markets.

Accumulating productive knowledge is difficult. For the most part, it is not available in books or on the Internet. It is embedded in brains and human networks. It is tacit and hard to transmit and acquire. It comes from years of experience more than from years of schooling. Productive knowledge, therefore, cannot be learned easily like a song or a poem. It requires structural changes. Just like learning a language requires changes in the structure of the brain, developing a new industry requires changes in the patterns of interaction inside an organization or society.

Expanding the amount of productive knowledge available in a country involves enlarging the set of activities that the country is able to do. This process, however, is tricky. Industries cannot exist if the requisite productive knowledge is absent, yet accumulating bits of productive knowledge will make little sense in places where the industries that require it are not present. This "chicken and egg" problem slows down the accumulation of productive knowledge. It also creates important path dependencies. It is easier for countries to move into industries that mostly reuse what they already know, since these industries require adding modest amounts of productive knowledge. By gradually adding new knowledge to what they already know, countries economize on the chicken and egg problem. That is why we find empirically that countries move from the products that they already create to others that are "close by" in terms of the productive knowledge that they require.

The Atlas of Economic Complexity attempts to measure the amount of productive knowledge that each country holds. Our measure of productive knowledge can account for the enormous income differences between the nations of the world and has the capacity to predict the rate at which countries

will grow. In fact, it is much more predictive than other well-known development indicators, such as those that attempt to measure competitiveness, governance and education.

A central contribution of this Atlas is the creation of a map that captures the similarity of products in terms of their knowledge requirements. This map provides paths through which productive knowledge is more easily accumulated. We call this map, or network, the product space, and use it to locate each country, illustrating their current productive capabilities and the products that lie nearby.

Ultimately, this Atlas views economic development as a social learning process, but one that is rife with pitfalls and dangers. Countries accumulate productive knowledge by developing the capacity to make a larger variety of products of increasing complexity. This process involves trial and error. It is a risky journey in search of the possible. Entrepreneurs, investors and policymakers play a fundamental role in this economic exploration.

By providing rankings, we wish to clarify the scope of the achievable, as revealed by the experience of others. By tracking progress, we offer feedback regarding current trends. By providing maps, we do not pretend to tell potential explorers where to go, but to pinpoint what is out there and what routes may be shorter or more secure. We hope this will empower these explorers with valuable information that will encourage them to take on the challenge and thus speed up the process of economic development.

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C O N T E N T S

PART I | WHAT, WHY AND HOW?

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PART I WHAT, WHY AND HOW?



SECTION I

What Do We Mean by *Economic Complexity*?

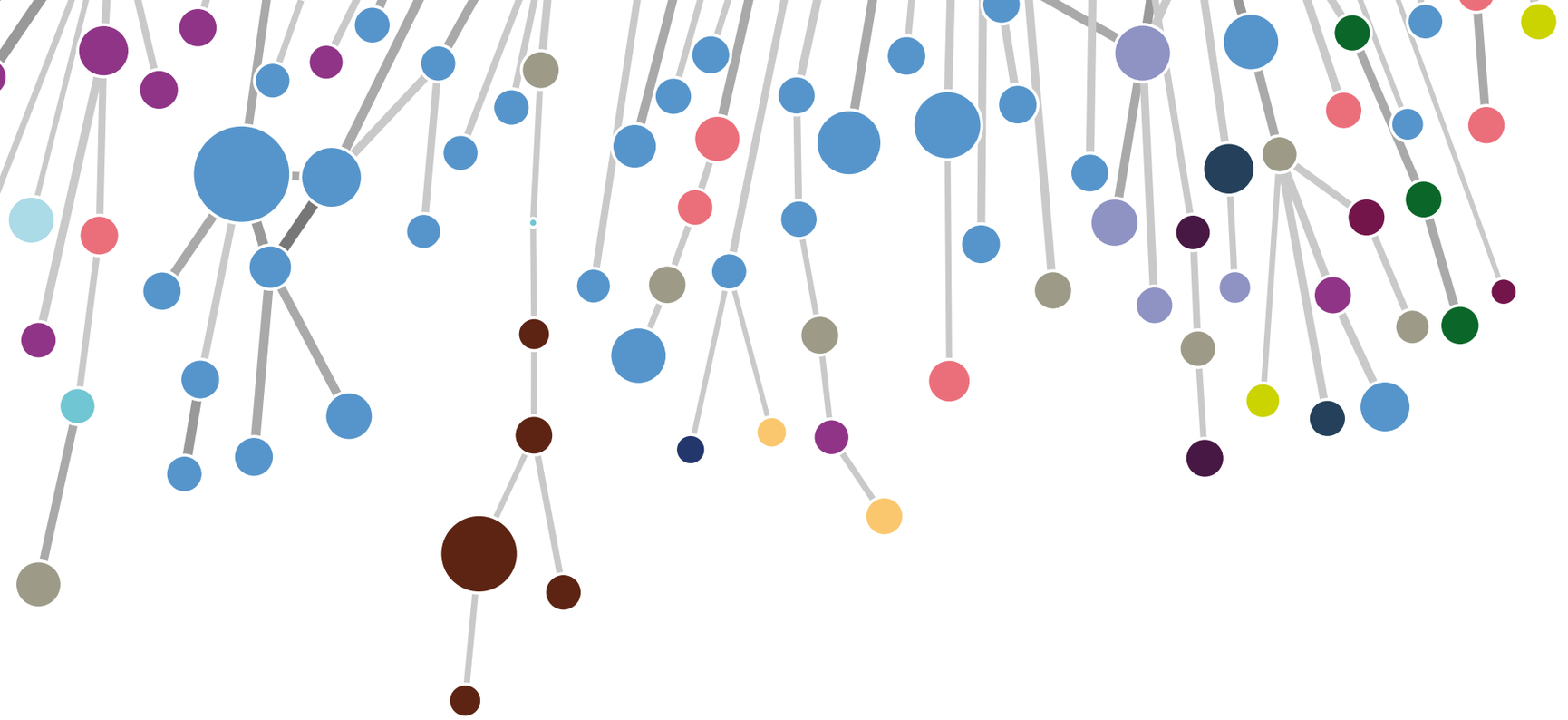
What are things made out of? One way of describing the economic world is to say that things are made with machines, raw materials and labor. Another way is to emphasize that products are made with knowledge. Consider toothpaste. Is toothpaste just some paste in a tube? Or do the paste and the tube allow us to access knowledge about the properties of sodium fluoride on teeth and about how to achieve its synthesis? The true value of a tube of toothpaste, in other words, is that it manifests knowledge about the chemicals that facilitate brushing, and that kill the germs that cause bad breath, cavities and gum disease.

When we think of products in these terms, markets take on a different meaning. Markets allow us to access the vast amounts of knowledge that are scattered among the people of the world. Toothpaste embeds our knowledge about the chemicals that prevent tooth decay, just like cars embody our knowledge of mechanical engineering, metallurgy, electronics and design. Computers package knowledge about information theory, electronics, plastics and graphics, whereas apples embody thousands of years of plant domestication as well as knowledge about logistics, refrigeration, pest control, food safety and the preservation of fresh produce.

Products are vehicles for knowledge, but embedding knowledge in products requires people who possess a working understanding of that knowledge. Most of us can be ignorant about how to synthesize sodium fluoride because we can rely on the few people who know how to create this atomic cocktail, and who together with their colleagues at the toothpaste factory, can deposit it into a product that we can use.

We owe to Adam Smith the idea that the division of labor is the secret of the wealth of nations. In a modern reinterpretation of this idea, the division of labor is what allows us to access a quantity of knowledge that none of us would be able to hold individually. We rely on dentists, plumbers, lawyers, meteorologists and car mechanics to sustain our standard of living, because few of us know how to fill cavities, repair leaks, write contracts, predict the weather or fix our cars. Many of us, however, can get our cavities filled, our cars repaired and our weather predicted. **Markets and organizations allow the knowledge that is held by few to reach many**. In other words, they make us collectively wiser.

The amount of knowledge embedded in a society, however, does not depend mainly on how much knowledge each individual holds. It depends, instead, on the diversity of knowledge across individuals and on their ability to combine this knowledge, and make use of it, through complex webs of interaction. A hunter-gatherer in the Arctic must know a lot of things to survive. Without the knowledge embedded in an Inuit, most of us would die in the Arctic, as has been demonstrated by the number of Westerners who have tried and failed. Yet, the total amount of knowledge embedded in a hunter-gatherer society is not very different from that which is embedded in each one of its members. The secret of modern societies is not that each person holds much more productive knowledge than those in a more traditional society. The secret to modernity is that we collectively use large volumes of knowledge, while each one of us holds only



a few bits of it. Society functions because its members form webs that allow them to specialize and share their knowledge with others.

We can distinguish between two kinds of knowledge: *explicit* and *tacit*. Explicit knowledge can be transferred easily by reading a text or listening to a conversation. Yesterday's sports results, tomorrow's weather forecast or the size of the moon can all be learned quickly by looking them up in a newspaper or on the web. And yet, if all knowledge had this characteristic, the world would be very different. Countries would catch up very quickly to frontier technologies, and the income differences across the world would be much smaller than what we see today. The problem is that crucial parts of knowledge are tacit and therefore hard to embed in people. Learning how to fix dental problems, speak a foreign language, or run a farm requires a costly and time-consuming effort. As a consequence, it does not make sense for all of us to spend our lives learning how to do everything. **Because it is hard to transfer, tacit knowledge is what constrains the process of growth and development**. Ultimately, differences in prosperity are related to the amount of tacit knowledge that societies hold.

Because embedding tacit knowledge is a long and costly process, we specialize. This is why people are trained for specific occupations and why organizations become good at specific functions. To fix cavities you must be able to identify them, remove the decayed material and replace it. To play baseball, you must know how to catch, field and bat, but you do not need to know how to give financial advice or fix cavities. On the other hand, to perform the function of baseball player, knowing how to catch a ball is not enough (you must also be able to field and bat). In other words, in allocating productive knowledge to individuals, it is important that the chunks each person gets be internally coherent so that he or she can perform a certain function. We refer to these modularized chunks of embedded knowledge as **capabilities**. Some of these capabilities have been modularized at the level of individuals, while others have been grouped into organizations and even into networks of organizations.

For example, consider what has happened with undergraduate degrees, which in the US take four years of study. This norm has remained constant for the last four centuries. During the same period, however, knowledge has expanded enormously. The university system did not respond to the increase in knowledge by lengthening the time it takes to get a college degree. Instead, it increased the diversity of degrees. What used to be a degree in philosophy, split into several branches, one being natural philosophy, which later split into physics, chemistry and biology and later into other disciplines such as ecology, earth sciences and psychology. The Bureau of Labor Statistics' Standard Occupation Classification for 2010 lists 840 different occupations, including 78 in healthcare, 16 in engineering, 35 kinds of scientists – in coarse categories such as "economists", "physicists" and

"chemists" – five types of artists, and eight kinds of designers. We can all imagine a much more nuanced classification in our respective fields. For instance, we could distinguish between economists that specialize in labor, trade, finance, development, industrial organization, macro and econometrics, among others. If we did this further disaggregation for all occupations, we would easily go into the tens of thousands. The only way that society can hold all of the knowledge we have is by distributing coherent pieces of it among individuals. It is the way the world adapts to expanding knowledge.

Most products, however, require more knowledge than can be mastered by any individual. Hence, those products require that individuals with different capabilities interact. Assume that a person has the capacity to hold an amount of tacit knowledge equal to one ***personbyte***. How can you make a product that requires 100 different personbytes? Obviously, it cannot be made by a micro-entrepreneur working on her own. It has to be made either by an organization with at least 100 individuals (with a different personbyte each), or by a network of organizations that can aggregate these 100 personbytes of knowledge. How can a society hold a kilo-, mega- or giga-personbyte? Only through a deep division of labor, in which individuals become experts in small pieces of the available knowledge and then aggregate their personbytes into *peoplebytes* through organizations and markets.

For example, to make a shirt you need to design it, procure the fabric, cut it, sew it, pack it, brand it, market it and distribute it. In a firm that manufactures shirts, expertise in each of these knowledge chunks will be held by different people. And shirts require all of them. Moreover, you need to finance the operation, hire the relevant people, coordinate all the activities and negotiate everybody's buy-in, which in itself require different kinds of knowhow. We can say that putting together this operation requires *know-who* and *know-where*. Know-who can be thought of as knowledge of who has the requisite chunks of knowledge, and know-where as knowledge of where the people and organizations that have this knowledge are located. To make shirts, you can import the fabric and access the knowledge about looms and threading that is embedded in a piece of cloth. Yet some of the knowledge required cannot be accessed through shipped inputs. The people with the relevant knowledge must be near the place where shirts are made.

In fact, just as knowhow is modularized in people in the form of individual capabilities, larger amounts of knowhow are modularized in organizations, and networks of organizations, as organizational or collective capabilities. For example, to operate a garment plant you need power and water. You need to be able to move raw materials in and ship the final product out. Workers need access to urban transportation, day care centers and health facilities. To be able to operate, the plant manager needs all of these services to be locally available. This implies that others must be aggre-

►

gating the personbytes required to generate power, provide clean water, and run a transportation system. The relevant capabilities to perform all of these functions reside in organizations that are able to package the relevant knowledge into transferable bundles. These are bundles of knowhow that are more efficiently organized separately and transferred as intermediate inputs. We can think of these bundles as organizational capabilities the manufacturer needs.

Ultimately, **the complexity of an economy is related to the multiplicity of useful knowledge embedded in it**. For a complex society to exist, and to sustain itself, people who know about design, marketing, finance, technology, human resource management, operations and trade law must be able to interact and combine their knowledge to make products. These same products cannot be made in societies that are missing parts of this capability set. **Economic complexity, therefore, is expressed in the composition of a country's productive output and reflects the structures that emerge to hold and combine knowledge.**

Knowledge can only be accumulated, transferred and preserved if it is embedded in networks of individuals and organizations that put this knowledge into productive use. Knowledge that is not used, however, is also not transferred, and will disappear once the individuals and organization that have it retire or die.

Said differently, countries do not simply make the products and services they need. They make the ones they can. To do so, they need people and organizations that possess relevant knowledge. Some goods, like medical imaging devices or jet engines, embed large amounts of knowledge and are the results of very large networks of people and organizations. By contrast, wood logs or coffee, embed much less knowledge, and the networks required to support these operations do not need to be as large. Complex economies are those that can weave vast quantities of relevant knowledge together, across large networks of people, to generate a diverse mix of knowledge-intensive products. Simpler economies, in contrast, have a narrow base of productive knowledge and produce fewer and simpler products, which require smaller webs of interaction. Because individuals are limited in what they know, the only way societies can expand their knowledge base is by facilitating the interaction of individuals in increasingly complex webs of organizations and markets. **Increased economic complexity is necessary for a society to be able to hold and use a larger amount of productive knowledge**, and we can measure it from the mix of products that countries are able to make.

SECTION 2

How Do We Measure *Economic Complexity*?

How do we go from what a country makes to what a country knows? If making a product requires a particular type and mix of knowledge, then the countries that make the product reveal having the requisite knowledge (see *Technical Box 2.1*). From this simple observation, it is possible to extract a few implications that can be used to construct a measure of economic complexity. First, countries whose residents and organizations possess more knowledge have what it takes to produce a more diverse set of products. In other words, the amount of embedded knowledge that a country has is expressed in its productive diversity, or the number of distinct products that it makes. Second, products that demand large volumes of knowledge are feasible only in the few places where all the requisite knowledge is available. We define ubiquity as the number of countries that make a product (*Figure 2.1*). Using this terminology, we can observe that complex products –those that contain many personbytes of knowledge–are less ubiquitous. The ubiquity of a product, therefore, reveals information about the volume of knowledge that is required for its production. Hence, the amount of knowledge that a country has is expressed in the diversity and ubiquity of the products that it makes.

A game of scrabble is a useful analogy. In scrabble, players use tiles containing single letters to make words. For instance, a player can use the tiles **R**, **A** and **C** to construct the word **CAR** or **ARC**. In this analogy, each product is represented by a word, and each capability, or module of embedded knowledge, is represented by a letter. We assume that each player has plenty of copies of the letters they have. Our measure of economic complexity corresponds to estimating what fraction of the alphabet a player possesses, knowing only how many words he or she can make, and how many other players can also make those same words.

Players who have more letters will be able to make more words. So we can expect the diversity of words (products) that a player (country) can make to be strongly related to the number of letters (capabilities) that he (it) has. Long words will tend to be rare, since they can only be put together by players with many letters. Hence, the number of players that can make a word tells us something about the variety of letters each word requires: longer words tend to be less ubiquitous, while shorter words tend to be more common. Similarly, ubiquitous products are more likely to require few capabilities, and less ubiquitous products are more likely to require a large variety of capabilities.

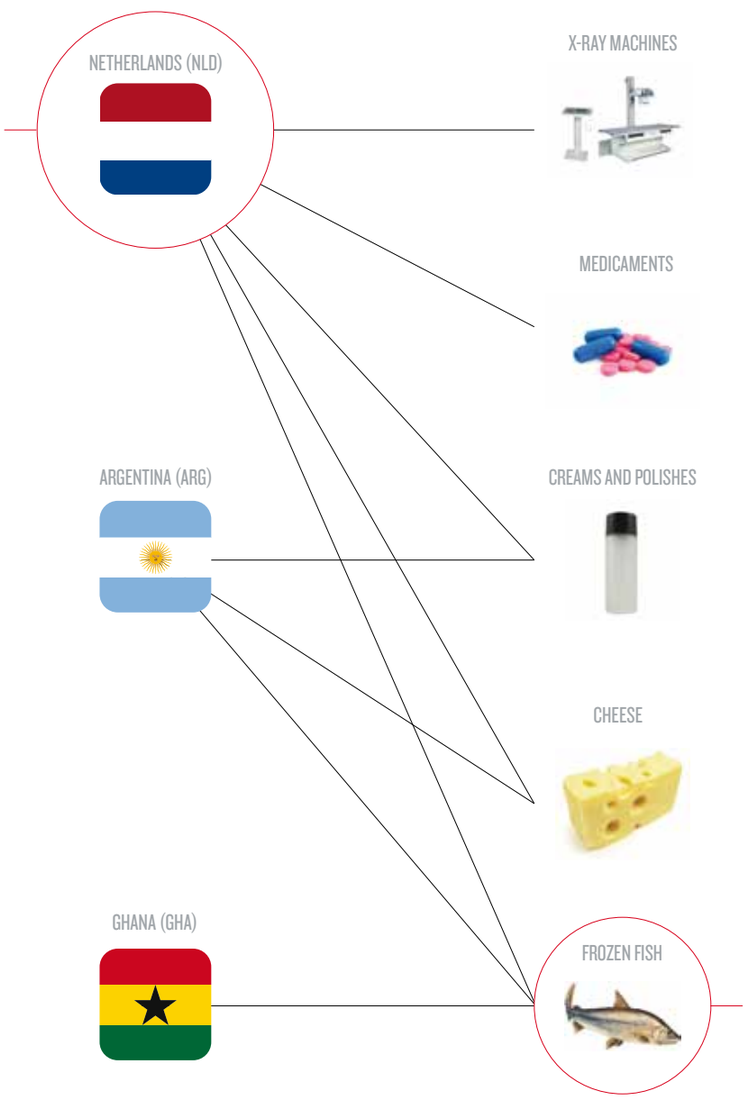
Diversity and ubiquity are, respectively, crude approximations of the variety of capabilities available in a country or required by a product. Both of these mappings are affected by the existence of rare letters, such as Q and X. For instance, players holding rare letters will be able to put together words that few other players can make, not because they have many letters, but because the letters that they have are rare. This is just like rare natural resources, such as uranium or diamonds. Yet, we can see whether low ubiquity originates in scarcity or complexity by looking at the number of other words that the makers of rare words are able to form. If these players can only make a few other words, then it is likely that rarity explains the low ubiquity. However, if the players that can make these rare words are, in general, able to put together many other words, then it is likely that the low ubiquity of the word reflects the fact that it requires a large number of letters and not just a few rare ones.

Diversity can therefore be used to correct the information carried by ubiquity, and ubiquity can be used to correct the information carried by diversity. We can take this process a step further by correcting diversity using a measure of ubiquity that has already been corrected by diversity and vice versa. In fact, we can do this an infinite number of times using mathematics. This process converges after a few iterations and represents our quantitative measures of

FIGURE 2.1:

Graphical explanation of diversity and ubiquity.

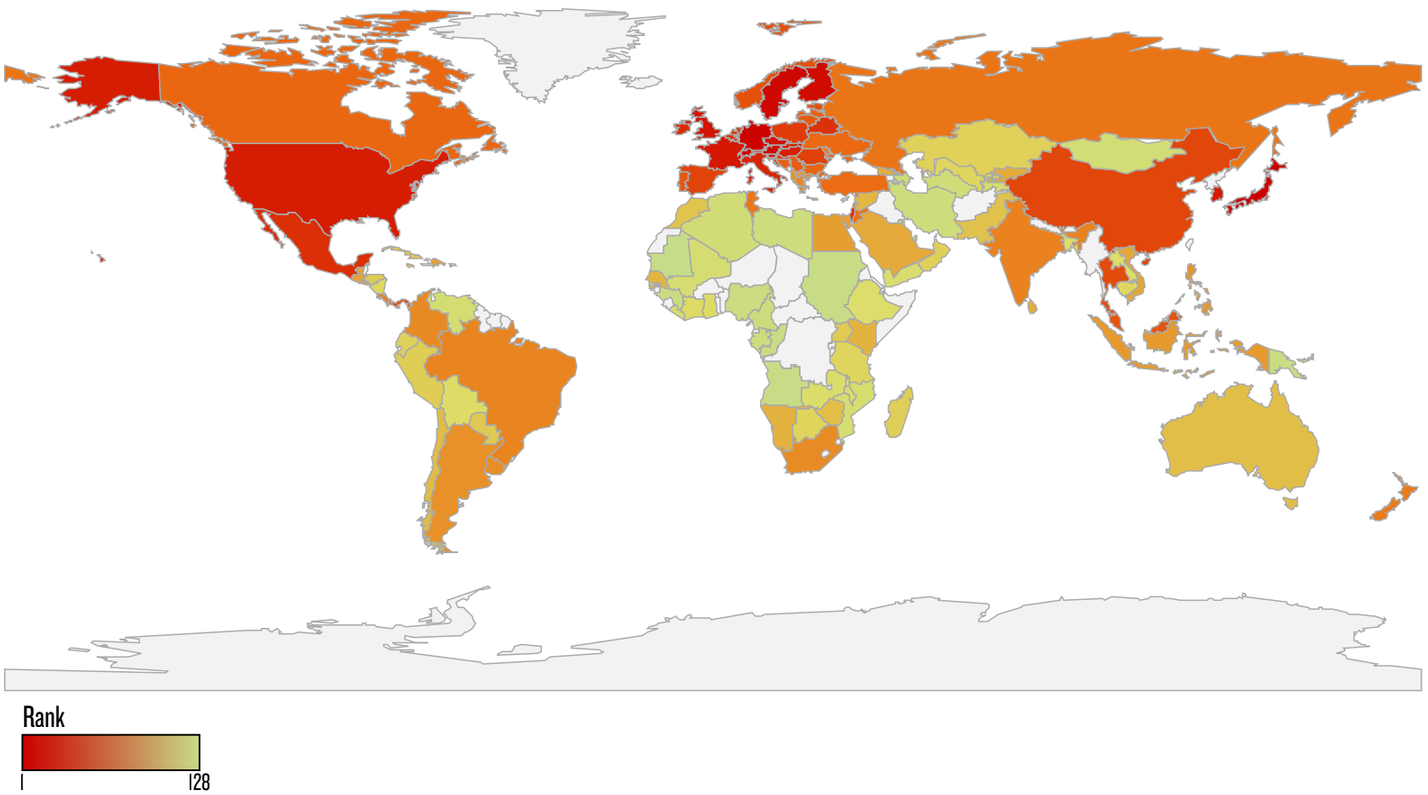
DIVERSITY ($k_{c,0}$):
Diversity is related to the number of products that a country is connected to. This is equal to the number of links that this country has in the network. In this example, using a subset of the 2009 data, the diversity of Netherlands is 5, that of Argentina is 3, and that of Gana is 1.



UBIQUITY ($k_{p,0}$):
Ubiquity is is related to the number of countries that a product is connected to. This is equal to the number of links that this product has in the network. In this example, using a subset of the 2009 data, the ubiquity of Cheese is 2, that of Fish is 3 and that of Medicaments is 1.

FIGURE 2.2:

Map of the World colored according to ECI Ranking.



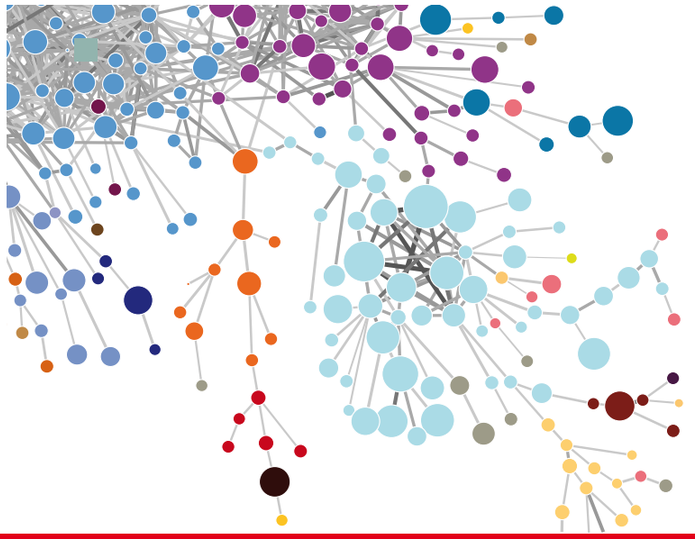
complexity. For countries, we refer to this as the Economic Complexity Index (ECI). The corresponding measure for products gives us the Product Complexity Index. *Technical Box 2.2* presents the mathematical definition of these two quantities and *Ranking 1* lists countries sorted by their ECI. *Figure 2.2* shows a map of the world colored according to a country's ECI ranking.

Consider the case of Singapore and Pakistan. The population of Pakistan is 34 times larger than that of Singapore. At market prices their GDPs are similar since Singapore is 38 times richer than Pakistan in per capita terms. Under the classification we use in this Atlas, they both export a similar number of different products, about 133. How can products tell us about the conspicuous differences in the level of development that exist between these two countries? Pakistan exports products that are on average exported by 28 other countries (placing Pakistan in the 60th percentile of countries in terms of the average ubiquity of their products), while Singapore exports products that are exported on average by 17 other countries (1st percentile). Moreover, the products that Singapore exports are exported by highly diversified countries, while those that Pakistan exports are exported by poorly diversified countries. Our mathematical approach exploits these second, third and higher order differences to create measures that approximate the amount of productive knowledge held in each of these countries. Ultimately, what countries make reveals what they know (see *Information Box 2.1*).

Take medical imaging devices. These machines are made in few places, but the countries that are able to make them, such as the United States or Germany, also export a large number of other products. We can infer that medical imaging devices

are complex because few countries make them, and those that do tend to be diverse. By contrast, wood logs are exported by most countries, indicating that many countries have the knowledge required to export them. Now consider the case of raw diamonds. These products are extracted in very few places, making their ubiquity quite low. But is this a reflection of the high knowledge-intensity of raw diamonds? Of course not. If raw diamonds were complex, the countries that would extract diamonds should also be able to make many other things. Since Sierra Leone and Botswana are not very diversified, this indicates that something other than large volumes of knowledge is what makes diamonds rare (see *Information Box 2.2* on Product Complexity).

This Atlas relies on international trade data. We made this choice because it is the only dataset available that has a rich detailed cross-country information linking countries to the products that they produce in a standardized classification. As such, it offers great advantages, but it does have limitations. First, it includes data on exports, not production. Countries may be able to make things that they do not export. The fact that they do not export them, however, suggests that they may not be very good at them. Countries may also export things they do not make. To circumvent this issue we require that countries export a fair share of the products we connect them to (see *Technical Box 2.1*). Second, because the data is collected by customs offices, it includes only goods and not services. This is an important drawback, as services are becoming a rising share of international trade. Unfortunately, the statistical efforts of most countries of the world have not kept up with this reality. Finally, the data does not include information on non-tradable activities. These are an important part of the economic eco-system that allows products and services to be made. Our current research is focused on finding implementable solutions to these limitations, and we hope we will be able to present them in future versions of this Atlas.



INFORMATION BOX 2.1: AN ALTERNATIVE WAY TO UNDERSTAND OUR MEASURES OF ECONOMIC COMPLEXITY

Understanding the measures of economic complexity described in this Atlas can be sometimes challenging. Analogies, however, can help get our minds around what the economic complexity index is able to capture.

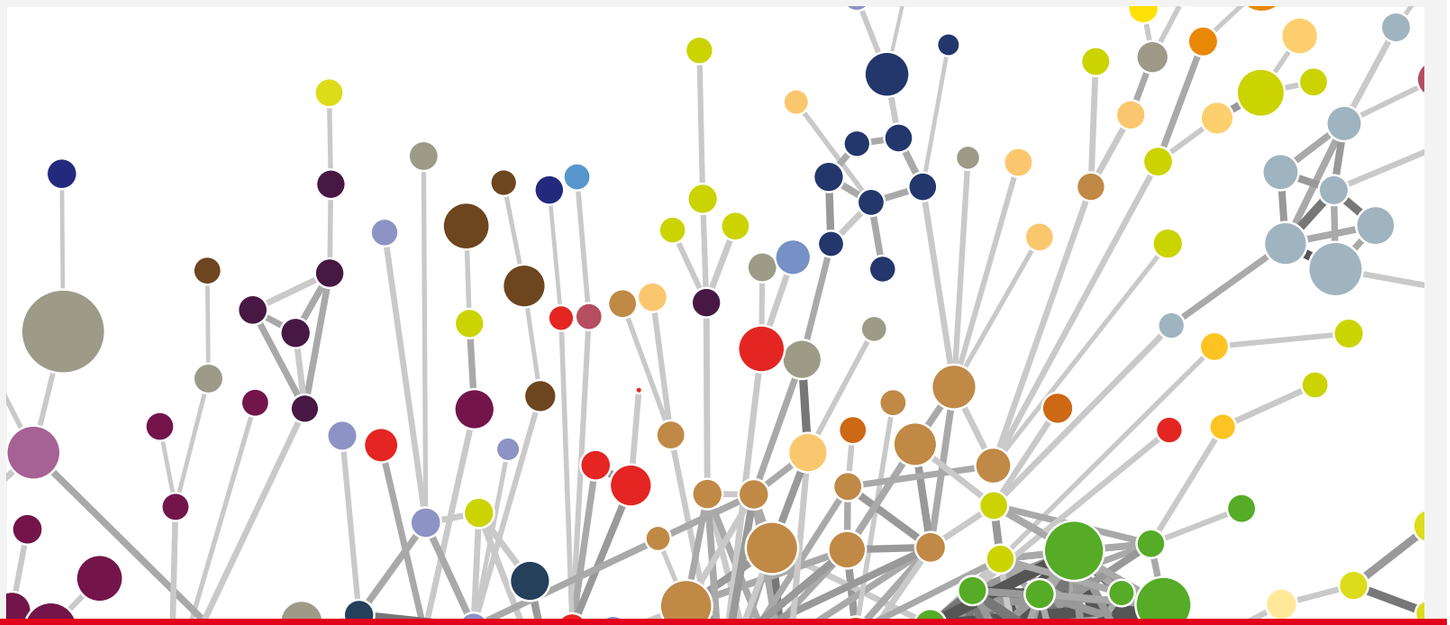
Think of a particular country and consider a random product. Now, ask yourself the following question: If this country cannot make this product, in how many other countries can this product be made? If the answer is many countries, then this country probably does not have a complex economy. On the other hand, if few other countries are able to make a product that this country cannot make, this would suggest that this is a complex economy.

Let us illustrate this with a few examples. According to our measures, Japan and Germany are the two countries with the highest levels of economic complexity. Ask yourself the question: If a good cannot be produced in Japan or Germany, where else can it be made? That list of countries is likely to be a very short one, indicating that Japan and Germany are complex economies. Now take an opposite example: if a product cannot be made in Mauritania or Sudan, where else can it be made? For most products this is likely to be a long list of countries, indicating that Sudan and Mauritania are among the world's least complex economies.

This analogy is useful to understand the difference between economic complexity and the level of income per capita of a country. Two countries that have high levels of economic complexity, but still low levels of per capita income are China and Thailand. Ask yourself the question, if you cannot produce it in China or Thailand, where else can you produce it? That list of countries will tend to be relatively short. The comparison becomes starker if we restrict it to countries with a similar level of per capita income, like Iran, Peru and Venezuela, countries that do not make things that many other can.

At the opposite end of this comparison, there are countries with high levels of per capita income but relatively low levels of economic complexity. Examples of this are Qatar, Kuwait, Oman, Venezuela, Libya and Chile. These countries are not rich because of the productive knowledge they hold but because of their "geological luck", given the large volumes of natural resources based wealth. Ask yourself the question; if you cannot build it in Chile or Venezuela, where else can you build it? The fact that there are many countries where it would be possible to produce many things that are not being made in Chile or Venezuela, including countries with a similar level of income such as Hungary or the Czech Republic, indicates that the level of economic complexity of these countries is low, despite their fairly high level of income.

In fact, as we show in this Atlas, the gap between a country's complexity and its level of per capita income is an important determinant of future growth: countries tend to converge to the level of income that can be supported by the knowhow that is embedded in their economy.



TECHNICAL BOX 2.1: MEASURING ECONOMIC COMPLEXITY:

If we define M_{cp}, as a matrix that is I if country c produces product p, and 0 otherwise, we can measure diversity and ubiquity simply by summing over the rows or columns of that matrix. Formally, we define:

$$Diversity = k_{c,0} = \sum_{p} M_{cp} \tag{1}$$

$$Ubiquity = k_{p,0} = \sum_{c} M_{cp} \tag{2}$$

To generate a more accurate measure of the number of capabilities available in a country, or required by a product, we need to correct the information that diversity and ubiquity carry by using each one to correct the other. For countries, this requires us to calculate the average ubiquity of the products that it exports, the average diversity of the countries that make those products and so forth. For products, this requires us to calculate the average diversity of the countries that make them and the average ubiquity of the other products that these countries make. This can be expressed by the recursion:

$$k_{c,N} = \frac{1}{k_{c,0}} \sum_{p} M_{cp} \cdot k_{p,N-1} \tag{3}$$

$$k_{p,N} = \frac{1}{k_{p,0}} \sum_{c} M_{cp} \cdot k_{c,N-1} \tag{4}$$

We then insert (4) into (3) to obtain

$$k_{c,N} = \frac{1}{k_{c,0}} \sum_{p} M_{cp} \frac{1}{k_{p,0}} \sum_{c'} M_{c'p} \cdot k_{c',N-2} \tag{5}$$

$$k_{c,N} = \sum_{c'} k_{c',N-2} \sum \frac{M_{cp} M_{c'p}}{k_{c,0} k_{p,0}} \tag{6}$$

and rewrite this as :

$$k_{c,N} = \sum_{c'} \widetilde{M}_{cc'} k_{c',N-2} \tag{7}$$

where

$$\widetilde{M}_{cc'} = \sum_{p} \frac{M_{cp} M_{c'p}}{k_{c,0} k_{p,0}} \tag{8}$$

We note (7) is satisfied when $k_{c,N} = k_{c,N-2} = 1$ .This is the eigenvector of $\widetilde{M}_{cc'}$ which is associated with the largest eigenvalue. Since this eigenvector is a vector of ones, it is not informative. We look, instead, for the eigenvector associated with the second largest eigenvalue. This is the eigenvector that captures the largest amount of variance in the system and is our measure of economic complexity. Hence, we define the Economic Complexity Index (ECI) as:

$$ECI = \frac{\vec{K} - < \vec{K} >}{\text{stdev}(\vec{K})} \tag{9}$$

where < > represents an average, stdev stands for the standard deviation and

$$\vec{K} = Eigenvector\ of\ \widetilde{M}_{cc'}\ associated\ with\ second\ largest\ eigenvalue. \tag{10}$$

Analogously, we define a Product Complexity Index (PCI). Because of the symmetry of the problem, this can be done simply by exchanging the index of countries (c) with that for products (p) in the definitions above. Hence, we define PCI as:

$$PCI = \frac{\vec{Q} - < \vec{Q} >}{\text{stdev}(\vec{Q})} \tag{11}$$

where

$$\vec{Q} = Eigenvector\ of\ \widetilde{M}_{pp'}\ associated\ with\ second\ largest\ eigenvalue. \tag{12}$$

INFORMATION BOX 2.2: THE WORLD'S MOST AND LEAST COMPLEX PRODUCTS

Table 2.2.1 and Table 2.2.2 show respectively the products that rank highest and lowest in the complexity scale. The difference between the world's most and less complex products is stark. The most complex products are sophisticated chemicals and machinery that tend to emerge from organizations where a large number of high skilled individuals participate. The world's least complex products, on the other hand, are raw minerals or simple agricultural products.

The economic complexity of a country is connected intimately to the complexity of the products that it exports. Ultimately, countries can only increase their score in the Economic Complexity Index by becoming competitive in an increasing number of complex industries.

TABLE 2.2.1: TOP 5 PRODUCTS BY COMPLEXITY

Product Code (SITC4)	Product Name	Product Community	Product Complexity Index
7284	Machines & appliances for specialized particular industries	Machinery	2.27
8744	Instrument & appliances for physical or chemical analysis	Chemicals & Health	2.21
7742	Appliances based on the use of X-rays or radiation	Chemicals & Health	2.16
3345	Lubricating petrol oils & other heavy petrol oils	Chemicals & Health	2.10
7367	Other machine tools for working metal or metal carbide	Machinery	2.05

TABLE 2.2.2: BOTTOM 5 PRODUCTS BY COMPLEXITY

Product Code (SITC4)	Product Name	Product Community	Product Complexity Index
3330	Crude oil	Oil	-3.00
2876	Tin ores & concentrates	Mining	-2.63
2631	Cotton, not carded or combed	Cotton, Rice, Soy & Others	-2.63
3345	Cocoa beans	Tropical Agriculture	-2.61
7367	Sesame seeds	Cotton, Rice, Soy & Others	-2.58

TECHNICAL BOX 2.2: WHO MAKES WHAT?

When associating countries to products it is important to take into account the size of the export volume of countries and that of the world trade of products. This is because, even for the same product, we expect the volume of exports of a large country like China, to be larger than the volume of exports of a small country like Uruguay. By the same token, we expect the export volume of products that represent a large fraction of world trade, such as cars or footwear, to represent a larger share of a country's exports than products that account for a small fraction of world trade, like cotton seed oil or potato flour.

To make countries and products comparable we use Balassa's definition of Revealed Comparative Advantage or RCA. Balassa's definition says that a country has Revealed Comparative Advantage in a product if it exports more than its "fair" share, that is, a share that is equal to the share of total world trade that the product represents. For example, in 2008, with exports of $42 billion, soybeans represented 0.35% of world trade. Of this total, Brazil exported nearly $11 billion, and since Brazil's total exports for that year were $140 billion, soybeans accounted for 7.8% of Brazil's exports. This represents around 21 times Brazil's "fair share" of soybean exports (7.8% divided by 0.35%), so we can say that Brazil has revealed comparative advantage in soybeans.

Formally, if X_{cp} represents the exports of country c in product p, we can express the Revealed Comparative Advantage that country c has in product p as:

$$RCA_{cp} = \frac{X_{cp}}{\sum_c X_{cp}} \Big/ \frac{\sum_p X_{cp}}{\sum_{c,p} X_{cp}} \qquad (1)$$

We use this measure to construct a matrix that connects each country to the products that it makes. The entries in the matrix are 1 if country c exports product p with Revealed Comparative Advantage larger than 1, and 0 otherwise. Formally we define this as the M_{cp} matrix, where

$$M_{cp} = \begin{cases} 1 & if\ RCA_{cp} \geq 1; \\ 0 & otherwise. \end{cases} \qquad (2)$$

M_{cp} is the matrix summarizing which country makes what, and is used to construct the product space and our measures of economic complexity for countries and products. In our research we have played around with cutoff values other than 1 to construct the M_{cp} matrix and found that our results are robust to these changes.

Going forward, we smooth changes in export volumes induced by the price fluctuation of commodities by using a modified definition of RCA in which the denominator is averaged over the previous three years.

SECTION 3

Why Is *Economic Complexity* Important?

As we have argued, economic complexity reflects the amount of knowledge that is embedded in the productive structure of an economy. Seen this way, it is no coincidence that there is a strong correlation between our measures of economic complexity and the income per capita that countries are able to generate.

Figure 3.1 illustrates the relationship between the Economic Complexity Index (ECI) and Income per capita for the 128 countries studied in this Atlas. Here, we separate countries according to their intensity in natural resource exports. We color in red those countries for which natural resources, such as minerals, gas and oil, represent at least 10% of GDP. For the 75 countries with a limited relative presence of natural-resource exports (in blue), economic complexity accounts for 75 percent of the variance in income per capita. But as the *Figure* 3.1 illustrates, countries with a large presence of natural resources can be relatively rich without being complex. If we control for the income that is generated from extractive activities, which has more to do with geology than knowhow, economic complexity can explain about 73 percent of the variation in income across all 128 countries. *Figure* 3.2 shows the tight relationship between economic complexity and income per capita that emerges after we take into account a country's natural resource income.

Economic complexity, therefore, is related to a country's level of prosperity. As such, it is just a correlation of things we care about. The relationship between income and complexity, however, goes deeper than this. **Countries whose economic complexity is greater than what we would expect, given their level of income, tend to grow faster than those that are "too rich" for their current level of economic complexity. In this sense, economic complexity is not just a symptom or an expression of prosperity: it is a driver.**

Technical Box 3.1 presents the regression that we use to relate economic complexity to subsequent economic growth. The equation is simple. We regress the growth in per capita income over 10-year periods on economic complexity, while controlling for initial income and for the increase in real natural resource income experienced during that period. We also include an interaction term between initial income per capita and the ECI. The increase in the explanatory power of the growth equation that can be attributed to the Economic Complexity Index is at least 15 percentage points, or more than a third of the variance explained by the whole equation. Moreover, the size of the estimated effect is large: **an increase of one standard deviation in complexity, which is something that Thailand achieved between 1970 and 1985, is associated with a subsequent acceleration of a country's long-term growth rate of 1.6 percent per year. This is over and above the growth that would have been expected from mineral wealth and global trends.**

The ability of the ECI to predict future economic growth suggests that countries tend to move towards an income level that is compatible with their overall level of embedded knowhow. On average, their income tends to reflect their embedded knowledge. But when it does not, it gets corrected through accelerated or diminished growth. The gap between a country's level of income and complexity is the key vari-

FIGURE 3.1:

Shows the relationship between income per capita and the Economic Complexity Index (ECI) for countries where natural resource exports are larger than 10% of GDP (red) and for those where natural resource exports are lower than 10% of GDP (blue). For the latter group of countries, the Economic Complexity Index accounts for 75% of the variance. Countries in which the levels of natural resource exports is relatively high tend to be significantly richer than what would be expected given the complexity of their economies, yet the ECI still correlates strongly with income for that group.

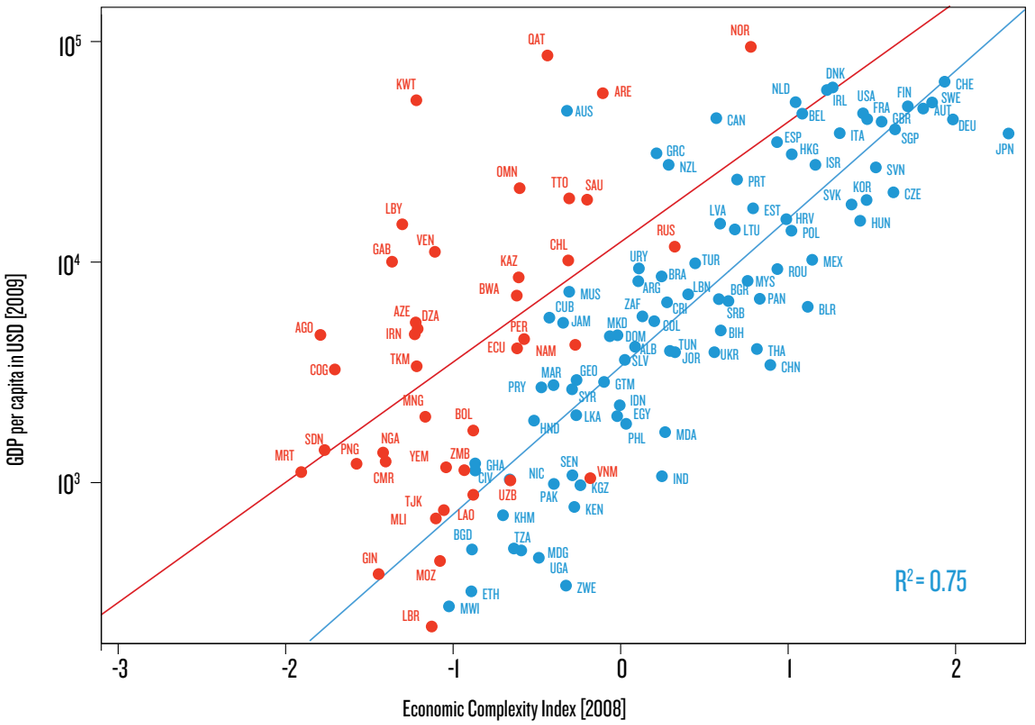


FIGURE 3.2:

Shows the relationship between economic complexity and income per capita obtained after controlling for each country's natural resource exports. After including this control, through the inclusion of the log of natural resource exports per capita, economic complexity and natural resources explain 73% of the variance in per capita income across countries.

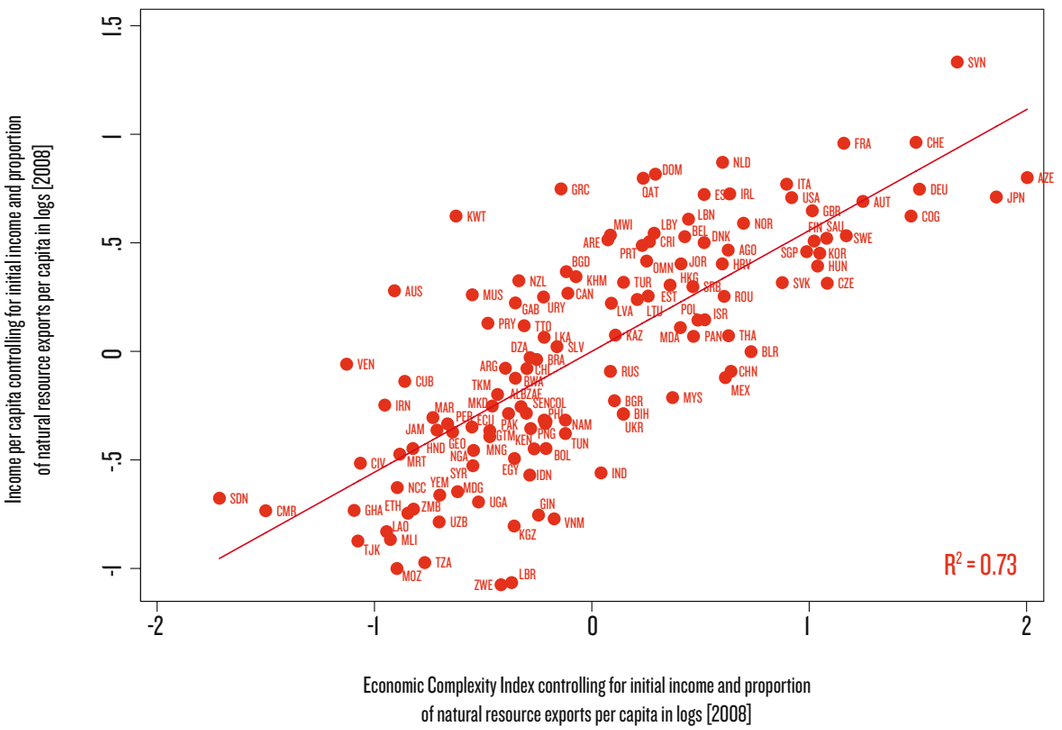
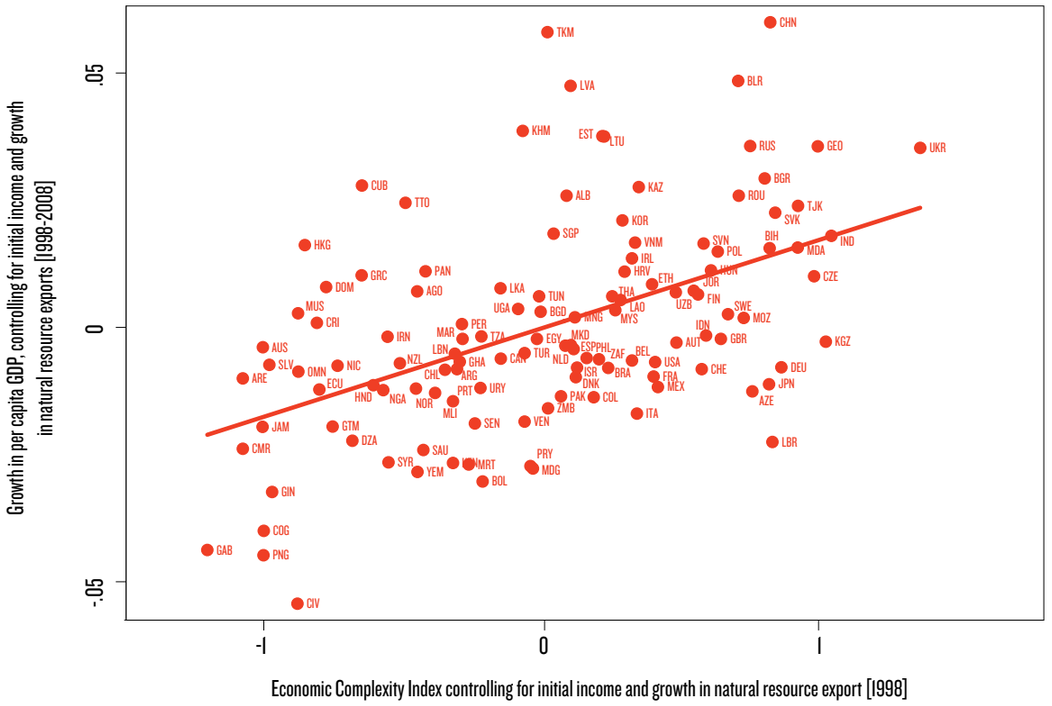


FIGURE 3.3:

Shows the relationship between the annualized GDP per capita growth for the period between 1998 and 2008 and the Economic Complexity Index for 1998, after taking into account the initial level of income and the increase in natural resource exports during that period (in constant dollars as a share of initial GDP).



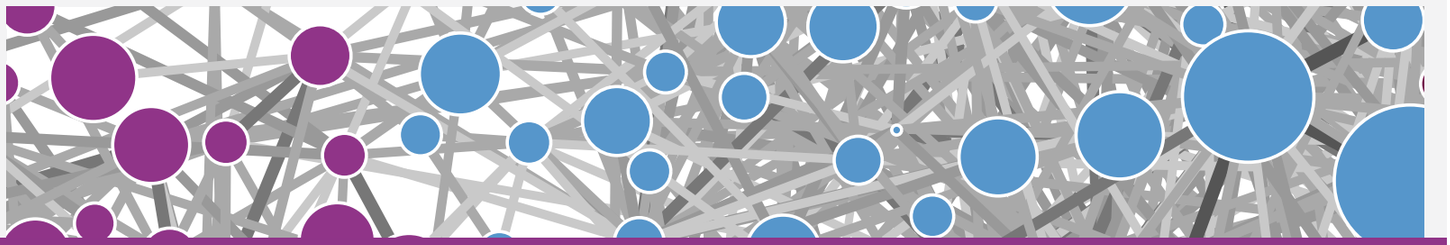
able that we use here to estimate the growth potential of countries (*Figure* 3.3).

It is important to note what the Economic Complexity Index is not about: it is not about export-oriented growth, openness, export diversification or country size. Although we calculate the ECI using export data, the channel through which it contributes to future growth is not limited to its impact on the growth of exports. Clearly, countries whose exports grow faster, all other things being equal, will necessarily experience higher GDP growth. This is simply because exports are a component of GDP. However, as *Technical Box* 3.2 shows, the contribution of the ECI to future economic growth remains strong after accounting for the growth in real exports.

The ECI is also not about openness to trade: the impact of the ECI on growth is essentially unaffected if we account for differences in the ratio of exports to GDP. And the ECI is not a measure of export diversification. Controlling for standard measures of export concentration, such as the Herfindahl-Hirschman Index, does not affect our results. In fact, neither openness nor export concentration are statistically significant determinants of growth after controlling for the ECI (see *Technical Box* 3.2).

Finally, the ECI is not about a country's size. The ability of the ECI to predict growth is unaffected when we take into account a country's size, as measured by its population, while the population itself is not statistically significant (see *Technical Box* 3.2).

In short, economic complexity matters because it helps explain differences in the level of income of countries, and more important, because it predicts future economic growth. Economic complexity might not be simple to accomplish, but the countries that do achieve it, tend to reap important rewards.



TECHNICAL BOX 3.1: THE GROWTH REGRESSION

To analyze the impact of the Economic Complexity Index (ECI) on future economic growth we estimate two regressions where the dependent variable is the annualized growth rate of GDP per capita for the periods 1978-1988, 1988-1998 and 1998-2008. In the first of these equations we do not include ECI and use only two control variables: the logarithm of the initial level of GDP per capita in each period and the increase in natural resource exports in constant dollars as a share of initial GDP. The first variable captures the idea that, other things equal, poorer countries should grow faster than rich countries and catch up. This is known in the economic literature as convergence. The second control variable captures the effect on growth of increases in income that come from natural resource wealth, which complexity does not explain. In addition, we include a dummy variable for each decade, capturing any common factor affecting all countries during that decade, such as a global boom or a widespread financial crisis. Taken together, these variables account for 28.5 percent of the variance in countries' growth rates. This is shown in the first column of Table 3.1.1.

In addition to the above mentioned variables, the second regression includes the effect of economic complexity on growth. We do this by adding two additional terms: the ECI at the beginning of the decade and an interaction term between the ECI and the initial level of GDP per capita. The interaction attempts to capture the idea that the contribution of economic complexity to future economic growth depends on the level of per capita income. The second column of Table 3.1.1 shows that economic complexity is strongly associated with future economic growth. The negative coefficient on the interaction term indicates that the impact of complexity on growth declines with a country's level of income. For example, according to the estimation in Column 2, and using data for 1998, an increase in the ECI of one standard deviation would accelerate growth by 2.3 percent per year in a country at the 10^{th} percentile of income, by 1.6 percent in a country at the median income, and by 0.7 percent for countries in the 90^{th} percentile. The variables contained in Column 2 jointly account for 43.4 percent of the variance in growth rates. The difference between these two regressions indicates that the ECI increases the regression's R^2 in 15 percentage points. This represents over a third of the explained fraction of the 43.4 percent of the variance that the equation explains as a whole.

The estimates of the second column of Table 3.1.1 are used to forecast the growth in GDP per capita and rank countries according to their growth potential (See Table 3.1.1). To predict average annualized growth between 2008 and 2020 we make two assumptions. First, we assume a worldwide common growth term for the decade, which we take to be the same as that observed in the 1998-2008 period. Changing this assumption would affect the growth rate of all countries by a similar amount but would not change the rankings. Second, we assume that there will be no change in the real value of natural resource exports as a share of initial GDP. This implies that the we assume that natural resource exports in real terms in the next decade will remain at the record-high levels achieved in 2008. This assumption may underestimate the effect on countries whose volumes of natural resource extraction will increase significantly and over-estimate the growth in countries that will see their natural-resource export volumes declines. A higher (lower) constant dollar price of natural resource exports would improve (reduce) the projected growth performance of countries by an amount proportional to their natural resource intensity.

TABLE 3.1.1

	Annualized growth in GDP pc (by decade)	
	(1978-1988, 1988-1998, 1998-2008)	
VARIABLES	(1)	(2)
Initial Income per capita, log	-0.00017	-0.00638***
	(0.001)	(0.001)
Increase in natural resource exports	0.03960***	0.03682***
- in constant dollars (as a share of initial GDP)	(0.008)	(0.010)
Initial Economic Complexity Index (ECI)		0.04430***
		(0.009)
[ECI] X [Income per capita, log]		-0.00371***
		(0.001)
Constant	0.03036***	0.08251***
	(0.008)	(0.011)
Observations	291	291
R^2	0.285	0.434
Year FE	Yes	Yes

TECHNICAL BOX 3.2: ECONOMIC COMPLEXITY: THE VOLUME AND CONCENTRATION OF EXPORTS AND COUNTRY SIZE

This box explores the robustness of the impact of the Economic Complexity Index on growth. While the ECI is constructed using export data, its relationship with future growth is not driven by export volumes or concentration. To show this, we start with our basic growth equation (Table 3.2.1, column 1). Column 2 adds to this equation the increase in the real value of the exports of goods and services in the decade in question as a fraction of initial GDP. Exports are a component of GDP, and therefore, we expect them to contribute to growth. Nevertheless, after including the increase in exports, the effect of ECI on growth remains strong and significant. Column 3 introduces export as a share of GDP. We use this as a measure of openness. Column 4 includes the Herfindahl-Hirschman index as a measure of export concentration. Column 5 includes the log of initial population as a measure of size. This is equivalent to introducing total GDP, given that we are already controlling for GDP per capita. The contribution to growth of the variables introduced in columns 3, 4 and 5 are estimated to be very close to zero, are not statistically significant and do not affect the ability of the ECI to predict future economic growth.

TABLE 3.2.1

	Annualized growth in GDP pc (by decade)				
	(1978-1988, 1988-1998, 1998-2008)				
VARIABLES	(1)	(2)	(3)	(4)	(5)
Initial Economic Complexity Index (ECI)	0.04430***	0.03005***	0.04240***	0.04143***	0.04389***
	(0.009)	(0.007)	(0.008)	(0.010)	(0.009)
[ECI] X [Income per capita, log]	-0.00371***	-0.00244***	-0.00345***	-0.00354***	-0.00381***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Increase exports (goods and services)		0.04549***			
- in constant dollars (as a share of initial GDP)		(0.007)			
Exports to GDP			0.00009		
			(0.000)		
Export Concentration				-0.00890	
				(0.008)	
Population, log					0.00168
					(0.001)
Initial Income per capita, log	-0.00638***	-0.00562***	-0.00729***	-0.00611***	-0.00558***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Increase in natural resource exports	0.03682***	0.00169	0.03441***	0.03699***	0.03758***
- in constant dollars (as a share of initial GDP)	(0.010)	(0.005)	(0.008)	(0.010)	(0.010)
Constant	0.08251***	0.06741***	0.08616***	0.08145***	0.04878**
	(0.011)	(0.011)	(0.011)	(0.011)	(0.022)
Observations	291	260	284	291	291
R^2	0.434	0.584	0.449	0.436	0.440
Year FE	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

SECTION 4

How Is *Complexity* Different from Other Approaches?

We are certainly not the first ones to look for correlates or causal factors of income and growth. There are plenty of others who have come before us. One strand of the literature has looked at the salience of institutions in determining growth, whereas others have looked at human capital or broader measures of competitiveness. Clearly, more complex economies have better institutions, more educated workers and more competitive environments, so these approaches are not completely at odds with each other or with ours. In fact, institutions, education, competitiveness and economic complexity emphasize different aspects of the same intricate reality. It is not clear, however, that these different approaches have the same ability to capture factors that are verifiably important for growth and development. In this section, we compare each of these measures with the Economic Complexity Index and gauge their marginal contribution to income and economic growth.

MEASURES OF GOVERNANCE AND INSTITUTIONAL QUALITY

Some of the most respected measures of institutional quality are the six Worldwide Governance Indicators (WGIs), which the World Bank has published biennially since 1996. These indicators are used, for example, as eligibility criteria by the Millennium Challenge Corporation (MCC) when selecting the countries they chose to support. These criteria are based on the direct connection between governance and growth and poverty reduction.

To the extent that governance is important to allow individuals and organizations to cooperate, share knowledge and make more complex products, it should be reflected in the kind of industries that a country can support. Therefore, the Economic Complexity Index indirectly captures information about the quality of governance in the country. Which indicator captures information that is more relevant for growth is an empirical question.

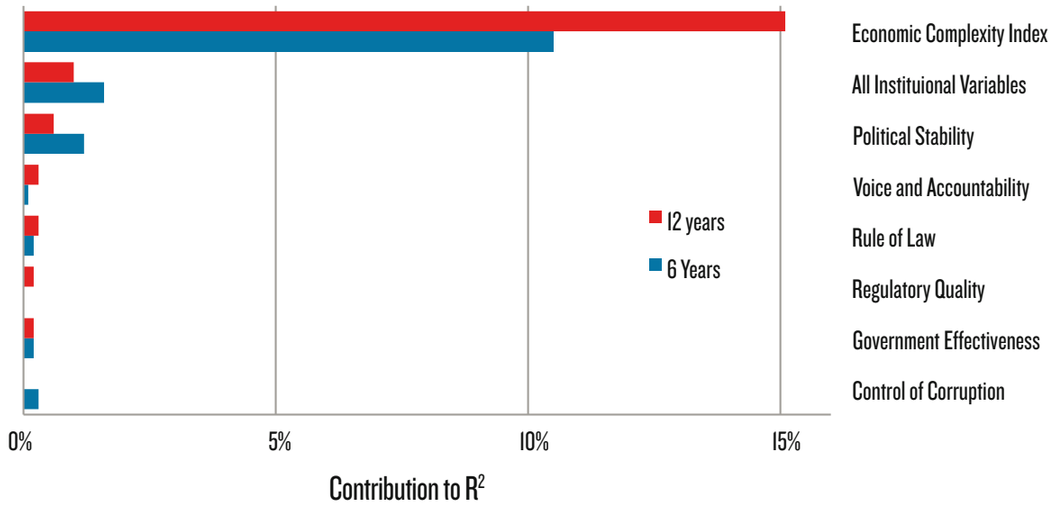
Here we compare the contribution to future economic growth implied by the WGIs and the ECI using a technique described in *Technical Box 4.1*. Since the WGIs are available only since 1996, we perform this exercise using the 1996-2008 period as a whole and as two consecutive 6-year periods. We also compare with each individual WGI and with the six of them together.

Figure 4.1 shows that the ECI accounts for 15.1 percent of the variance in economic growth during the 1996-2008 period, while the six WGIs combined account only for 1.0 percent. For the estimation using the two six year periods, we find that ECI accounts for 10.5% of the variance in growth, whereas the six WGIs combined account for 1.6%.

We conclude that as far as future economic growth is concerned, **the Economic Complexity Index captures significantly more growth-relevant information than the 6 World Governance Indicators, either individually or combined.** This does not mean that governance is not important for the economy. It suggests that the aspects of governance important for growth are weakly reflected in the WGIs and appear to be more strongly reflected in the economic activities that thrive in each country. These may be more effectively captured by the Economic Complexity Index.

FIGURE 4.1:

Contribution to the variance of economic growth from the Economic Complexity Index (ECI) and from the measures of governance and institutional quality.



MEASURES OF HUMAN CAPITAL

Another strand of the growth and development literature has looked at the impact of human capital on economic growth. The idea that human capital is important for income and growth is not unrelated to our focus on the productive knowledge that exists in a society. The human capital literature, however, has placed its attention on measures of formal education. Instead, our approach emphasizes the tacit productive knowledge that is embedded in a country's economic activities.

The standard variables used as a proxy for human capital are the number of years of formal schooling attained by those currently of working age, or the school enrollment of the young (Barro and Lee, 2010). Since these indicators do not take into account the quality of the education received by pupils, they have been subject to criticism resulting in new measures of educational quality. These measures use test scores from standardized international exams, such as the OECD Programme for International Student Assessment (PISA) or the Trend in International Mathematics and Science Study (TIMSS). Hanuschek and Woessmann (2008) collected data for all the countries that participated in either program and used this information to generate a measure of the cognitive ability of students for a cross-section of countries around the year 2000.

The information on productive knowhow captured by the Economic Complexity Index and by measures of human capital, are not just two sides of the same coin. Analytically, human capital indicators try to measure how much of the same knowledge individuals have, whether knowledge is measured as years of study of the national curriculum or as the skills mastered by students according to standardized international tests. In contrast, the Economic Complexity Index tries to capture the total amount of productive knowledge that is embedded in a society as a whole and is related to the *diversity* of knowledge that a society holds. Clearly, for a complex economy to exist, its members must be able to read, write and manipulate symbols, such as numbers or mathematical functions. This is what is taught in schools. Yet, the converse is not true: the skills acquired in school may be a poor proxy for the productive knowledge of society.

For example, if a country were to achieve the goal of having everybody finish a good secondary education and if this was the extent of its productive knowledge, nobody would know how to make a pair of shoes, a metal knife, a roll of paper or a patterned piece of cotton fabric. There is a reason why job offers request years of experience and not just years of schooling. This means that what a society makes affects what kinds of knowledge new workers can acquire on the job. The human capital approach emphasizes the opposite logic: what workers formally study is what affects what a society can produce.

Figure 4.2 shows the relationship between our measure of economic complexity and years of schooling for the year 2000. It is clear that there is positive relationship between the two (R^2=50%). Countries like India and Uganda, or Mongolia and Mexico, have very similar levels of average formal education. Yet, they differ dramatically in economic complexity. India is much more complex than Uganda, and Mexico is much more complex than Mongolia.

Figure 4.3 shows that the relationship between cognitive ability and economic complexity is also positive.Here we

FIGURE 4.2:

Relationship between Years of Schooling and the Economic Complexity Index (ECI) for the year 2000.

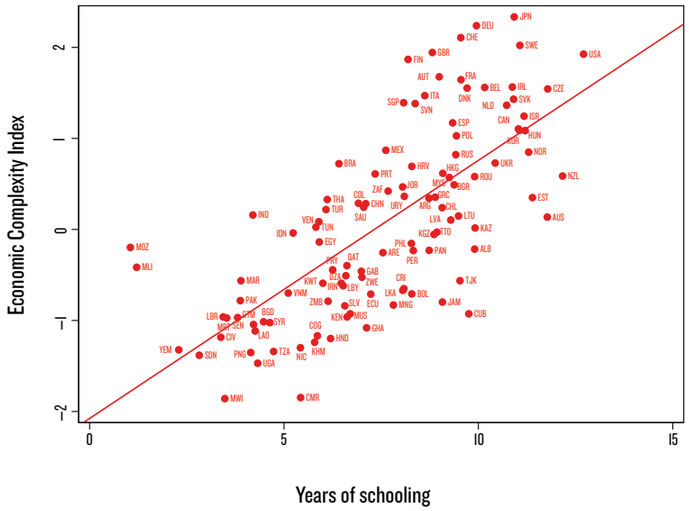
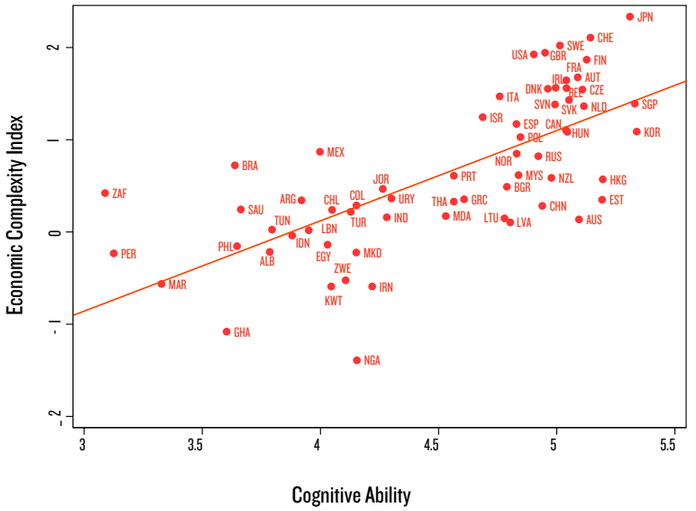


FIGURE 4.3:

Relationship between Cognitive Ability and the Economic Complexity Index (ECI) for the year 2000.



find that Brazil and Ghana are two countries with similar levels of cognitive ability, but very different levels of economic complexity. Brazil is two standard deviations more complex than Ghana. The same is true for Colombia and Nigeria. Their measured cognitive abilities are the same, but Colombia is nearly 1.5 standard deviations more complex than Nigeria.

For illustration purposes, consider the case of Ghana and Thailand. Both countries had similar levels of schooling in 1970, but Ghana expanded education more vigorously than Thailand in the subsequent 40 years (*Figure* 4.4). But Ghana's economic complexity and income stagnated as it remained an exporter of cocoa, aluminum, fish and forest products. By contrast, between 1970 and 1985 Thailand underwent a massive increase in economic complexity, equivalent to a change of one standard deviation in the Economic Complexity Index (*Figure* 4.5). This caused a sustained economic boom in Thailand after 1985. As a consequence, the level of income per capita between Ghana and Thailand has since diverged dramatically (*Figure* 4.6).

Next, we measure these indicators' ability to predict future economic growth, using the same technique that we employed to compare ECI to the WGIs (see *Technical Box* 4.2). We begin by looking at the relationship between education, complexity and a country's level of income per capita. While data on years of schooling and school enrollment is available for several years, the data on educational quality exists only for a cross-section of countries around the year 2000. We use the data for this year to estimate equations where the dependent variable is the level of income per capita and the independent variables are the years of schooling of the labor force, the Hanushek and Woessmann measure of cognitive ability, and the ECI. We do not use school enrollment as this variable affects future human capital but not the human capital invested in creating today's income. The results, presented in *Figure* 4.7, indicate that the Economic Complexity Index explains 17.2 percent of the variance while years of schooling and cognitive ability account for only 3.6 percent of the variance when combined.

We also look at the ability of human capital and complexity to explain future growth. To do this we follow a similar methodology as before (see *Technical Box* 4.2). In this case, we include data on school enrollment at the secondary and tertiary levels as these would affect the years of schooling of the labor force going forward. We do not include cognitive ability as this variable exists only for a single year.

Figure 4.8 shows that economic complexity accounts for 12.1 percent of the variance in economic growth rates for the three decades between 1978 and 2008. All education variables, on the other hand, account only for 2.6 percent when combined.

These results show that the Economic Complexity Index contains information that is more directly related to a country's level of income and its future rate of growth than the standard variables used to measure human capital.

MEASURES OF COMPETITIVENESS

Finally, we look at measures of competitiveness. The most respected source of these measures is the World Economic Forum's Global Competitiveness Index (GCI). The GCI has been published since 1979. Over the course of more than 30 years, the coverage of the GCI has been expanded and

FIGURE 4.4:

Years of schooling of Thailand and Ghana as a function of time.

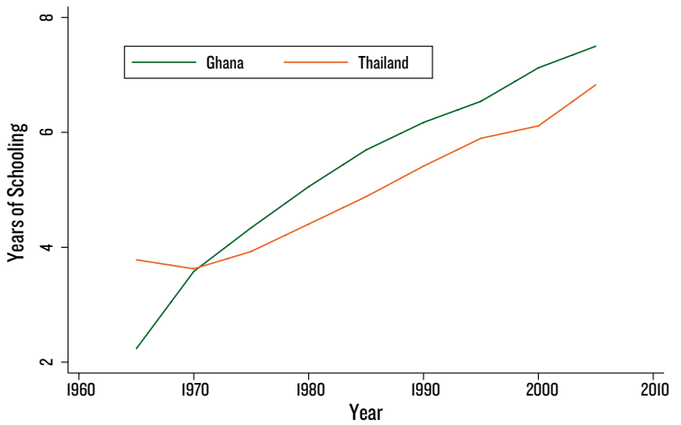
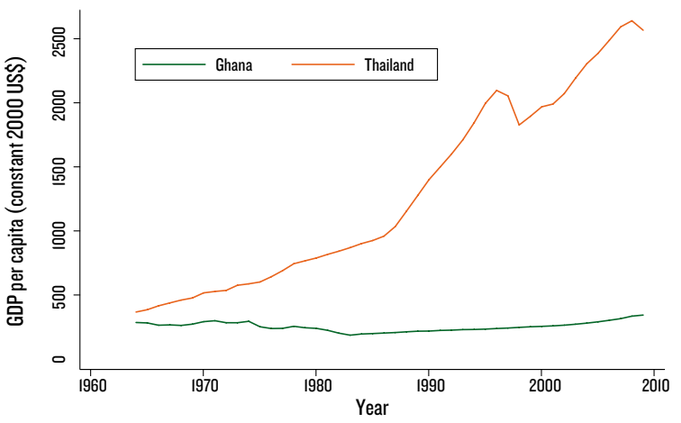


FIGURE 4.5:

Economic Complexity Index (ECI) of Thailand and Ghana as a function of time.

FIGURE 4.6:

Evolution of the GDP per capita of Thailand and Ghana as a function of time.



improved methodologically, going through two major revisions in 2001 and 2006. By 1995, the GCR ranked less than 50 countries, but over the years this number has increased, now reaching over 130 countries. The claim of the Global Competitiveness Report is that the index captures the fundamental variables that drive growth over the medium term:

> *"We define competitiveness as the set of institutions, policies, and factors that determine the level of productivity of a country. Because the rates of return are the fundamental drivers of the growth rates of the economy, a more competitive economy is one that is likely to grow faster in the medium to long run."*
> (GLOBAL COMPETITIVENESS REPORT 2010. CHAPTER 1.1, PAGE 4)

The GCI develops over 150 measures of elements that it considers important for competitiveness and then averages them. The ECI looks, instead, at the actual kinds of industry that a country can support. Both should capture information that is relevant to an economy's ability to grow. Which one does so more effectively is an empirical question that we address next.

Since we only have data for the GCI rankings, and not the underlying value of the index, we do the analysis using the rankings of the Economic Complexity Index instead of its value. This allows for a fairer comparison. **We do comparisons using 5 and 10 year panels starting in 1979 and find that the GCI rankings contribute significantly less to the variance of economic growth than the ECI** (see *Technical Box 4.3* and *Figure 4.9*).

We conclude that the Economic Complexity Index can account for a significant fraction of the cross-country variation in income per capita and economic growth, and that the ECI is a much stronger predictor of growth than other commonly used indicators that measure human capital, governance or competitiveness.

FIGURE 4.7:

Contribution to the variance of income from the Economic Complexity Index (ECI) and measures of Human Capital.

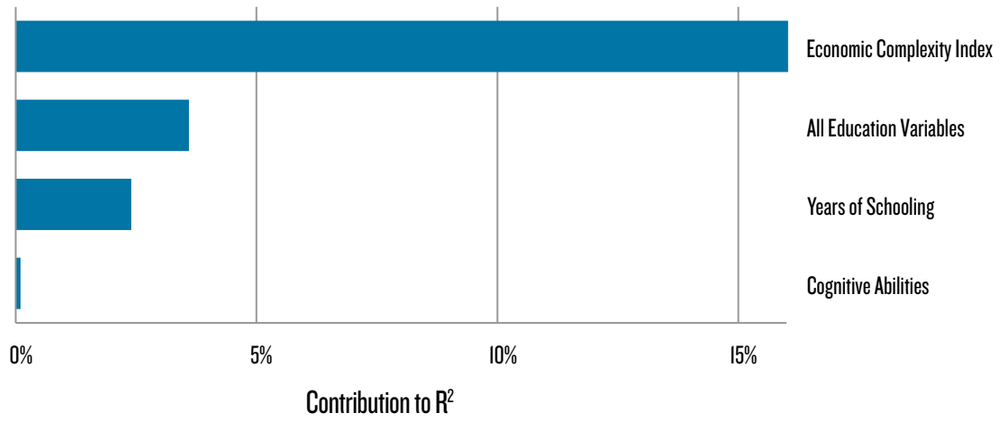


FIGURE 4.8:

Contribution to the variance of economic growth from the Economic Complexity Index (ECI) and measures of Human Capital.

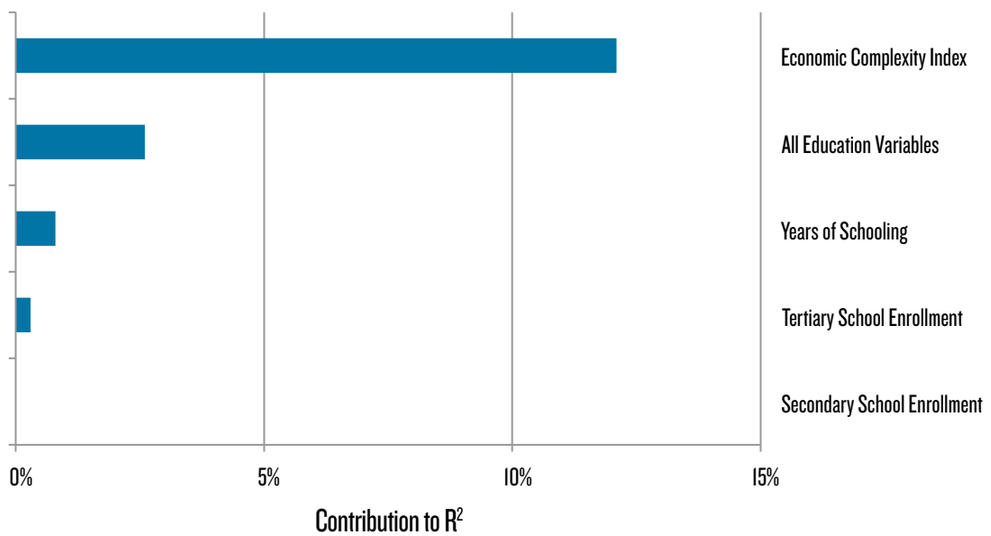
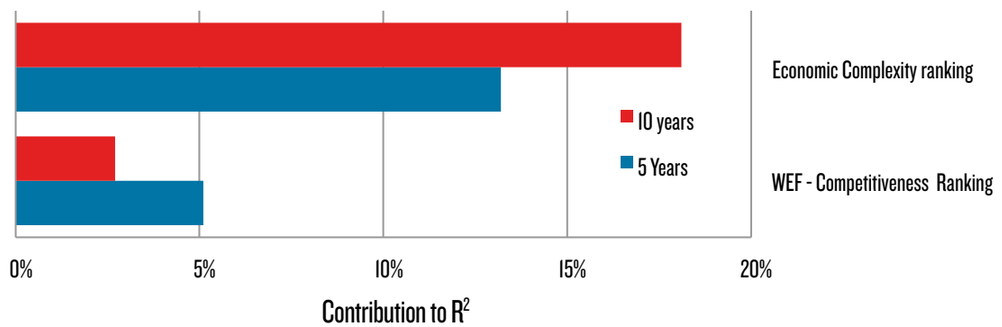


FIGURE 4.9:

Contribution to the variance of economic growth from the Economic Complexity Index (ECI) and measures of competitiveness.



TECHNICAL BOX 4.1: GOVERNANCE AND COMPLEXITY

We compare the contribution to economic growth of the Worldwide Governance Indicators (WGIs) and economic complexity by estimating a growth regression where all of the WGIs and the Economic Complexity Index are used as explanatory variables. As controls we include the logarithm of per capita income, the increase in natural resource exports during the period and the initial share of GDP represented by natural resource exports. The contribution of each variable is estimated by taking the difference between the R^2 obtained for the regression using all variables and that obtained for the regression where the variable was removed.

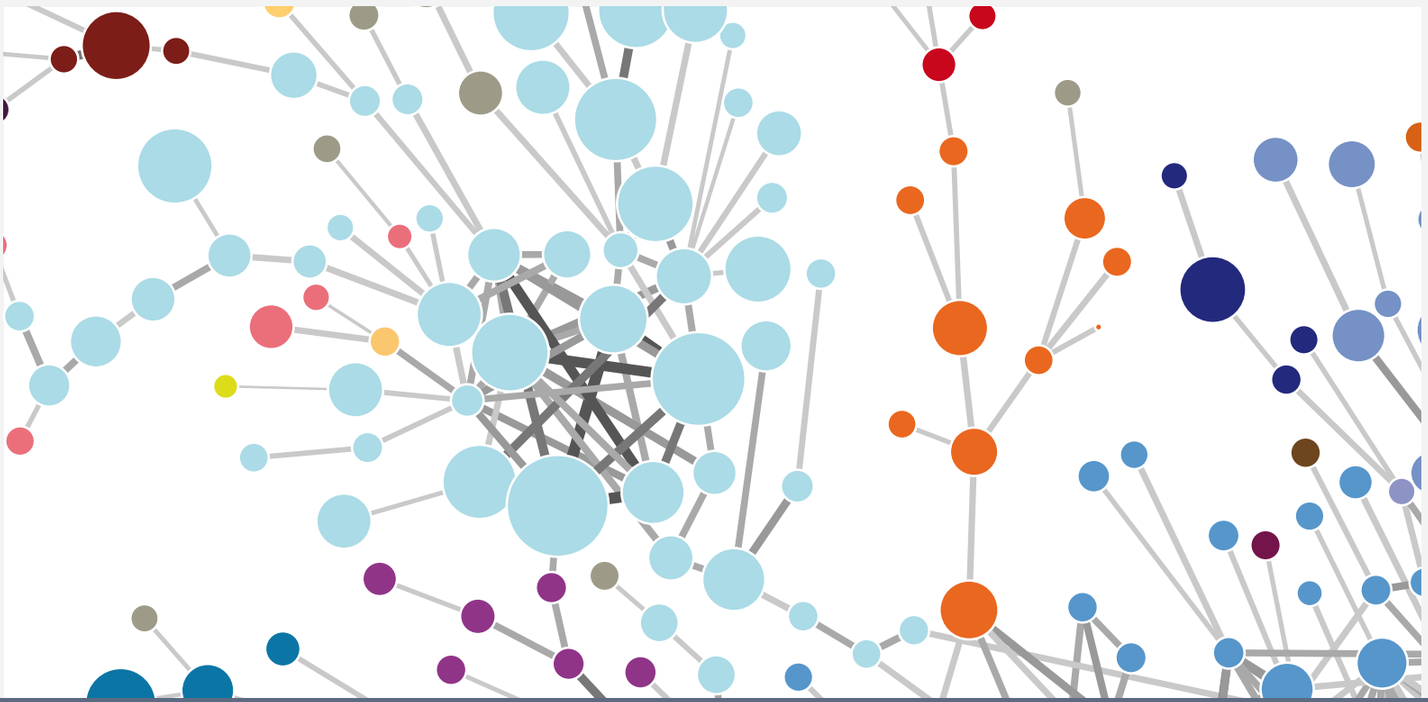
TABLE 4.1.1

	Annualized growth in GDP pc (6 years)								
	1996-2002, 2002-2008								
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Income per capita, logs	-0.00253***	-0.00149***	-0.00251***	-0.00251***	-0.00257***	-0.00253***	-0.00258***	-0.00254***	-0.00210***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Increase in natural resource exports	0.00420**	0.00246	0.00418**	0.00417**	0.00426**	0.00423**	0.00431**	0.00411**	0.00393**
- in constant dollars (as a share of initial GDP)	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Initial NR exports to GDP	0.01181***	0.00879***	0.01178***	0.01177***	0.01169***	0.01184***	0.01214***	0.01174***	0.01121***
	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Initial Economic Complexity Index (ECI)	0.00547***		0.00547***	0.00536***	0.00598***	0.00551***	0.00531***	0.00537***	0.00500***
	(0.001)		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
[ECI] x GDP per capita, log	-0.00035**		-0.00035**	-0.00034**	-0.00042**	-0.00036**	-0.00032**	-0.00034**	-0.00026*
	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Initial Control of Corruption	-0.00006	-0.00123		0.00003	-0.00005	0.00000	-0.00006	-0.00006	
	(0.001)	(0.001)		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	
Initial Government Effectiveness	0.00029	0.00110	-0.00006		0.00050	0.00036	0.00013	0.00025	
	(0.001)	(0.001)	(0.001)		(0.001)	(0.001)	(0.001)	(0.001)	
Initial Political Stability	0.00102**	0.00119**	0.00091**	0.00104**		0.00105**	0.00106**	0.00107**	
	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	
Initial Rule of Law	0.00022	0.00105	0.00046	0.00031	0.00082		0.00003	0.00029	
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)		(0.001)	(0.001)	
Initial Regulatory Quality	-0.00056	-0.00125	-0.00050	-0.00052	-0.00068	-0.00053		-0.00039	
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)		(0.001)	
Initial Voice and Accountability	0.00032	0.00053	0.00034	0.00031	0.00050	0.00033	0.00014		
	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		
Constant	0.02428***	0.01621***	0.02412***	0.02410***	0.02452***	0.02421***	0.02453***	0.02429***	0.01868***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)
Observations	243	243	243	243	243	243	243	243	243
Adjusted R^2	0.420	0.315	0.417	0.422	0.408	0.422	0.420	0.421	0.404
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2 difference		10.5%	0.3%	0.2%	1.2%	0.2%	0.0%	0.1%	1.6%

Table 4.I.I shows the results of this procedure using two consecutive six year periods. Table 4.I.2 shows the same procedure using one twelve year period (1996-2008). Figure 4.I of the main text, illustrates the differences in R^2 between the regression using all variables and those where individual variables were removed.

TABLE 4.I.2

	Annualized growth in GDP pc (12 years)								
	1996-2008								
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Income per capita, logs	-0.00202***	-0.00127***	-0.00199***	-0.00213***	-0.00203***	-0.00196***	-0.00207***	-0.00201***	-0.00202***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Increase in natural resource exports	0.00228***	0.00255***	0.00226***	0.00233***	0.00228***	0.00227***	0.00233***	0.00232***	0.00235***
- in constant dollars (as a share of initial GDP)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Initial NR exports to GDP	0.00361***	0.00314**	0.00357***	0.00367***	0.00342***	0.00367***	0.00383***	0.00361***	0.00369***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Initial Economic Complexity Index [ECI]	0.00380**		0.00371***	0.00436***	0.00405**	0.00415***	0.00364**	0.00392**	0.00467***
	(0.002)		(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)	(0.001)
[ECI] x [GDP per capita, log]	-0.00017		-0.00015	-0.00026	-0.00020	-0.00020	-0.00014	-0.00019	-0.00026**
	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Initial Control of Corruption	0.00004	-0.00079		-0.00027	0.00001	0.00029	0.00005	-0.00003	
	(0.001)	(0.001)		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	
Initial Government Effectiveness	-0.00097	-0.00040	-0.00117		-0.00080	-0.00069	-0.00107	-0.00087	
	(0.001)	(0.001)	(0.001)		(0.001)	(0.001)	(0.001)	(0.001)	
Initial Political Stability	0.00065*	0.00079*	0.00054	0.00057*		0.00078**	0.00069*	0.00059*	
	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)	
Initial Rule of Law	0.00103	0.00237***	0.00121*	0.00073	0.00135*		0.00087	0.00094	
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)		(0.001)	(0.001)	
Initial Regulatory Quality	-0.00040	-0.00125*	-0.00036	-0.00051	-0.00051	-0.00024		-0.00053	
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)		(0.001)	
Initial Voice and Accountability	-0.00030	-0.00014	-0.00028	-0.00019	-0.00016	-0.00021	-0.00042		
	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		
Constant	0.01960***	0.01384***	0.01936***	0.02052***	0.01963***	0.01918***	0.01993***	0.01961***	0.01954***
	(0.003)	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)
Observations	118	118	118	118	118	118	118	118	118
Adjusted R^2	0.516	0.365	0.516	0.514	0.510	0.513	0.518	0.519	0.506
Difference in R^2		15.1%	0.0%	0.2%	0.6%	0.3%	0.2%	0.3%	1.0%



TECHNICAL BOX 4.2: EDUCATION, COGNITIVE ABILITY AND ECONOMIC COMPLEXITY

We compare the contribution to income of education, cognitive ability and economic complexity by regressing income against years of schooling, cognitive ability and the Economic Complexity Index. The contribution to income of each variable is estimated by taking the difference between the R^2 obtained for the regression using all variables and that obtained for a regression where the variable in question was removed.

Table 4.2.1 shows the results of this procedure for the year 2000, when cognitive ability data is available. Figure 4.7 in the main text summarizes the results.

We compare the contribution to growth of education and economic complexity by regressing growth against years of schooling secondary school enrollment, tertiary school enrollment, and the Economic Complexity Index. As additional controls we include the change in natural resource exports during the period, the logarithm of per capita income and year fixed effects. The contribution of each variable to growth is estimated by taking the difference between the R^2 obtained for a regression using all variables and one obtained for a regression where the variable in question was removed.

Table 4.2.2 shows the results of this procedure for ten year panels starting in 1978, 1988 and 1998. Figure 4.8 in the main text summarize the results.

TABLE 4.2.1

	Income per capita, log – Year 2000				
VARIABLES	(1)	(2)	(3)	(4)	(5)
Economic Complexity Index	0.998***		1.079***	1.042***	1.264***
	(0.204)		(0.214)	(0.160)	(0.138)
Years of schooling	0.134*	0.213**		0.14750**	
	(0.077)	(0.085)		(0.068)	
Cognitive ability	0.118	0.875***	0.344		
	(0.263)	(0.290)	(0.249)		
Constant	6.294***	2.861***	6.38972***	6.688***	7.826***
	(0.917)	(0.995)	(0.977)	(0.562)	(0.183)
Observations	59	59	59	59	59
R^2	0.620	0.448	0.596	0.619	0.584

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

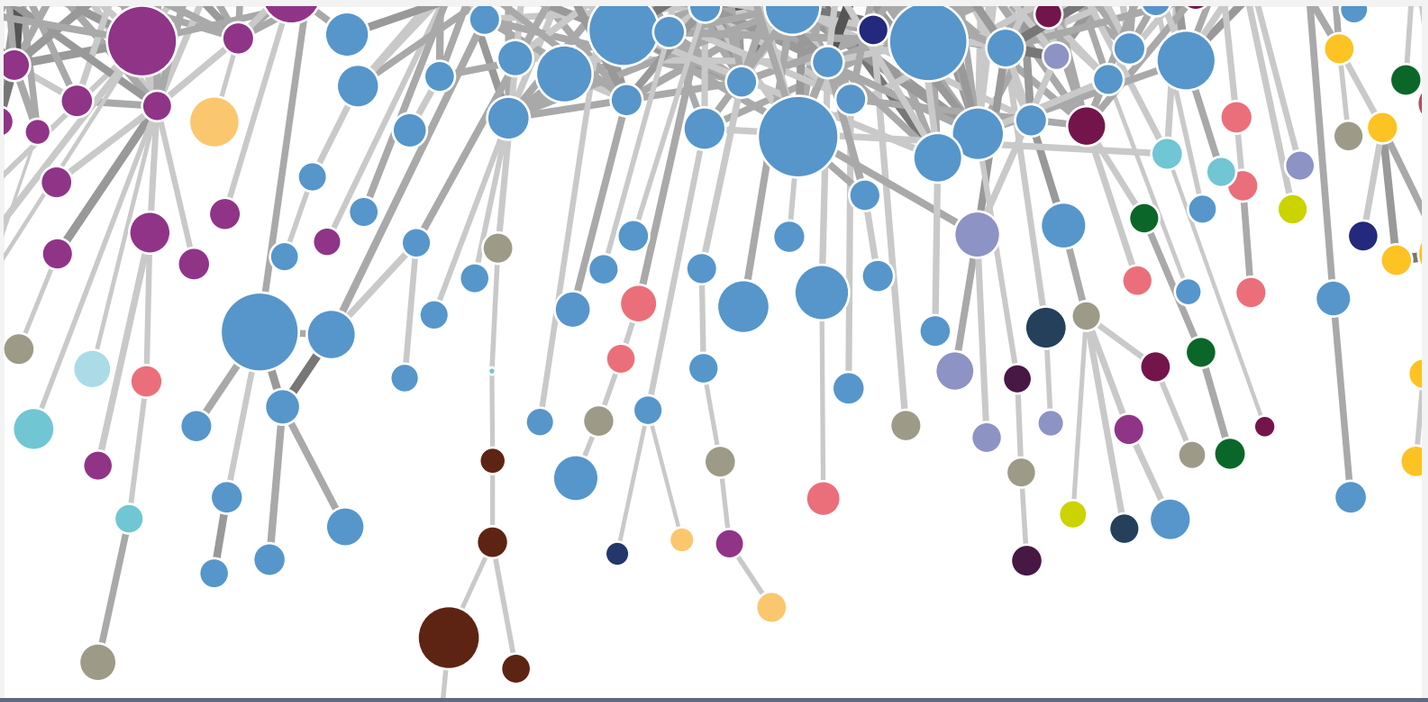
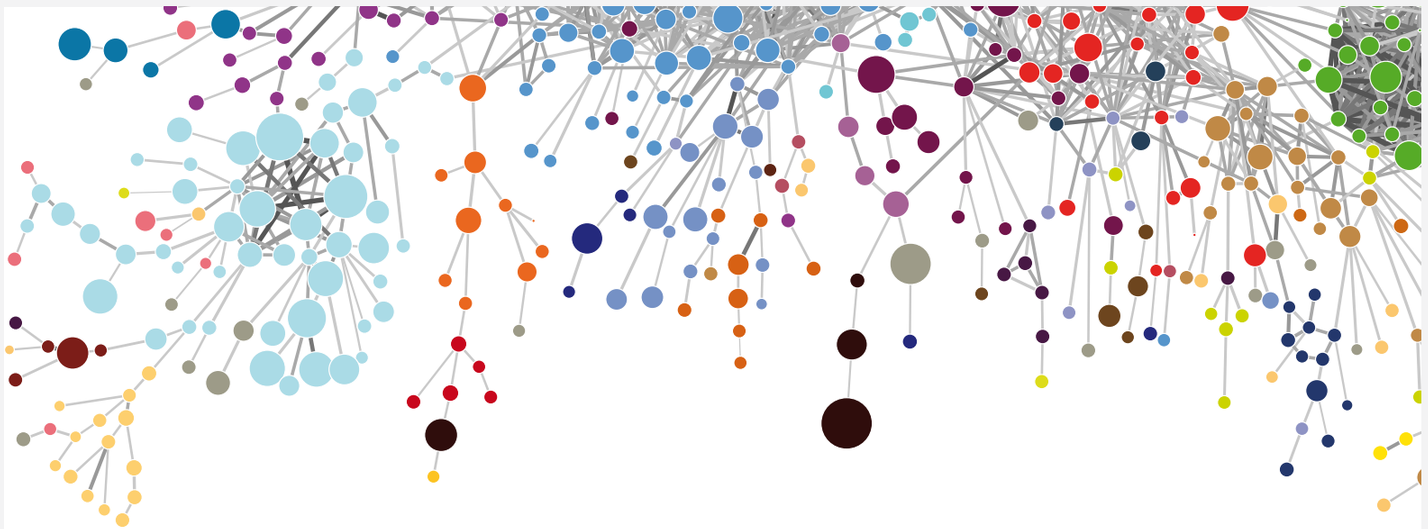


TABLE 4.2.2

	Annualized growth in GDP pc (by decade)					
	(1978-1988, 1988-1998, 1998-2008)					
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Initial Income per capita, log	-0.009***	-0.006***	-0.008***	-0.009***	-0.009***	-0.007***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Increase in natural resource exports	0.055***	0.049**	0.055***	0.055***	0.055***	0.061***
- in constant dollars (as a share of initial GDP)	(0.018)	(0.021)	(0.018)	(0.018)	(0.018)	(0.017)
Initial Economic Complexity Index	0.044***		0.046***	0.044***	0.045***	0.052***
	(0.011)		(0.011)	(0.011)	(0.011)	(0.011)
Initial Economic Complexity Index X Income per capita, log	-0.004***		-0.004***	-0.004***	-0.004***	-0.004***
	(0.001)		(0.001)	(0.001)	(0.001)	(0.001)
Years of schooling (standardized)	0.008*	0.013***		0.008***	0.005	
	(0.004)	(0.004)		(0.003)	(0.003)	
Secondary school enrollment (standardized)	0.000	0.001	0.005**		0.002	
	(0.003)	(0.003)	(0.002)		(0.003)	
Tertiary school enrollment (standardized)	-0.003	-0.003	-0.000	-0.003		
	(0.002)	(0.002)	(0.001)	(0.002)		
Constant	0.097***	0.071***	0.091***	0.097***	0.099***	0.083***
	(0.012)	(0.012)	(0.011)	(0.012)	(0.012)	(0.010)
Observations	263	263	263	263	263	263
R^2	0.409	0.288	0.401	0.409	0.406	0.383
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1



TECHNICAL BOX 4.3: GLOBAL COMPETITIVENESS INDEX AND GROWTH

Here we compare the contribution of the Global Competitiveness Index (GCI) and the ECI to economic growth. We use the ranking of countries in the GCI and the ranking of countries in ECI to predict growth using 5 and 10 year panels. As controls, we use the increase in natural resource exports during the period as well as the logarithm of the initial GDP per capita and year fixed effects. We estimate the contribution of the GCI and ECI to growth by taking the difference between the R^2 obtained for the equation in which they were both included and that in which one or the other is missing.

Table 4.3.1 shows that eliminating the rank of the ECI from the regression results in a much larger loss of explanatory power than removing the rank of GCI. This is true for both 5 and 10 year panels. Figure 4.9 on the main text illustrates these results.

TABLE 4.3.1

	Annualized growth in GDP pc					
	5 year panels			10 year panels		
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Ranking of GCI	-0.00007*	-0.00004		-0.00023	-0.00005	
	(0.000)	(0.000)		(0.000)	(0.000)	
Ranking of ECI	-0.00009***		-0.00007***	-0.00064***		-0.00060***
	(0.000)		(0.000)	(0.000)		(0.000)
Initial income per capita, logs	-0.00231***	-0.00092***	-0.00180***	-0.01384***	-0.00439*	-0.01200***
	(0.001)	(0.000)	(0.000)	(0.004)	(0.002)	(0.003)
Increase in natural resource exports	0.00709	0.00077	0.00578	0.09135*	0.04545	0.08814*
- in constant dollars (as a share of initial GDP)	(0.008)	(0.009)	(0.008)			
				(0.048)	(0.049)	(0.045)
Constant	0.02744***	0.01181***	0.02059***	0.17473***	0.06694***	0.15084***
	(0.006)	(0.003)	(0.004)	(0.044)	(0.025)	(0.030)
Observations	104	104	104	83	83	83
Adjusted R^2	0.255	0.123	0.204	0.233	0.074	0.228
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

SECTION 5

How Does *Economic Complexity* Evolve?

So economic complexity seems to matter: it affects a country's level of income per capita and drives its future growth. It is also distinct from what is captured by measures of human capital, governance and competitiveness. But how does complexity evolve? How do societies increase the amount of productive knowledge embedded in them? What limits the speed of this process? And why does it happen in some places but not in others?

Again, in our interpretation, the complexity of a country's economy reflects the amount of productive knowledge it contains. This knowledge is costly to acquire and transfer, and is modularized into chunks we call capabilities. Capabilities are difficult to accumulate because doing so creates a complicated chicken and egg problem. On the one hand, countries cannot create products that require capabilities they do not have. On the other hand, there are scant incentives to accumulate capabilities in places where the industries that demand them do not exist. This is particularly true when the missing capabilities required by a potential new industry are many. In this case, supplying any single missing capability will not be enough to launch the new industry, given the absence of the other required capabilities. In a world in which capabilities are complementary, new capabilities risk not being demanded simply because other capabilities are not present.

Consider the following example. A country that does not export fresh produce probably does not have either a cold-storage logistic chain, an expedited green lane at the customs service, or a food safety certification system. All are needed by potential produce exporters. Investors planning to provide the capability to refrigerate and transport fresh produce would not get any traction because they would still need to certify their produce and get through customs fairly quickly. Yet, the systems that provide these services are not in place.

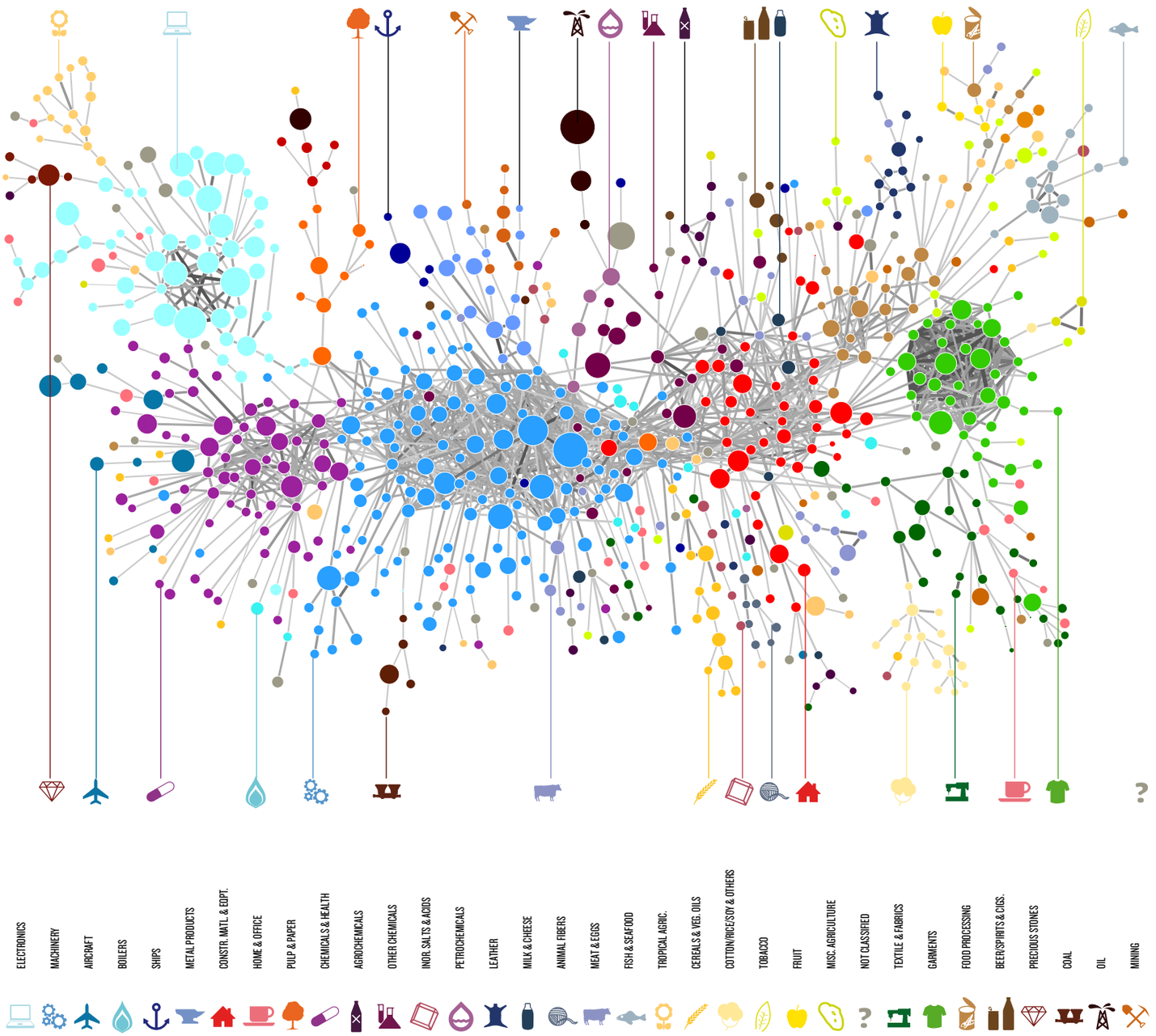
It follows then that new capabilities will be more easily accumulated if they can be combined with others that already exist. This reduces the need to coordinate the accumulation of several new capabilities simultaneously. In our example, if only the green lane at the customs service was missing, it would be easier to develop the fresh produce export industry.

For this reason, countries are more likely to move into products that make use of the capabilities that are already available. These capabilities are available, however, because they are being used to make other products. An implication of this is that a country will diversify by moving from the products they already produce to others that require a similar set of embedded knowledge. Arguably, it is easier to move from shirts to blouses than it is to move from shirts to engines. This is because, in terms of embedded knowledge, shirts are more similar to blouses than to engines. A testable implication of this logic is that countries will move into products that are similar, in terms of the capabilities they require, to the ones they already make.

Measuring the *similarity* in the capability requirements of different products is not simple. Identifying the precise technical and institutional requirements of each product would involve collecting a mindboggling volume of information. Instead, here we measure similarity using a simple trick. If shirts require knowledge that is similar to that required by blouses, but different from that required by engines, then the probability that a country exporting shirts will also export blouses will be higher than the probability that it will

FIGURE 5.1:

The product space.



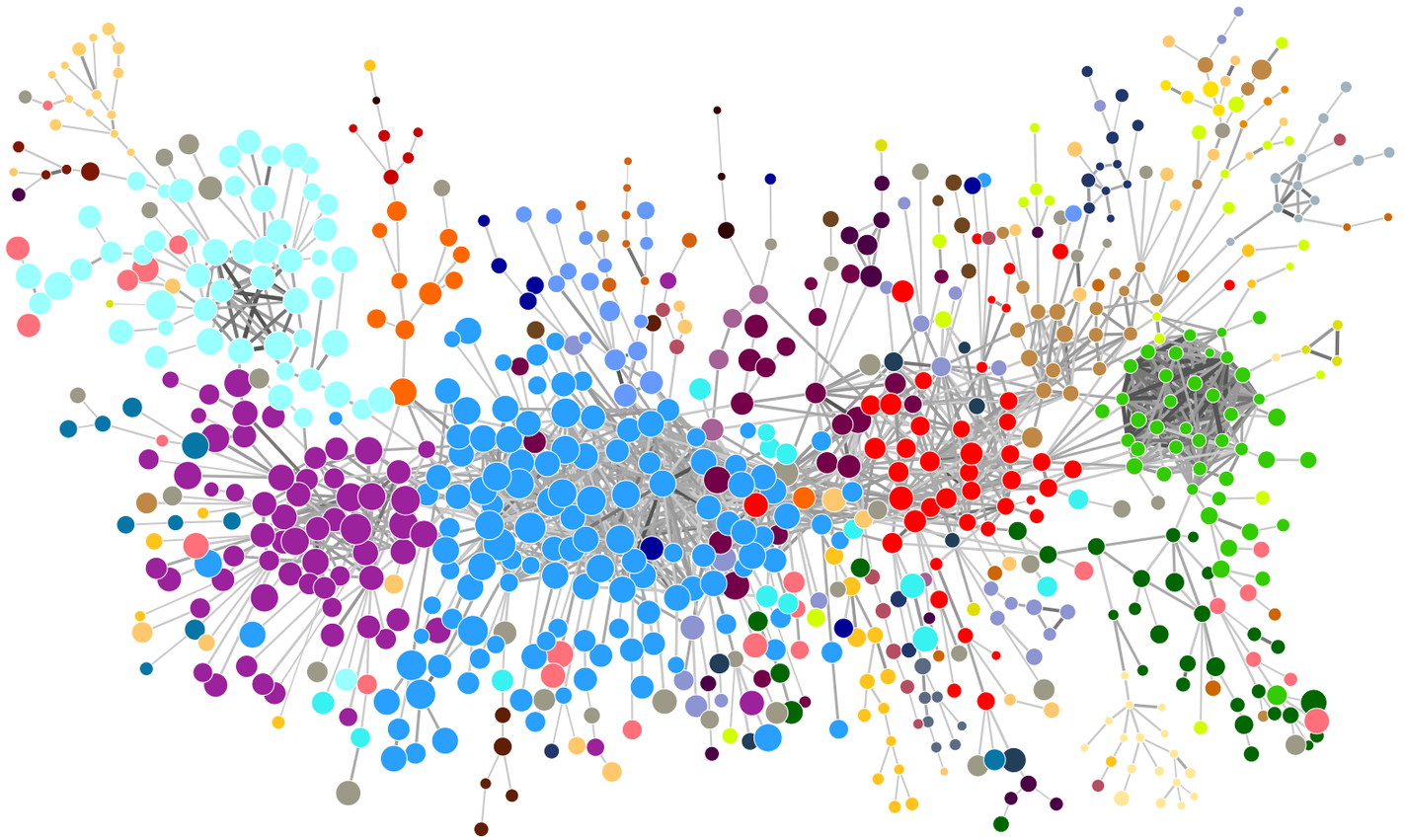
also export engines. So the probability that a pair of products is co-exported carries information about how similar these products are. We use this idea to measure the *proximity* between all pairs of products in our dataset (see *Technical Box* 5.1 on Measuring Proximity). The collection of all proximities is a network connecting pairs of products that are significantly likely to be co-exported by many countries. We refer to this network as the *product space* and use it to study the productive structure of countries.

We care about the structure of the product space because it affects the ability of countries to move into new products. Products that are tightly connected share most of the requisite capabilities. If this is the case, then countries that already have what it takes to make one product will find it relatively easy to move to the next ones. A highly connected product space, therefore, makes the problem of growing the complexity of an economy easier. Conversely, a sparsely connected product space makes it harder.

Once again, a metaphor may help to clarify these ideas. Imagine that the product space is a forest, where every product is a tree. Trees that require similar capabilities are near each other in the forest. Distant trees require very different capabilities. If countries are a collection of firms that make different products, we can think of firms as monkeys that live

FIGURE 5.2:

The product space revisited. The same as *Figure* 5.1 but with node sizes proportional to the Product Complexity Index (PCI).



on trees, meaning that they exploit certain products. Countries differ in the number and location of their monkeys in this common forest. The development process, which implies increasing product diversity and complexity, is akin to monkeys colonizing the forest, occupying more trees, and moving especially into the more complex or fruitier ones.

When monkeys jump to nearby trees it minimizes the chicken and egg problem of having to accumulate several missing capabilities at once. Furthermore, if trees are densely packed together it will be relatively easy for monkeys to move from tree to tree and populate the forest. But if trees are far apart, monkeys may be stuck in their current activities. If the product space is heterogeneous, there may be some patches of highly related products, where adding capabilities and expanding into new products would be easier, and other patches of more loosely connected products that make the process of capability accumulation and diversification harder.

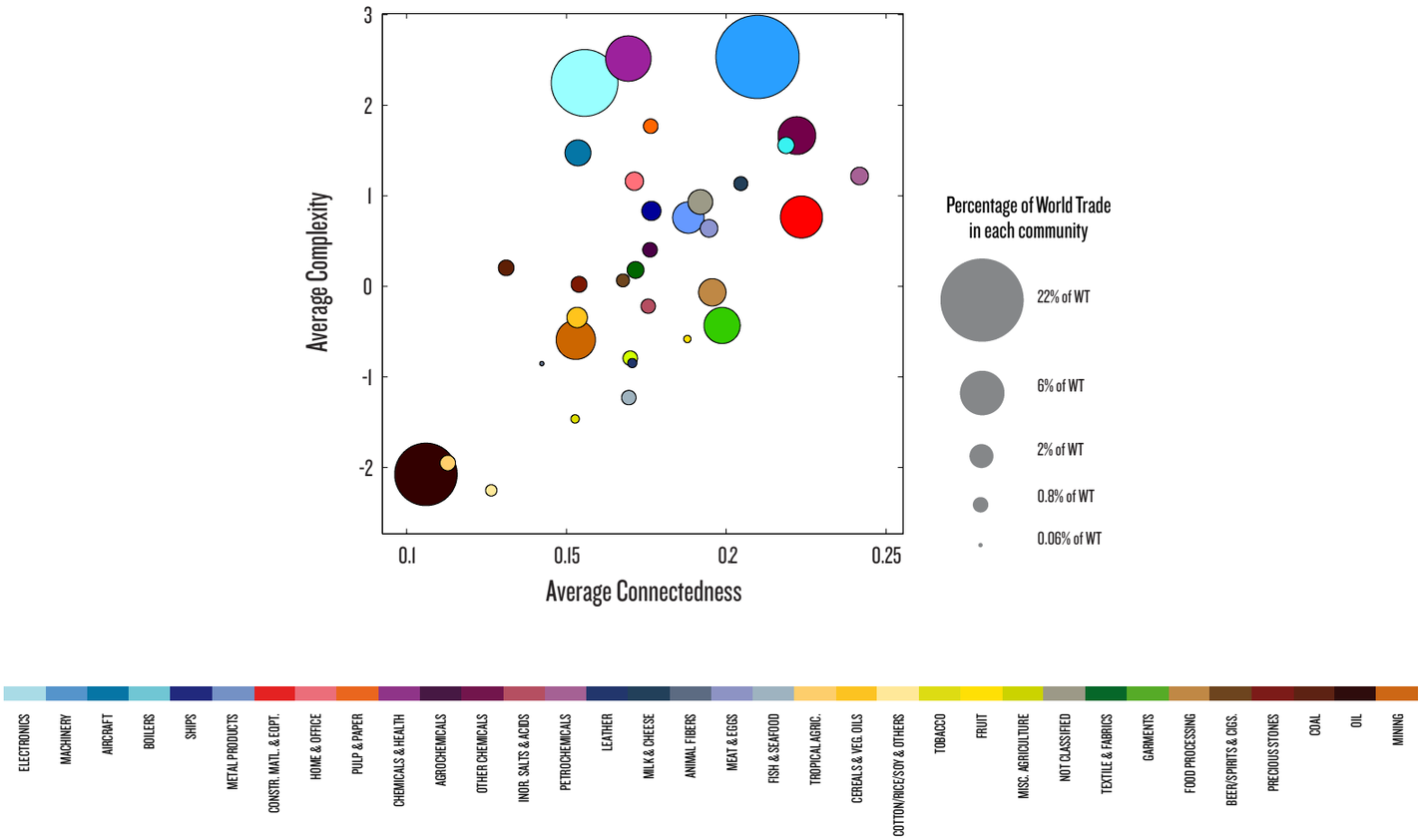
What is the shape of the product space we live in? Is it a world in which the forest is dense or sparse? *Figure* 5.1 shows a visualization of the product space constructed using international trade data for the years 2006-2008. Here, nodes represent products and their size is proportional to total world trade in that good. Links connect products with a high probability of being co-exported (see *Technical Box* 5.2). The visualization reveals that the product space is highly heterogeneous. Some sections of it are composed of densely connected groups of products whereas others tend to be more peripheral and sparse.

The product space shows that many goods group naturally into highly connected *communities*. This suggests that products in these communities use a similar set of capabilities. We can identify communities because the products that belong to them are more closely connected to each other than to products outside of the community.Here, we use network science algorithms to discover the communities of products that are hidden in the data (see *Technical Box* 5.3 for a discussion of the method). We use these communities to make the discussion of products more tractable. The nearly 800 products in the SITC4 classification were grouped into 34 communities, which we identify by color in our visualization of the product space (*Figure* 5.1). The names, complexity, market size and other characteristics of the communities appear in *Table* 5.1.

Figure 5.2 shows a visualization of the product space that is similar to *Figure* 5.1, but where the size of the nodes is proportional to the complexity of products they represent, as estimated by the Product Complexity Index (PCI). It shows that communities tend to have similar levels of complexity. Products in the Machinery, Electronics and Chemical com-

FIGURE 5.3:

Community characteristics. Average complexity of the products in each community as a function of its connectedness. Bubble size is proportional to the community's participation in world trade.



munities tend to be much more complex than those in the garments cluster or in peripheral communities such as Oil and Tropical Agriculture.

Figure 5.3 shows some of the network characteristics of these communities. *Connectedness* is a measure of how centrally located a community is in the product space. It is the *average proximity* of a community's products to all other products, where *proximity* is the measure of distance between two products used to construct the product space. The figure shows the average connectedness of the products in each community and their average complexity estimated by PCI. The figure reveals a positive relationship between how centrally located the communities are in the product space and how complex their products are. Poorly connected communities such as petroleum, cotton, rice and soybeans tend to be low in complexity. Machinery, by contrast, is very complex and highly connected. Sectors such as garments, textiles and food processing are, on the other hand, in an intermediate position, being connected but not very sophisticated. Electronics and health-related chemicals, however, are also very complex but not as connected as machinery. This suggests they use specific capabilities relevant within their communities but not outside of them.

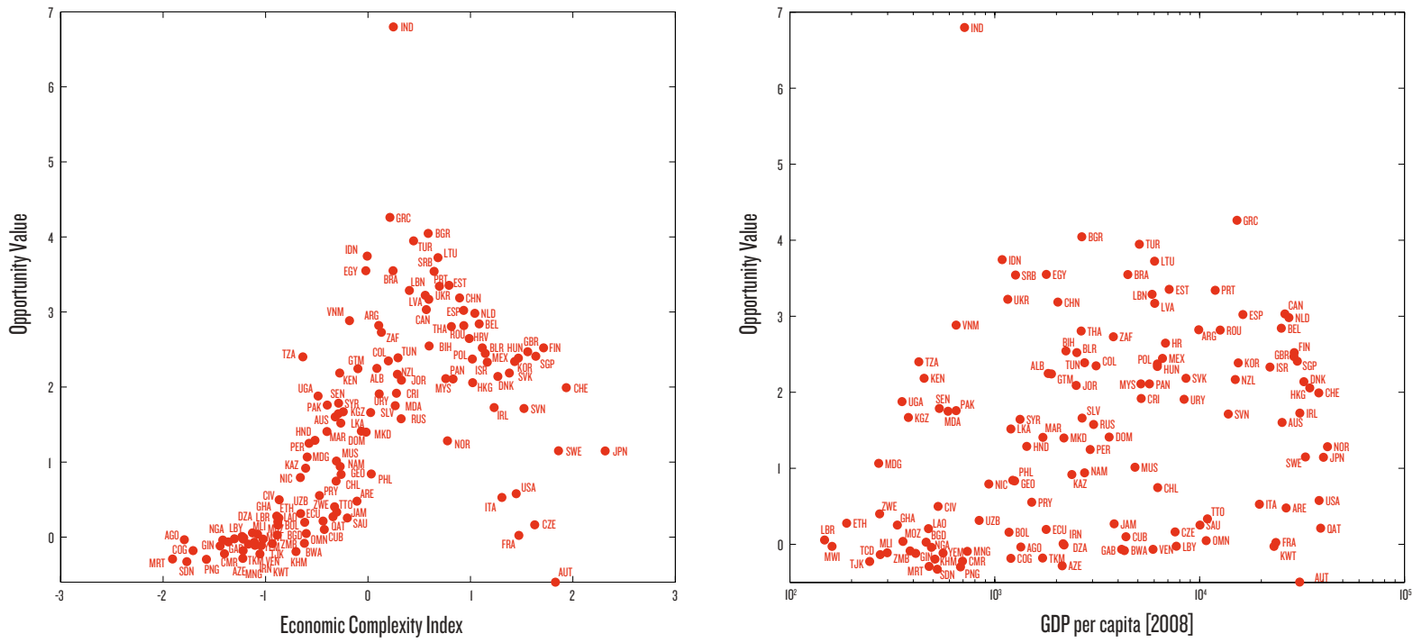
Previous research has shown that the probability that a country will make a new product is strongly related to how close that product is to other products the country already makes. So the location of a country in the product space captures information regarding both the productive knowledge that it possesses and the capacity to expand that knowledge by moving into other nearby products. The ability of countries to diversify and to move into more complex products is crucially dependent on their initial location in the product space.

The product space gives us a glimpse of the embedded knowledge of countries by highlighting the productive capabilities they posses and the opportunities these imply.We can evaluate a country's overall position in the product space by calculating how far it is to alternative products and how complex these products are. We call this measure *opportunity value* and it can be thought of as the value of the option to move into more and more complex products (see *Technical Box* 5.4).

Figure 5.4 compares opportunity value with the Economic Complexity Index and income. It shows that countries with low levels of complexity tend to have few opportunities available. This is because the products they do create tend to be peripheral in the product space. Complex economies tend to have few remaining opportunities because they already occupy a large fraction of the better part of the product space. Countries with an intermediate level of complexity, on the other hand, differ largely in their opportunity value. Some

FIGURE 5.4:

Opportunity Value as a function of the Economic Complexity Index and GDP per capita.



countries like Saudi Arabia, Jamaica and Chile, are located in parts of the product space that imply few opportunities. Others, like India, Greece, Turkey, Brazil and Indonesia are located in parts of the product space where opportunities are plentiful. *Figure* 5.4 also shows that countries with similar incomes face dramatically different opportunities.

Finally, we illustrate how countries move through the product space by looking at Ghana, Poland, Thailand and Turkey (*Figure* 5.5). Here, square nodes with thick black outlines are used to indicate the products that each of these countries was exporting at each point in time. In all cases we see that new industries –new black squares– tend to lie close to the industries already present in these countries. The productive transformation undergone by Poland, Thailand and Turkey, however, look striking compared to that of Ghana. Thailand and Turkey, in particular, moved from mostly agricultural societies to manufacturing powerhouses during the 1975-2009 period. Poland, also "exploded" towards the center of the product space during the last two decades, becoming a manufacturer of most products in both the home and office and the processed foods community and significantly increasing its participation in the production of machinery. These transformations imply an increase in embedded knowledge that is reflected in our Economic Complexity Index. Ultimately, it is these transformations that underpinned the impressive growth performance of these countries.

We started this section asking several questions: How does complexity evolve? And how do societies increase the total amount of productive knowledge embedded in them? Here we have shown that countries expand their productive knowledge by moving into nearby goods. This increases the likelihood that the effort to accumulate any additional capability will be successful, as the complementary capabilities needed to make a new product are more likely to be present in the production of the nearby goods.

What limits the speed of this process? Since capabilities are useful only when combined with others, the accumulation of capabilities is slowed down by the chicken and egg problem. New products may require capabilities that do not exist precisely because the other products that use them are not present. Moreover, since capabilities are chunks of tacit knowledge, accumulating them is difficult even when there is demand for them, because the country does not have any exemplars to copy.

Most important, why does this process of development occur in some places, but not in others? There are many answers to this question. Our approach adds an alternative answer by showing that a country's position in the product space determines its opportunities to expand its productive knowledge and increase its level of economic complexity. But the product space is highly heterogeneous, placing countries in radically different settings. Ultimately, development is the expression of the total amount of productive knowledge that is embedded in a society. But the process by which this knowledge is accumulated has a structure that we are only now starting to understand.

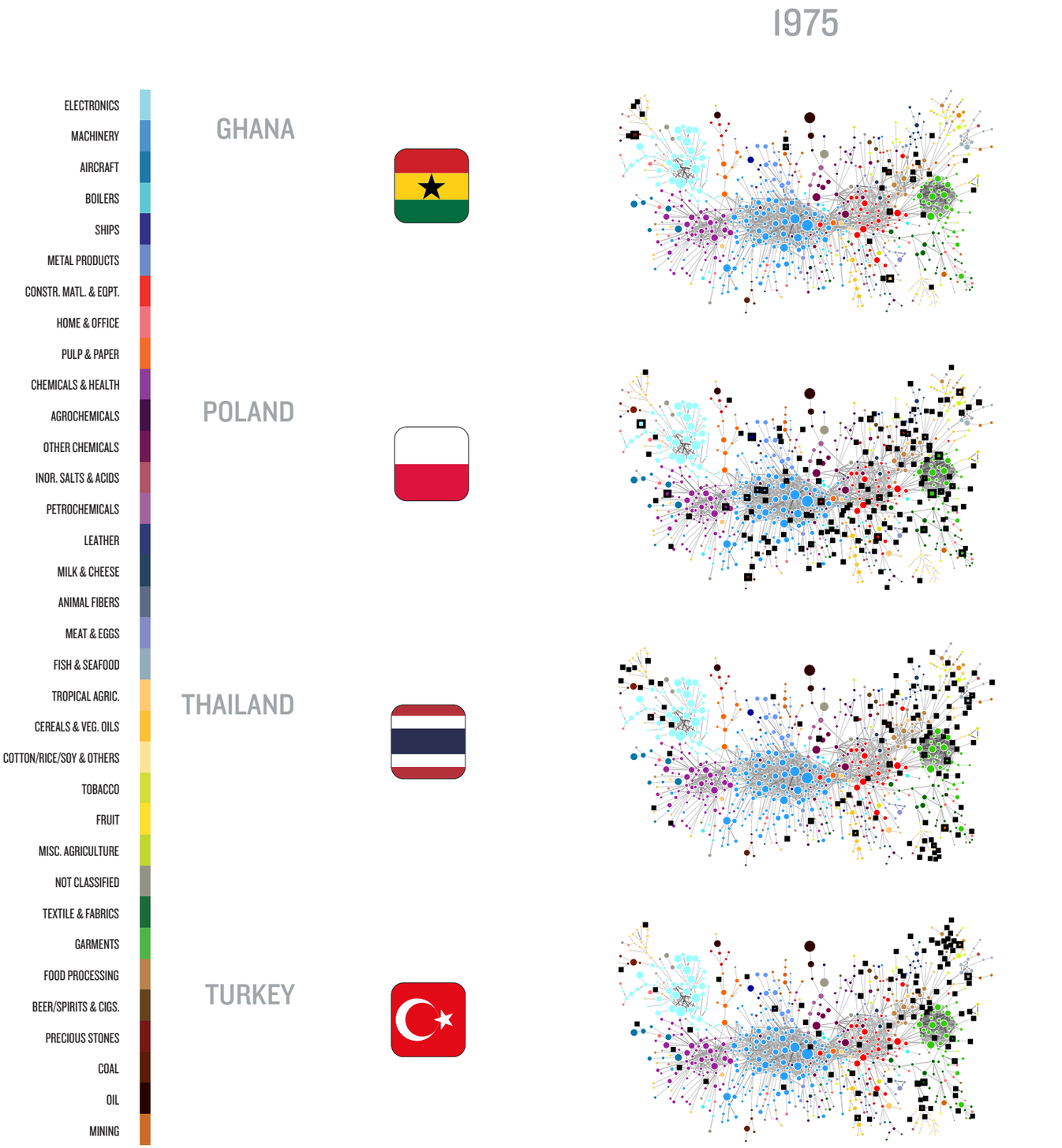
TABLE 5.1:

CHARACTERISTICS OF PRODUCT COMMUNITIES

Community Name	Average PCI	Number of Products	World Trade	World Share	Top 3 Countries by Export Volume	Top 3 Countries by Number of Products (RCA>1)
Machinery	2.54	125	4.4T	20.29%	DEU, USA, JPN	DEU, ITA, AUT
Electronics	2.25	52	3.6T	16.71%	CHN, HKG, USA	CHN, HKG, MYS
Oil	-2.08	4	2.3T	10.49%	SAU, RUS, NOR	EGY, KAZ, DZA
Chemicals & Health	2.52	64	1.6T	7.47%	USA, DEU, BEL	USA, BEL, DEU
Other Chemicals	1.67	24	1.2T	5.49%	DEU, USA, FRA	DEU, ITA, ESP
Construction Materials & Equipment	0.77	44	1.1T	5.23%	CHN, DEU, ITA	CZE, POL, SVN
Mining	-0.59	48	1.1T	5.01%	AUS, USA, CHL	CAN, AUS, KAZ
Garments	-0.43	42	1.1T	4.63%	CHN, HKG, ITA	CHN, VNM, TUN
Food Processing	-0.07	26	603B	2.74%	DEU, ITA, USA	SRB, ESP, BEL
Metal Products	0.76	17	496B	2.26%	JPN, DEU, KOR	ZAF, UKR, SVK
Aircraft	1.48	10	440B	2.00%	FRA, DEU, GBR	CAN, GBR, FRA
Not Classified	0.93	36	426B	1.94%	USA, CHN, DEU	CHN, FRA, GBR
Cereals & Vegetable Oils	-0.34	21	295B	1.34%	USA, BRA, ARG	PRY, MDA, ARG
Home & Office	1.16	23	250B	1.14%	CHN, CHE, USA	CHN, PAN, PRT
Meat & Eggs	0.64	23	242B	1.10%	USA, BRA, DEU	FRA, BEL, POL
Ships	0.83	8	232B	1.05%	KOR, CHN, JPN	ROU, POL, HRV
Petrochemicals	1.22	5	220B	1.00%	DEU, USA, BEL	PRT, BEL, FRA
Boilers	1.56	14	193B	0.88%	CHN, DEU, JPN	CHN, TUR, KOR
Fish & Seafood	-1.23	11	191B	0.87%	CHN, NOR, THA	CHL, NAM, SYC
Textile & Fabrics	0.18	32	189B	0.86%	CHN, ITA, HKG	CHN, TUR, IND
Tropical Agriculture	-1.95	16	190B	0.86%	IDN, NLD, MYS	IDN, CIV, CRI
Coal	0.21	6	183B	0.83%	AUS, IDN, RUS	CZE, COL, RUS
Misc Agriculture	-0.79	22	170B	0.78%	BRA, DEU, FRA	ESP, TZA, NIC
Precious Stones	0.02	4	170B	0.77%	IND, ISR, BEL	GBR, LBN, LKA
Pulp & Paper	1.77	11	148B	0.67%	USA, CAN, SWE	SWE, FIN, CAN
Agrochemicals	0.40	13	141B	0.64%	DEU, USA, CAN	BEL, JOR, DEU
Milk & Cheese	1.14	7	134B	0.61%	DEU, FRA, NLD	NLD, BLR, LTU
Beer, Spirits & Cigarettes	0.07	6	124B	0.57%	GBR, NLD, DEU	JAM, BEL, NLD
Inorganic Salts & Acids	-0.22	10	117B	0.53%	USA, CHN, DEU	ISR, JOR, USA
Cotton, Rice, Soy & Others	-2.25	18	96B	0.44%	USA, IND, THA	TZA, MOZ, GRC
Tobacco	-1.46	6	64B	0.29%	DEU, NLD, BRA	PHL, GRC, SEN
Leather	-0.85	14	53B	0.24%	ITA, USA, HKG	ALB, SOM, ESP
Fruit	-0.58	4	45B	0.21%	ESP, USA, CHL	NLD, LBN, LTU
Animal Fibers	-0.85	7	12B	0.06%	AUS, CHN, ITA	URY, NZL, ZAF

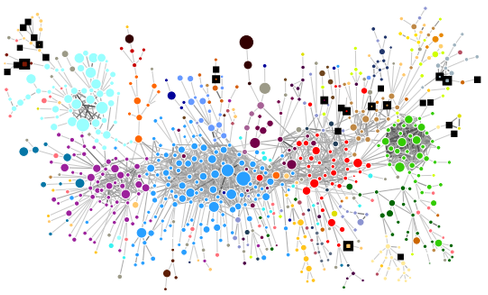
FIGURE 5.5:

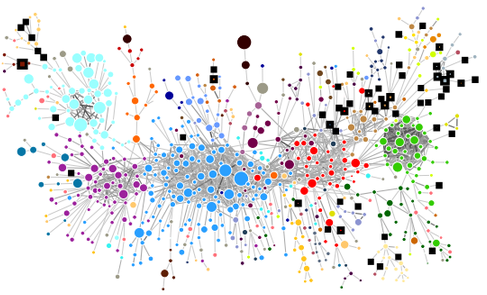
The evolution of Ghana, Poland, Thailand and Turkey in the product space: 1975, 1990 and 2009. Black boxes indicate the products in which these countries had RCA>1.

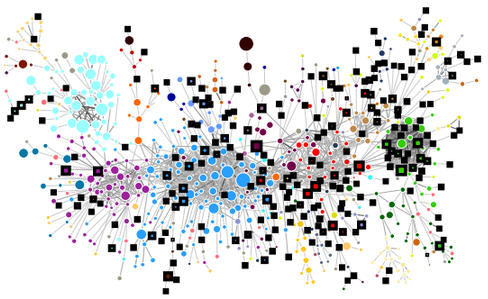


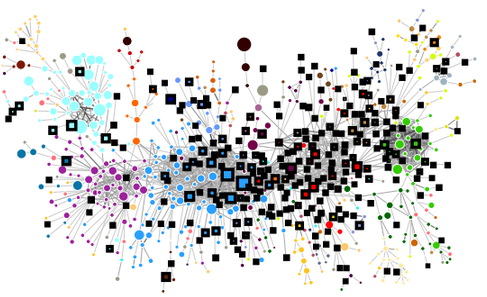
1990

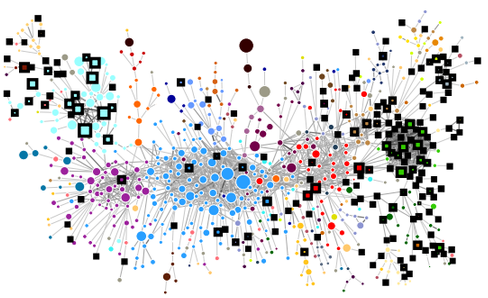
2009

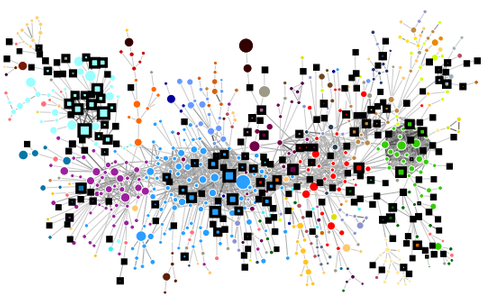


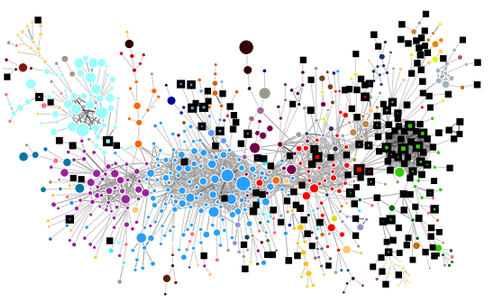


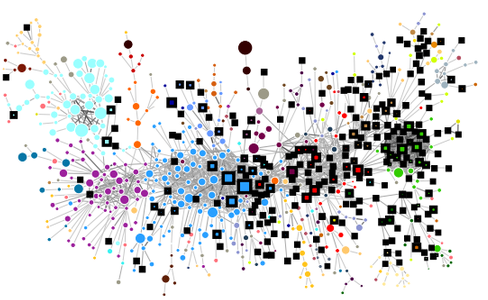












TECHNICAL BOX 5.1: MEASURING PROXIMITY

To make products you need chunks of embedded knowledge which we call capabilities. The capabilities needed to produce one good may or may not be useful in the production of other goods. Since we do not observe capabilities directly, we create a measure that infers the similarity between the capabilities required by a pair of goods by looking at the probability that they are co-exported. To quantify this similarity we assume that if two goods share most of the requisite capabilities, the countries that export one will also export the other. By the same token, goods that do not share many capabilities are less likely to be co-exported.

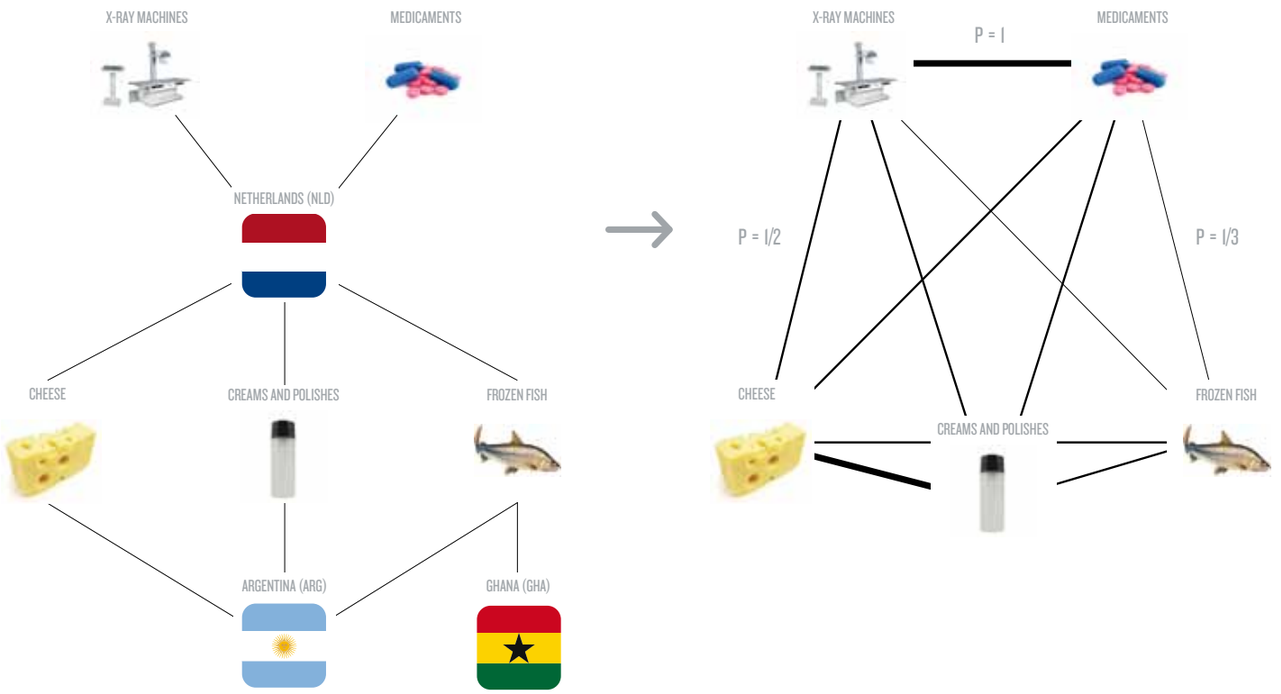
Our measure is based on the conditional probability that a country that exports product p will also export product p' (Figure 5.1.1). Since conditional probabilities are not symmetric we take the minimum of the probability of exporting product p, given p' and the reverse, to make the measure symmetric and more stringent. For instance, in the year 2008, 17 countries exported wine, 24 exported grapes and 11 exported both, all with RCA>1. Then, the proximity between wines and grapes is 11/24=0.46. Note that we divide by 24 instead of 17 to minimize false positives. Formally, for a pair of goods p and p' we define proximity as:

$$\phi_{pp'} = \frac{\sum_c M_{cp} M_{cp'}}{max(k_{p,0}, k_{p',0})}$$

Where M_{cp}=1 if country c exports product p with RCA>1 and 0 otherwise. $k_{p,0}$ is the ubiquity of product p.

FIGURE 5.1.1:

An illustrative example for the proximity measure.



TECHNICAL BOX 5.2: VISUALIZING THE PRODUCT SPACE

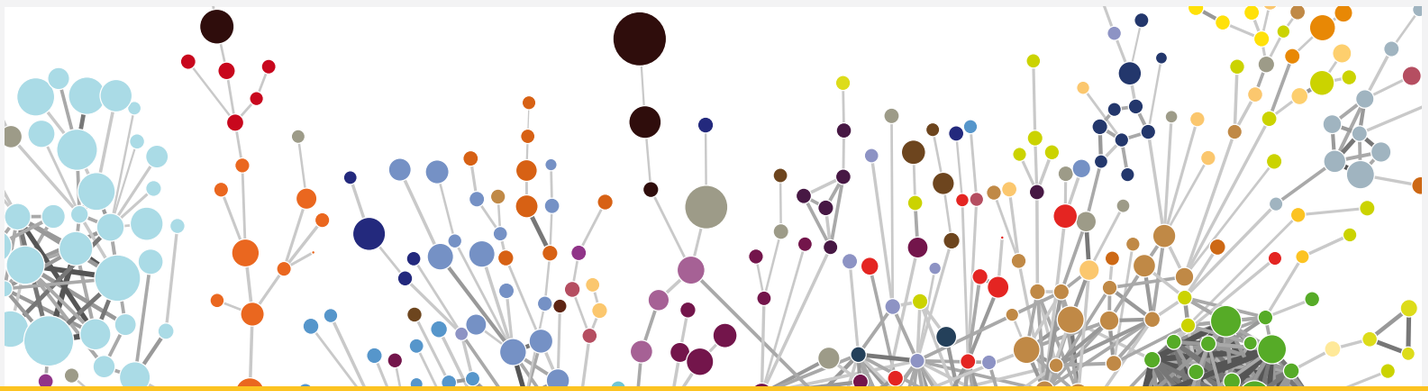
To visualize the product space we use some simple design criteria. First, we want the visualization of the product space to be a connected network. By this, we mean avoiding islands of isolated products. The second criteria is that we want the network visualization to be relatively sparse. Trying to visualize too many links can create unnecessary visual complexity where the most relevant connections will be occluded. This criteria is achieved by creating a visualization in which the average number of links per node is not larger than 5 and results in a representation that can summarize the structure of the product space using the strongest 1% of the links.

To make sure the visualization of the product space is connected, we calculate the maximum spanning tree (MST) of the proximity matrix. MST is the set of links that connects all the nodes in the network using a minimum number of connections and the maximum possible sum of proximities. We calculated the MST using Kruskal's algorithm. Basically the algorithm sorts the values of the proximity matrix in descending order and then includes links in the MST if and only if they connect an isolated product. By definition, the MST includes all products, but the number of links is the minimum possible.

The second step is to add the strongest connections that were not selected for the MST. In this visualization we included the first 1,006 connections satisfying our criterion. By definition a spanning tree for 774 nodes contains 773 edges. With the additional 1,006 connections we end up with 1,779 edges and an average degree of nearly 4.6.

After selecting the links using the above mentioned criteria we build a visualization using a Force-Directed layout algorithm. In this algorithm nodes repel each other, just like electric charges, while edges act as spring trying to bring connected nodes together. This helps to create a visualization in which densely connected sets of nodes are put together while nodes that are not connected are pushed apart.

Finally, we manually clean up the layout to minimize edge crossings and provide the most clearly representation possible.



TECHNICAL BOX 5.3: IDENTIFYING PRODUCT COMMUNITIES

In network science, groups of highly interconnected nodes are known as communities. In the Product Space, communities represent groups of products that are likely to require many of the same capabilities.

We assign products to communities using the algorithm introduced by Rosvall and Bergstrom (2008). This algorithm finds communities using a two step process. First, it explores the network using a collection of random walkers. The intuition behind this first step is that nodes belonging to the same community are more likely to lie close by in the sequence of nodes visited by a random walker. For instance, take *photographic film, photographic chemicals* and *silicones*. These are three products that are interconnected and belong to a densely connected region of the product space. Hence, the random walker is much more likely to go through the sequences {*silicones, photographic chemicals, photographic film*} or {*photographic film, silicones, photographic chemicals*} than {*photographic film, grapes, blouses*}. The emergence of these sequences indicates that photographic film, photographic chemicals and silicones, probably belong to the same community. After several iterations of random walks have been recorded, the algorithm tries to compresses these sequences by looking for ways to rename nodes and minimize the amount of space required to store information about these sequences. For instance, if *silicones, photographic films,* and *photographic chemicals* are grouped into a community called photographic materials this would allow compressing the sequence by replacing each time it appears by a reference to that community. The algorithm looks for a compression that preserves as much information as possible. This avoids the trivial solution in which all products are assigned to the same community.

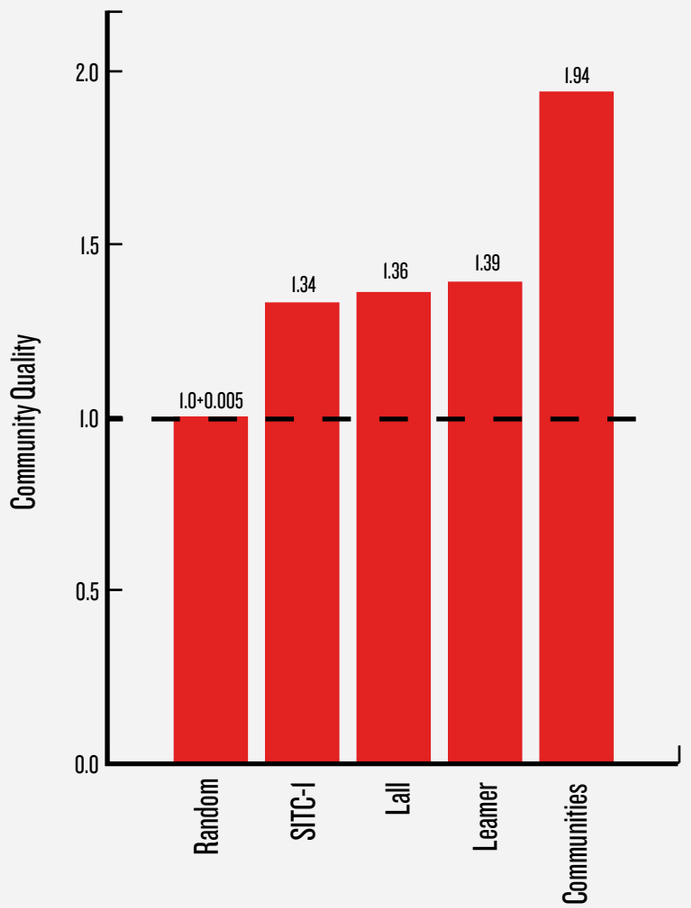
The communities determined through this algorithm were manually named and merged into 34 communities (see Table 5.1 for details).

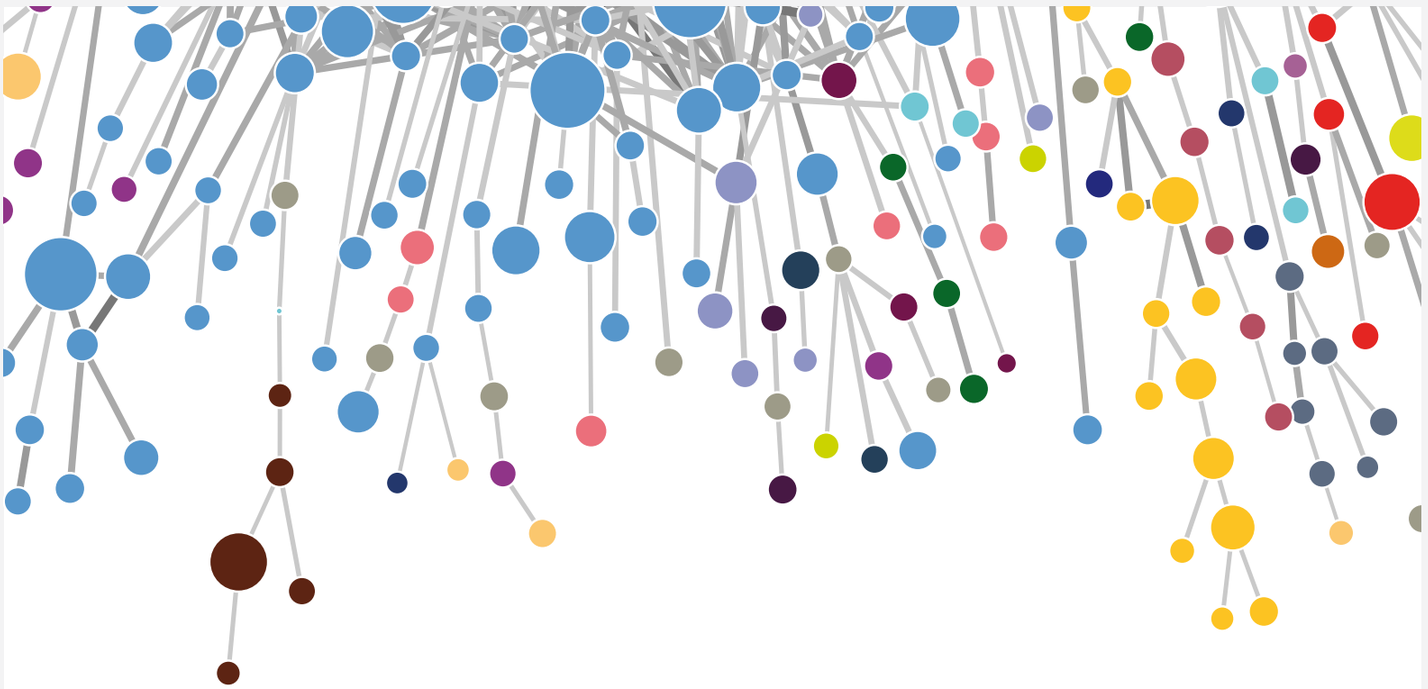
We compare the ability of these communities to summarize the structure of the product space by introducing a measure of *community quality*. This is the ratio between the average proximity of the links within a community, and those connecting products from that community to products in other communities.

To get a sense of the community quality we compare our assignment of products into communities with a baseline null model and three popular categorizations. The baseline null model is given by an ensemble of communities of the same size, where nodes have been assigned to each community at random. In this case, the average strength of the links within communities is equal to the average strength of links between communities, and the community quality is 1. The three categorizations we use as comparators are: the first digit of the Standard International Trade Classification, the categories introduced by Leamer (1984) -based on factor intensities- and the technology categories introduced by Lall (2000). All three classifications produce values of the community quality between 1.3 and 1.4, indicating that links within communities tend to be, on average, 30% to 40% stronger than those between communities. The communities we propose here have a community quality value of 1.94, indicating that the links between nodes in the same community are, on average, 94% stronger than those connecting nodes between communities (Figure 5.3.1). The difference in community quality of our proposed community system and that of the three alternative categorizations is highly statistically significant with a p-value<1x10^{-30}.

FIGURE 5.3.1:

Community quality for five different ways of grouping products.





TECHNICAL BOX 5.4: UNDERSTANDING THE POSITION OF COUNTRIES IN THE PRODUCT SPACE: DISTANCE, OPPORTUNITY VALUE AND OPPORTUNITY GAIN

Empirically, we find that countries move through the product space by developing goods close to those they currently produce. But countries do not make just one product; they make a certain number. Proximity measures the similarity between a pair of products, so we need another measure to quantify the distance between the products that a country makes and each of the products that it does not. We call this measure distance and define it as the sum of the proximities connecting a new good p to all the products that country c is not currently exporting. We normalize distance by dividing it by the sum of proximities between all products and product p. In other words, distance is the weighted proportion of products connected to good p that country c is not exporting. The weights are given by proximities. If country c exports most of the goods connected to product p, then the distance will be short, close to 0. But, if country c only exports a small proportion of the products that are related to product p, then the distance will be large (close to 1). Formally,

$$d_{cp} = \frac{\sum_{p'}(1 - M_{cp'})\phi_{pp'}}{\sum_{p'}\phi_{pp'}}$$

Distance gives us an idea of how far each product is given a country's current mix of exports. Yet, it would be useful to have a holistic measure of the opportunities implied by a country's position in the product space. Countries that make products that are relatively complex, given their current level of income, tend to grow faster. Hence, it makes sense to include not only the distance to products, but also their complexity. Some countries may be located near few, poorly connected and relatively simple products, while others may have a rich unexploited neighborhood of highly connected or complex products. This means that countries differ not just in what they make but in what their opportunities are. We can think of this as the value of the option to move into other products.

Hence, to quantify the "opportunity value" of a country's unexploited prospects we can add the level of complexity of the products that it is not currently weighted by how close these products are to the country's current export suite. We can write this mathematically as:

$$opportunity\ value_{c} = \sum_{p'}(1 - d_{cp'})(1 - M_{cp'})\,PCI_{p'}$$

Where PCI is the Product Complexity Index of product p'. The term $1 - M_{cp'}$ makes sure that we count only the products that the country is not currently producing. Higher opportunity value implies being in the vicinity of more products and/or of products that are more complex.

We can use opportunity value to calculate the potential benefit to a country if it were to move to a particular new product. We call this the "opportunity gain" that country c would obtain from making product p. This is calculated as the change in opportunity value that would come as a consequence of developing product p. Opportunity gain quantifies the contribution of a new product in terms of opening up the doors to more and more complex products. Formally, we can write the opportunity gain as:

$$opportunity\ gain_{c} = \sum_{p'}\frac{\phi_{pp'}}{\sum_{p''}\phi_{p''p'}}(1 - M_{cp'})\,PCI_{p'} - (1 - d_{cp})\,PCI_{p}$$

How Can This Atlas Be Used?

SECTION 6

In recent years there has been an explosion in the use of indexes to rank countries, corporations, cities and other entities in terms of a myriad of indicators. We have the Human Development Index, put together by the United Nations Development Program (UNDP), the Freedom House's Freedom Index, the World Bank's Doing Business, Investment Climate Assessment and Governance indexes, the World Economic Forum's Competitiveness, Gender Gap and Trade Facilitation indexes, the OECD's Programme for International Student Assessment (PISA), the credit ratings of governments and corporations put together by Standard & Poor's, Moody's and Fitch, and the Quality of Development Assistance published by the Center for Global Development.

The popularity and usefulness of these efforts reflect the fact that they provide feedback about the relative performance of an entity on dimensions that societies find important and that the publishers want to highlight. The indexes may help the rated entities to evolve towards better outcomes by benchmarking current performance, vis-a-vis the best achievers, and by encouraging learning through imitation and experimentation around best practices.

Here it may be useful to distinguish between the two roles of any indicator. The first one is as a measure and the second one is as a guide to action. As a measure, the critical question is whether the index is able to adequately represent the information that one wants to capture, whether it is freedom, human development, solvency, business environment, governance, educational quality or, in our case, productive knowledge. As a guide to action the question is what interventions will lead an entity to improve its performance on the index.

With respect to the latter question, indexes differ in how clearly they map to a plan of action. At one extreme, the World Bank's Doing Business Index is based on the statutory requirements to perform certain functions such as registering and closing a business or obtaining a license. Here the course of action is clear: change the statutes in a direction that would improve the re-calculated index. However, in other cases, such as improving rule of law, educational quality, gender equality, the control of corruption or competitiveness, the mapping is not so clear. It is hard to know precisely which changes in current practice would be reflected in better performance. This is a general problem in many areas where the relationship between action and performance is complex. Should schools reduce class size, improve teacher training, increase nutritional assistance or implement standardized exams in order to improve educational quality? Should societies get more policemen, revamp the judicial system, encourage press freedom, revise their gun laws or confront organized crime in order to improve rule of law? The best humans have been able to do is to emulate some of the features of the best performers in the hopes that the elements that were selected for imitation may prove crucial to the achievement of better outcomes. If they do, this will hopefully be reflected in future measures of the index. If they do not, other actions will be tried until the action taken is consistently followed by a change in the desired direction.

In our case, the Economic Complexity Index (ECI) is based on the number and the complexity of the products that a country exports with comparative advantage. Empirically,

countries that do well in this index, given their income level, tend to achieve higher levels of economic growth. The ability to successfully export new products is a reflection of the fact that the country has acquired new productive knowledge that will then open up further opportunities for progress. What a country needs to do to achieve this will be highly specific to the context of the country and the product. Better seeds could cause an agricultural revolution; improved infrastructure could open up new possibilities for light manufactures; clarifying property rights and human subject regulations may allow for participation in pharmaceutical research; changing the responsiveness of training institutions to the needs of new sectors may unleash their growth; etc.

The Economic Complexity Index is not easy to manipulate through a narrow set of decisions. Ultimately, countries improve on the index by being able to increase the number of different activities they can successfully engage in and by moving towards activities that are more complex. The policy message for most countries is clear: create an environment where a greater diversity of productive activities can thrive and, in particular, activities that are relatively more complex. Countries are more likely to succeed in this agenda if they focus on products that are close to their current set of productive capabilities, as this would facilitate the identification and provision of the missing capabilities. The ECI therefore, is accompanied by maps that help chart the opportunities and rewards available for each country. These are maps that are specific to each country and do not represent one-size-fits-all development advice.

These maps, however, could also be used by firms searching for a new location or looking to diversify into a new product. These maps carry information about the productive capabilities that are present in a given country and the degree to which these capabilities are relevant to support a particular new industry.

A map does not tell people where to go, but it does help them determine their destination and chart their journey towards it. A map empowers by describing opportunities that would not be obvious in the absence of it. If the secret to development is the accumulation of productive knowledge, at a societal rather than individual level, then the process necessarily requires the involvement of many explorers, not just a few planners. This is why the maps we provide in this Atlas are intended for everyone to use.

Which Countries Are Included in This Atlas?

SECTION 7

Countries are highly heterogeneous. When it comes to the size of their population, territory, income and economy, countries differ by orders of magnitude. When it comes to land, Russia is 1,000 times larger than Kuwait. When it comes to population, China is more than 600 times more populous than Slovenia. When it comes to Gross Domestic Product, the United States is more than 1,300 times larger than Namibia. All of these are countries that made it into this Atlas, illustrating the large cross section of the world captured in this book.

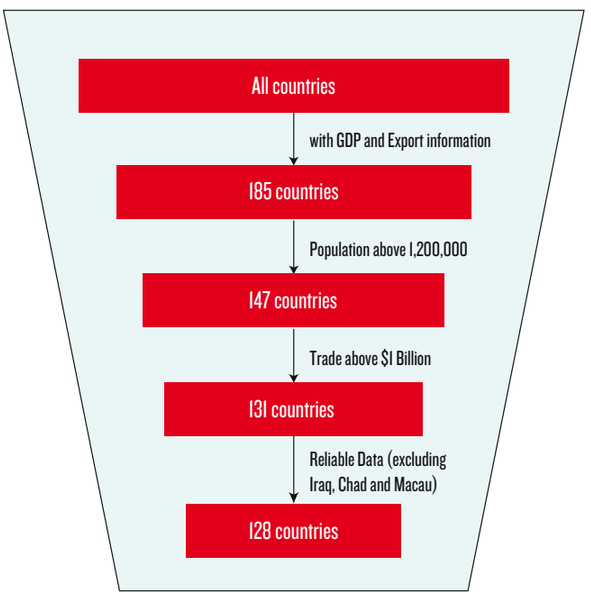
Products also differ enormously in terms of their world market size. Depending on the year, crude oil represents five to ten percent of world trade while goat skins represent less than one part in one hundred thousand of world trade. To make countries and products comparable we control for the size of the country and of the product by calculating their Revealed Comparative Advantage (see *Technical Box 2.2*). This means that large and small countries and products with big and small markets count the same as far as our method is concerned. Moreover, the data of each country affects the calculations of all others so including data that is noisy or unreliable greatly affects the integrity of our calculations.

Countries that are too small in terms of their export base, such as Tuvalu or Vanuatu, or with data that is highly unreliable or not adequately classified, do not provide us with a sufficiently broad sample to infer their structure. This is why we restrict the analysis to 128 countries, which account for 99% of world trade, 97% of the world's total GDP and 95% of the world's population.

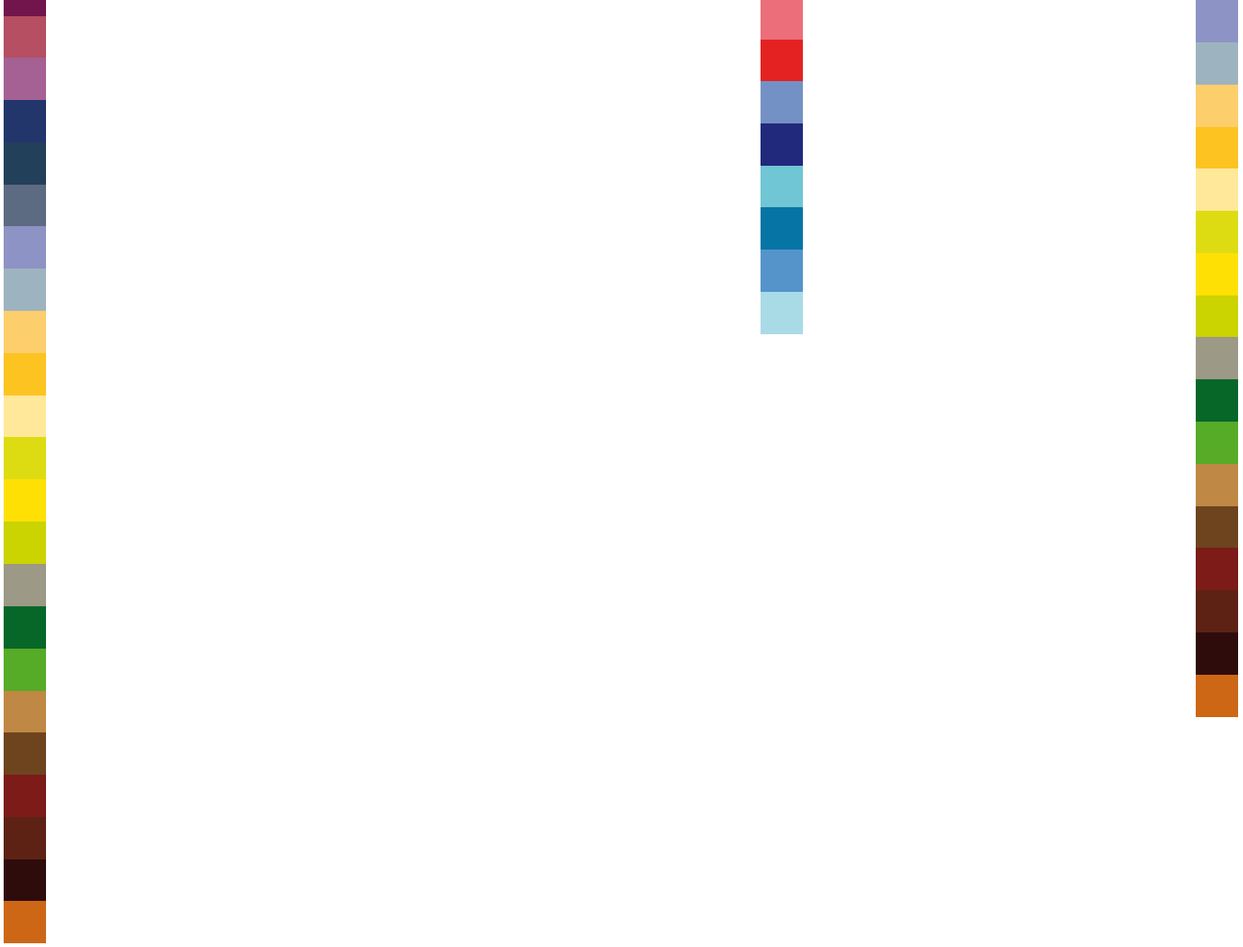
To generate this list we used a variety of criteria. First, we limit ourselves only to the set of countries for which there is product-level trade data available in the UN COMTRADE and income data available for 2008. Second, we only use data on countries with a population above 1,200,000. Third, we only consider countries that exported at least 1 billion dollars per year, on average, between 2006 and 2008. Finally we remove from this sample Iraq, Macau and Chad, three countries with severe data quality issues (*Figure 7.1*).

FIGURE 7.1:

Schematic of the procedure used to determine the countries that were included in the Atlas.



PART 2 COMPLEXITY RANKINGS



In this part we present five different rankings. These rankings sort countries according to:

RANKING 1: **Economic Complexity Index (ECI).**

RANKING 2: **Expected Growth in Per Capita GDP to 2020.**

RANKING 3: **Expected GDP Growth to 2020.**

RANKING 4: **Change in Economic Complexity (1964-2008).**

RANKING 5: **Expected Contribution to World GDP Growth to 2020.**

Each of these five rankings captures a different aspect of the world economy. This is well illustrated by the five countries that make it to the top of each ranking. According to the aforementioned ranking order, these are: Japan, China, Uganda, Mauritius and The United States. The heterogeneity of this group shows the wide range of dimensions that are captured by these five different rankings (Table I). Next, we comment each one of them briefly, and invite readers to explore them by themselves.

TABLE I

Correlations between the five different rankings. The low correlations between the rankings indicate that these tend to capture different dimensions of the world economy.

	R2: Per capita Growth Potential	R3: Total Growth	R4: Change in Complexity	R5: Contribution to World GDP
RI: Economic Complexity	0.45	-0.22	0.17	0.58
R2: Per capita Growth Potential		0.54	0.57	0.09
R3: Total Growth			0.54	-0.13
R4: Change in Complexity				-0.09

RANKING 1:

Economic Complexity Index

RANKING 1 shows the Economic Complexity ranking. Here countries are sorted based on the amount of productive knowledge that is implied in their export structures (*see Part 1, Section 2: How do we measure economic complexity?*). The countries in the top ten of this ranking are Japan, Germany, Switzerland, Sweden, Austria, Finland, Singapore, Czech Republic, the UK and Slovenia. Immediately after the top 10 we have France, Korea and the US. Of the top 20 countries, half are in Western Europe, 3 are in East Asia, and surprisingly 4 are in Eastern Europe. Israel and Mexico close the list of the top 20. These are countries with productive structures that are able to hold vast amounts of productive knowledge, and that manufacture and export a large number of sophisticated goods. At the bottom of the economic complexity ranking we have Papua New Guinea, The Republic of Congo, Sudan, Angola and Mauritania. *Figure 1* illustrates the relative levels of economic complexity of countries in Ranking 1 by plotting ECI as a function of a country's current level of GDP per capita. In *Map 1*, countries are color coded according to their position in ranking 1.

Interestingly the least complex countries in Western Europe are Portugal (35) and Greece (53), two countries whose high income cannot be explained by either their complexity or their natural resource wealth. We do not think that this is unrelated to their present difficulties: their current income has been propped up by massive capital inflows and, as these decline to more sustainable levels, the internal weaknesses come to the fore. The ECI, however, illustrates clearly how these mismatches can be identified from the data.

BY REGION:

By region, the most complex economies in Eastern Europe and Central Asia are the Czech Republic, Slovenia and Hungary, while the worst performing ones are Tajikistan, Turkmenistan and Azerbaijan. In Latin America and the Caribbean the best performers are Mexico (ranked 20), Panama (30) and Costa Rica (49); Brazil ranks fourth (52 in the worldwide scale) followed by Colombia (54). The worst performers are Ecuador (93), Nicaragua (97), Bolivia (101) and Venezuela (111). In East Asia and the Pacific, the best performers are Japan (1), Singapore (7) and Korea (12), followed by Hong Kong (24), China (29) and Thailand (31). The worst performers are Lao (102), Mongolia (113) and Papua New Guinea (124).

In South Asia, the best performing country is India (51) followed by Sri Lanka (71) and Pakistan (82). The list is closed by Bangladesh (103).

Finally, In Sub-Saharan Africa the most complex economies are South Africa (55), Namibia (72), Kenya (73), Senegal (74) and Mauritius (77). The worst performers are Guinea (123), the Republic of Congo (125), Sudan (126), Angola (127) and Mauritania (128). We note that many African countries are not in the rank because they did not satisfy our data filtering criteria (*see Part 1, Section 7: Which countries are in the Atlas?*).

In the Middle East and North Africa, the best performers are Israel (19), Lebanon (44), Jordan (45), Tunisia (47) and Egypt (53). The worst performers are Kuwait (116), Iran (118) and Libya (119), where the overwhelming presence of oil indicates a narrow base of productive knowledge.

RANKING I. ECONOMIC COMPLEXITY INDEX

RANK ECI COMPLEXITY (2008)	REGIONAL ECI RANKING	COUNTRY NAME	ISO CODE	ECI 2008	RANK INCOME 2009 [USD]	INCOME 2009 [USD]	REGION
1	1/16	JAPAN	JPN	2.316	17	39,738	EAST ASIA AND PACIFIC
2	1/16	GERMANY	DEU	1.985	16	40,670	WESTERN EUROPE
3	2/16	SWITZERLAND	CHE	1.935	3	63,629	WESTERN EUROPE
4	3/16	SWEDEN	SWE	1.859	13	43,654	WESTERN EUROPE
5	4/16	AUSTRIA	AUT	1.807	10	45,562	WESTERN EUROPE
6	5/16	FINLAND	FIN	1.715	11	44,581	WESTERN EUROPE
7	2/16	SINGAPORE	SGP	1.639	19	36,537	EAST ASIA AND PACIFIC
8	1/27	CZECH REPUBLIC	CZE	1.628	29	18,139	EASTERN EUROPE AND CENTRAL ASIA
9	6/16	UNITED KINGDOM	GBR	1.558	20	35,165	WESTERN EUROPE
10	2/27	SLOVENIA	SVN	1.523	27	23,726	EASTERN EUROPE AND CENTRAL ASIA
11	7/16	FRANCE	FRA	1.473	15	41,051	WESTERN EUROPE
12	3/16	KOREA, REP.	KOR	1.469	30	17,078	EAST ASIA AND PACIFIC
13	1/2	UNITED STATES	USA	1.447	9	45,989	NORTH AMERICA
14	3/27	HUNGARY	HUN	1.430	37	12,868	EASTERN EUROPE AND CENTRAL ASIA
15	4/27	SLOVAK REPUBLIC	SVK	1.379	32	16,176	EASTERN EUROPE AND CENTRAL ASIA
16	8/16	ITALY	ITA	1.308	21	35,084	WESTERN EUROPE
17	9/16	DENMARK	DNK	1.267	4	55,992	WESTERN EUROPE
18	10/16	IRELAND	IRL	1.231	6	51,049	WESTERN EUROPE
19	1/16	ISRAEL	ISR	1.164	26	26,256	MIDDLE EAST AND NORTH AFRICA
20	1/21	MEXICO	MEX	1.145	49	8,143	LATIN AMERICA AND THE CARIBBEAN
21	5/27	BELARUS	BLR	1.116	64	5,075	EASTERN EUROPE AND CENTRAL ASIA
22	11/16	BELGIUM	BEL	1.085	12	43,671	WESTERN EUROPE
23	12/16	NETHERLANDS	NLD	1.044	8	47,917	WESTERN EUROPE
24	4/16	HONG KONG SAR, CHINA	HKG	1.023	23	30,065	EAST ASIA AND PACIFIC
25	6/27	POLAND	POL	1.020	40	11,273	EASTERN EUROPE AND CENTRAL ASIA
26	7/27	CROATIA	HRV	0.989	36	14,222	EASTERN EUROPE AND CENTRAL ASIA
27	8/27	ROMANIA	ROU	0.936	52	7,500	EASTERN EUROPE AND CENTRAL ASIA
28	13/16	SPAIN	ESP	0.933	22	31,774	WESTERN EUROPE
29	5/16	CHINA	CHN	0.894	81	3,744	EAST ASIA AND PACIFIC
30	2/21	PANAMA	PAN	0.831	54	7,155	LATIN AMERICA AND THE CARIBBEAN
31	6/16	THAILAND	THA	0.814	78	3,893	EAST ASIA AND PACIFIC
32	9/27	ESTONIA	EST	0.791	35	14,238	EASTERN EUROPE AND CENTRAL ASIA
33	14/16	NORWAY	NOR	0.777	1	79,089	WESTERN EUROPE
34	7/16	MALAYSIA	MYS	0.759	55	7,030	EAST ASIA AND PACIFIC
35	15/16	PORTUGAL	PRT	0.696	28	21,903	WESTERN EUROPE
36	10/27	LITHUANIA	LTU	0.683	41	11,141	EASTERN EUROPE AND CENTRAL ASIA
37	11/27	SERBIA	SRB	0.644	60	5,872	EASTERN EUROPE AND CENTRAL ASIA
38	12/27	BOSNIA AND HERZEGOVINA	BIH	0.597	68	4,525	EASTERN EUROPE AND CENTRAL ASIA
39	13/27	LATVIA	LVA	0.594	38	11,616	EASTERN EUROPE AND CENTRAL ASIA
40	14/27	BULGARIA	BGR	0.587	57	6,423	EASTERN EUROPE AND CENTRAL ASIA
41	2/2	CANADA	CAN	0.571	18	39,599	NORTH AMERICA
42	15/27	UKRAINE	UKR	0.559	87	2,468	EASTERN EUROPE AND CENTRAL ASIA
43	16/27	TURKEY	TUR	0.444	47	8,215	EASTERN EUROPE AND CENTRAL ASIA

RANKING I. ECONOMIC COMPLEXITY INDEX

RANK ECI COMPLEXITY (2008)	REGIONAL ECI RANKING	COUNTRY NAME	ISO CODE	ECI 2008	RANK INCOME 2009 [USD]	INCOME 2009 [USD]	REGION
44	2/16	LEBANON	LBN	0.403	48	8,175	MIDDLE EAST AND NORTH AFRICA
45	3/16	JORDAN	JOR	0.325	73	4,216	MIDDLE EAST AND NORTH AFRICA
46	17/27	RUSSIAN FEDERATION	RUS	0.324	45	8,684	EASTERN EUROPE AND CENTRAL ASIA
47	4/16	TUNISIA	TUN	0.294	80	3,792	MIDDLE EAST AND NORTH AFRICA
48	8/16	NEW ZEALAND	NZL	0.287	24	29,352	EAST ASIA AND PACIFIC
49	3/21	COSTA RICA	CRI	0.278	58	6,386	LATIN AMERICA AND THE CARIBBEAN
50	18/27	MOLDOVA	MDA	0.266	97	1,516	EASTERN EUROPE AND CENTRAL ASIA
51	1/4	INDIA	IND	0.247	99	1,192	SOUTH ASIA
52	4/21	BRAZIL	BRA	0.244	46	8,230	LATIN AMERICA AND THE CARIBBEAN
53	16/16	GREECE	GRC	0.214	25	29,240	WESTERN EUROPE
54	5/21	COLOMBIA	COL	0.200	63	5,126	LATIN AMERICA AND THE CARIBBEAN
55	1/26	SOUTH AFRICA	ZAF	0.131	61	5,786	SUB-SAHARAN AFRICA
56	6/21	URUGUAY	URY	0.109	44	9,420	LATIN AMERICA AND THE CARIBBEAN
57	7/21	ARGENTINA	ARG	0.106	50	7,626	LATIN AMERICA AND THE CARIBBEAN
58	19/27	ALBANIA	ALB	0.087	79	3,808	EASTERN EUROPE AND CENTRAL ASIA
59	9/16	PHILIPPINES	PHL	0.032	95	1,752	EAST ASIA AND PACIFIC
60	8/21	EL SALVADOR	SLV	0.026	82	3,424	LATIN AMERICA AND THE CARIBBEAN
61	10/16	INDONESIA	IDN	-0.007	89	2,349	EAST ASIA AND PACIFIC
62	20/27	MACEDONIA, FYR	MKD	-0.018	69	4,515	EASTERN EUROPE AND CENTRAL ASIA
63	5/16	EGYPT, ARAB REP.	EGY	-0.021	90	2,270	MIDDLE EAST AND NORTH AFRICA
64	9/21	DOMINICAN REPUBLIC	DOM	-0.064	66	4,637	LATIN AMERICA AND THE CARIBBEAN
65	10/21	GUATEMALA	GTM	-0.099	84	2,661	LATIN AMERICA AND THE CARIBBEAN
66	6/16	UNITED ARAB EMIRATES	ARE	-0.106	7	50,070	MIDDLE EAST AND NORTH AFRICA
67	11/16	VIETNAM	VNM	-0.181	105	1,113	EAST ASIA AND PACIFIC
68	7/16	SAUDI ARABIA	SAU	-0.201	34	14,799	MIDDLE EAST AND NORTH AFRICA
69	21/27	KYRGYZ REPUBLIC	KGZ	-0.240	114	860	EASTERN EUROPE AND CENTRAL ASIA
70	22/27	GEORGIA	GEO	-0.263	88	2,449	EASTERN EUROPE AND CENTRAL ASIA
71	2/4	SRI LANKA	LKA	-0.265	92	2,068	SOUTH ASIA
72	2/26	NAMIBIA	NAM	-0.271	72	4,267	SUB-SAHARAN AFRICA
73	3/26	KENYA	KEN	-0.276	115	738	SUB-SAHARAN AFRICA
74	4/26	SENEGAL	SEN	-0.287	109	1,023	SUB-SAHARAN AFRICA
75	8/16	SYRIAN ARAB REPUBLIC	SYR	-0.290	86	2,474	MIDDLE EAST AND NORTH AFRICA
76	11/21	TRINIDAD AND TOBAGO	TTO	-0.306	33	15,841	LATIN AMERICA AND THE CARIBBEAN
77	5/26	MAURITIUS	MUS	-0.307	56	6,735	SUB-SAHARAN AFRICA
78	12/21	CHILE	CHL	-0.312	43	9,644	LATIN AMERICA AND THE CARIBBEAN
79	12/16	AUSTRALIA	AUS	-0.321	14	42,279	EAST ASIA AND PACIFIC
80	6/26	ZIMBABWE	ZWE	-0.327	122	449	SUB-SAHARAN AFRICA
81	13/21	JAMAICA	JAM	-0.343	70	4,471	LATIN AMERICA AND THE CARIBBEAN
82	3/4	PAKISTAN	PAK	-0.398	111	955	SOUTH ASIA
83	9/16	MOROCCO	MAR	-0.400	83	2,811	MIDDLE EAST AND NORTH AFRICA
84	14/21	CUBA	CUB	-0.426	62	5,596	LATIN AMERICA AND THE CARIBBEAN
85	10/16	QATAR	QAT	-0.438	2	69,754	MIDDLE EAST AND NORTH AFRICA
86	15/21	PARAGUAY	PRY	-0.474	91	2,242	LATIN AMERICA AND THE CARIBBEAN

RANKING I. ECONOMIC COMPLEXITY INDEX

RANK ECI COMPLEXITY (2008)	REGIONAL ECI RANKING	COUNTRY NAME	ISO CODE	ECI 2008	RANK INCOME 2009 [USD]	INCOME 2009 [USD]	REGION
87	7/26	UGANDA	UGA	-0.488	121	490	SUB-SAHARAN AFRICA
88	16/21	HONDURAS	HND	-0.518	93	1,918	LATIN AMERICA AND THE CARIBBEAN
89	17/21	PERU	PER	-0.576	71	4,469	LATIN AMERICA AND THE CARIBBEAN
90	8/26	MADAGASCAR	MDG	-0.594	123	438	SUB-SAHARAN AFRICA
91	11/16	OMAN	OMN	-0.604	31	16,207	MIDDLE EAST AND NORTH AFRICA
92	23/27	KAZAKHSTAN	KAZ	-0.608	53	7,257	EASTERN EUROPE AND CENTRAL ASIA
93	18/21	ECUADOR	ECU	-0.619	74	4,202	LATIN AMERICA AND THE CARIBBEAN
94	9/26	BOTSWANA	BWA	-0.620	59	6,064	SUB-SAHARAN AFRICA
95	10/26	TANZANIA	TZA	-0.637	120	503	SUB-SAHARAN AFRICA
96	24/27	UZBEKISTAN	UZB	-0.658	101	1,156	EASTERN EUROPE AND CENTRAL ASIA
97	19/21	NICARAGUA	NIC	-0.661	108	1,069	LATIN AMERICA AND THE CARIBBEAN
98	13/16	CAMBODIA	KHM	-0.702	117	706	EAST ASIA AND PACIFIC
99	11/26	CÔTE D'IVOIRE	CIV	-0.868	106	1,106	SUB-SAHARAN AFRICA
100	12/26	GHANA	GHA	-0.868	107	1,098	SUB-SAHARAN AFRICA
101	20/21	BOLIVIA	BOL	-0.879	94	1,758	LATIN AMERICA AND THE CARIBBEAN
102	14/16	LAO PDR	LAO	-0.880	112	940	EAST ASIA AND PACIFIC
103	4/4	BANGLADESH	BGD	-0.887	119	551	SOUTH ASIA
104	13/26	ETHIOPIA	ETH	-0.892	126	344	SUB-SAHARAN AFRICA
105	14/26	ZAMBIA	ZMB	-0.933	110	990	SUB-SAHARAN AFRICA
106	15/26	MALAWI	MWI	-1.024	127	310	SUB-SAHARAN AFRICA
107	12/16	YEMEN, REP.	YEM	-1.042	104	1,118	MIDDLE EAST AND NORTH AFRICA
108	25/27	TAJIKISTAN	TJK	-1.054	116	716	EASTERN EUROPE AND CENTRAL ASIA
109	16/26	MOZAMBIQUE	MOZ	-1.077	124	428	SUB-SAHARAN AFRICA
110	17/26	MALI	MLI	-1.103	118	691	SUB-SAHARAN AFRICA
111	21/21	VENEZUELA, RB	VEN	-1.109	39	11,490	LATIN AMERICA AND THE CARIBBEAN
112	18/26	LIBERIA	LBR	-1.128	128	222	SUB-SAHARAN AFRICA
113	15/16	MONGOLIA	MNG	-1.166	96	1,573	EAST ASIA AND PACIFIC
114	13/16	ALGERIA	DZA	-1.213	76	4,029	MIDDLE EAST AND NORTH AFRICA
115	26/27	TURKMENISTAN	TKM	-1.217	77	3,904	EASTERN EUROPE AND CENTRAL ASIA
116	14/16	KUWAIT	KWT	-1.219	5	54,260	MIDDLE EAST AND NORTH AFRICA
117	27/27	AZERBAIJAN	AZE	-1.223	65	4,899	EASTERN EUROPE AND CENTRAL ASIA
118	15/16	IRAN, ISLAMIC REP.	IRN	-1.229	67	4,540	MIDDLE EAST AND NORTH AFRICA
119	16/16	LIBYA	LBY	-1.304	42	9,714	MIDDLE EAST AND NORTH AFRICA
120	19/26	GABON	GAB	-1.364	51	7,502	SUB-SAHARAN AFRICA
121	20/26	CAMEROON	CMR	-1.403	102	1,136	SUB-SAHARAN AFRICA
122	21/26	NIGERIA	NGA	-1.418	103	1,118	SUB-SAHARAN AFRICA
123	22/26	GUINEA	GIN	-1.444	125	407	SUB-SAHARAN AFRICA
124	16/16	PAPUA NEW GUINEA	PNG	-1.577	100	1,172	EAST ASIA AND PACIFIC
125	23/26	CONGO, REP.	COG	-1.707	85	2,601	SUB-SAHARAN AFRICA
126	24/26	SUDAN	SDN	-1.768	98	1,294	SUB-SAHARAN AFRICA
127	25/26	ANGOLA	AGO	-1.793	75	4,081	SUB-SAHARAN AFRICA
128	26/26	MAURITANIA	MRT	-1.907	113	919	SUB-SAHARAN AFRICA

MAP I:

Countries are color coded according to their position in Ranking 1.

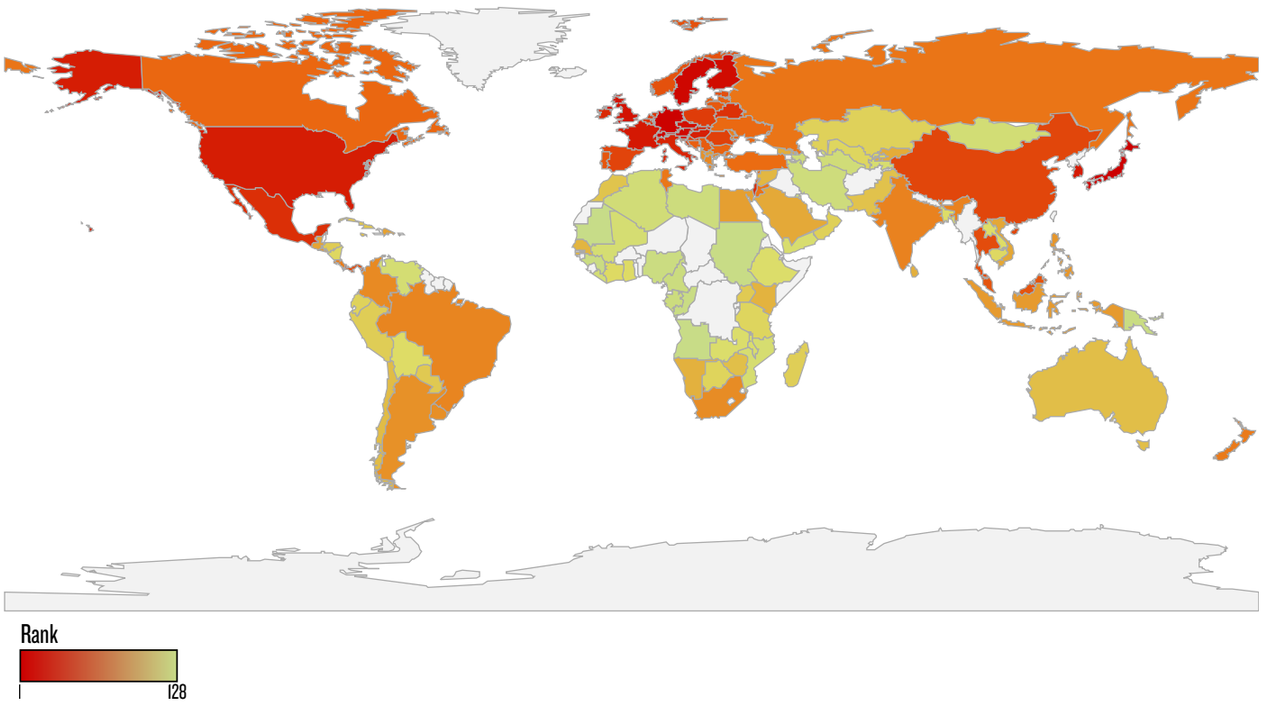
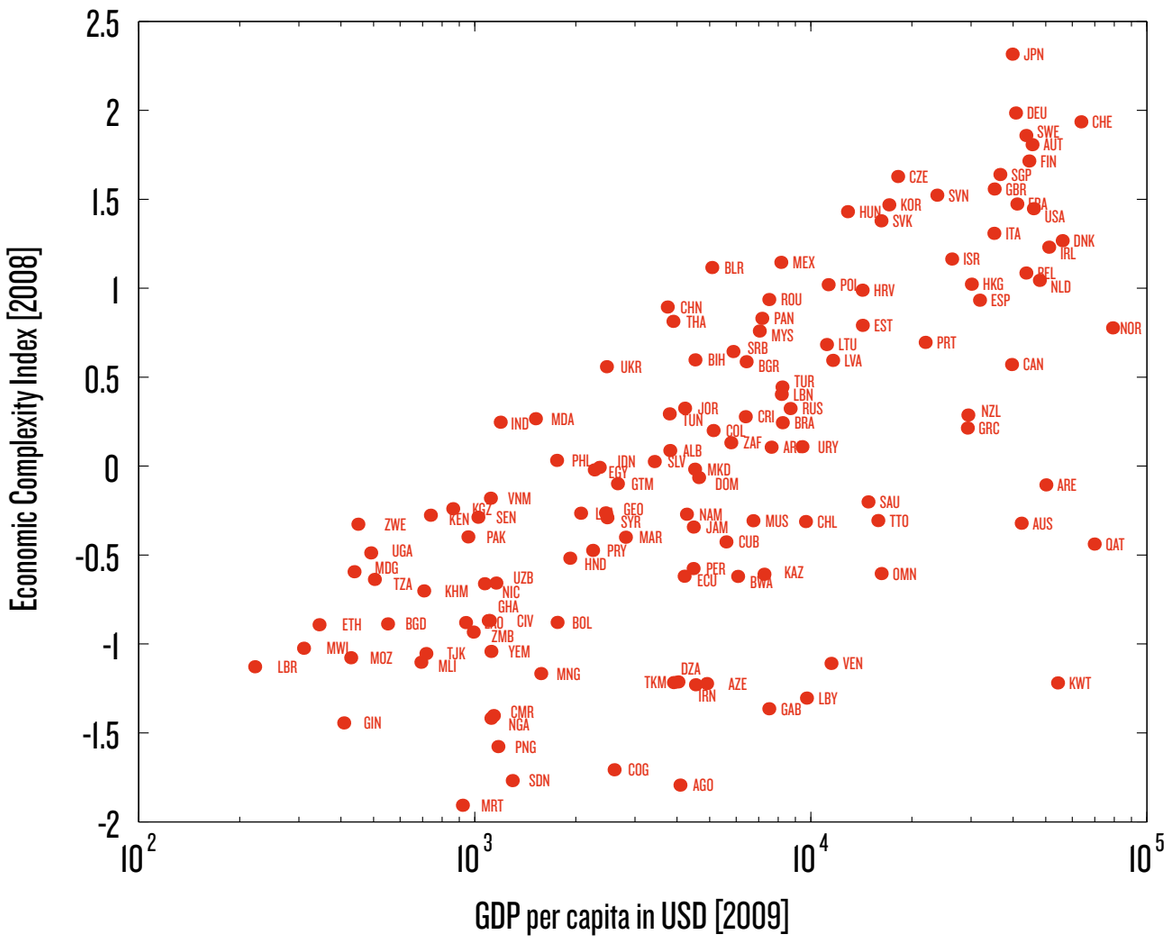


FIGURE I:

Illustrates the relative levels of economic complexity of countries in Ranking 1 by plotting ECI as a function of a country's current level of GDP per capita.



RANKING 2:

Expected Growth in Per Capita GDP to 2020

RANKING 2 sorts countries according to their expected annual per capita growth. Here countries are sorted according to their per capita growth potential, which is estimated from the mismatch between a country's current level of aggregate output (GDP per capita) and their level of economic complexity (*see Part 1, Section 3: Why is complexity important?*). China, India and Thailand are at the top of this ranking, since they are countries with economies that are remarkably complex, given their current level of income, and are expected to catch up faster than other developing nations. Next come Belarus, Moldova, Zimbabwe, Ukraine and Bosnia-Herzegovina, five countries where the current level of income is dramatically lower than what one would expect given their productive capabilities. This ranking shows that the two regions of the world where the potential of per capita growth is higher are East Asia and Eastern Europe (*Map 2*). At the bottom of this ranking we have Sudan, Angola and Mauritania. These are developing countries where the complexity of their economies does not provide a basis for future economic growth, and, where changes in income are dominated by fluctuations in the price and volume of natural resource activities. Per capita growth potential as a function of GDP per capita is illustrated in *Figure 2*.

The projection presented here is driven mainly by the gap between the initial level of complexity of an economy and its level of income. Countries whose income level is low relative to their complexity will grow faster. The opposite occurs for countries whose initial income is high, relative to their initial complexity. The projection requires an assumption about the evolution of natural resource exports. We assume that they will remain constant in real terms at the high level achieved in 2008. We believe this hypothesis is reasonable on average, as commodity prices were unusually high in 2008. To the extent that prices deviate from this assumption, so will growth. We do not include information regarding the changes in the extraction volumes of natural resource in the different countries, so we will tend to underestimate growth in countries where natural resource production is expanding faster than population and overestimating it where it is falling.

BY REGION:

By region, the top performers in East Asia and the Pacific are China (1), Thailand (3), Philippines (11), Vietnam (12) and Malaysia (20), while the worst performance is expected in New Zealand (93), Mongolia (107), Australia (114), and Papua New Guinea (123). In South Asia, India is the regional leader (2), while Bangladesh is the laggard (65).

In the Middle East and North Africa, the expected leaders in GDP per capita growth are Jordan (14), Egypt (18) and Tunisia (19), while the laggards are Libya (120), Qatar (122) and Kuwait (124), three oil exporters that are dragged down by their low complexity and by our assumption that oil exports per real terms will remain at 2008 levels.

In Eastern Europe and Central Asia, the leaders in GDP per capita growth are expected to be Belarus (4), Moldova (5), Ukraine (7) and Bosnia (8). The laggards would be Kazakhstan (98), Turkmenistan (109) and Azerbaijan (112), three low-complexity oil exporters. To the extent that they will carry out their planned expansion in their oil exports, their growth performance will be better than we project.

In Latin America the leaders are Panama (9), Mexico (10), El Salvador (31), Guatemala (35) and Colombia (36), while the laggards are expected to be Chile (86), Bolivia (89), Trinidad and Tobago (103) and Venezuela (115), four exporters of natural resources. Brazil ranks 8th in the region and 48th in the world in expected GDP per capita growth.

In Sub-Saharan Africa, the growth leaders are expected to be Zimbabwe (6), Kenya (13), Uganda (24) and Senegal (25), while the laggards are expected to be Sudan (126), Angola (127) and Mauritania (128).

RANKING 2. EXPECTED GROWTH IN PER CAPITA GDP TO 2020

RANK EXP. GROWTH IN GDP P/C	REGIONAL RANKING EXP. GROWTH IN GDP P/C	COUNTRY NAME	ISO CODE	EXPECTED GROWTH IN GDP P/C 2009-2020	GROWTH IN GDP P/C 1999-2009	RANK INCOME 2009 [USD]	INCOME 2009 [USD]	RANK INCOME 2020	EXPECTED INCOME 2020 [USD]	REGION
1	1/16	CHINA	CHN	4.32%	9.6%	81	3,744	70	5,962	EAST ASIA AND PACIFIC
2	1/4	INDIA	IND	4.26%	5.6%	99	1,192	97	1,886	SOUTH ASIA
3	2/16	THAILAND	THA	4.05%	3.1%	78	3,893	69	6,023	EAST ASIA AND PACIFIC
4	1/27	BELARUS	BLR	3.99%	7.9%	64	5,075	61	7,806	EASTERN EUROPE AND CENTRAL ASIA
5	2/27	MOLDOVA	MDA	3.95%	4.8%	97	1,516	95	2,321	EASTERN EUROPE AND CENTRAL ASIA
6	1/26	ZIMBABWE	ZWE	3.79%	-6.2%	123	449	122	676	SUB-SAHARAN AFRICA
7	3/27	UKRAINE	UKR	3.73%	5.2%	87	2,468	84	3,694	EASTERN EUROPE AND CENTRAL ASIA
8	4/27	BOSNIA AND HERZEGOVINA	BIH	3.59%	4.1%	68	4,525	65	6,669	EASTERN EUROPE AND CENTRAL ASIA
9	1/21	PANAMA	PAN	3.58%	3.9%	54	7,155	51	10,529	LATIN AMERICA AND THE CARIBBEAN
10	2/21	MEXICO	MEX	3.50%	0.8%	49	8,143	44	11,894	LATIN AMERICA AND THE CARIBBEAN
11	3/16	PHILIPPINES	PHL	3.50%	2.6%	95	1,752	93	2,560	EAST ASIA AND PACIFIC
12	4/16	VIETNAM	VNM	3.48%	6.0%	105	1,113	99	1,622	EAST ASIA AND PACIFIC
13	2/26	KENYA	KEN	3.46%	0.9%	115	738	114	1,073	SUB-SAHARAN AFRICA
14	1/16	JORDAN	JOR	3.42%	3.7%	73	4,216	68	6,101	MIDDLE EAST AND NORTH AFRICA
15	5/27	KYRGYZ REPUBLIC	KGZ	3.41%	3.7%	114	860	111	1,244	EASTERN EUROPE AND CENTRAL ASIA
16	6/27	ROMANIA	ROU	3.39%	4.9%	52	7,500	50	10,823	EASTERN EUROPE AND CENTRAL ASIA
17	7/27	SERBIA	SRB	3.38%	3.9%	60	5,872	58	8,467	EASTERN EUROPE AND CENTRAL ASIA
18	2/16	EGYPT, ARAB REP.	EGY	3.37%	2.9%	90	2,270	89	3,268	MIDDLE EAST AND NORTH AFRICA
19	3/16	TUNISIA	TUN	3.36%	3.6%	80	3,792	75	5,456	MIDDLE EAST AND NORTH AFRICA
20	5/16	MALAYSIA	MYS	3.32%	2.8%	55	7,030	53	10,071	EAST ASIA AND PACIFIC
21	6/16	INDONESIA	IDN	3.32%	3.8%	89	2,349	86	3,363	EAST ASIA AND PACIFIC
22	8/27	HUNGARY	HUN	3.31%	2.9%	37	12,868	36	18,420	EASTERN EUROPE AND CENTRAL ASIA
23	9/27	BULGARIA	BGR	3.30%	5.5%	57	6,423	54	9,178	EASTERN EUROPE AND CENTRAL ASIA
24	3/26	UGANDA	UGA	3.29%	3.7%	122	490	120	700	SUB-SAHARAN AFRICA
25	4/26	SENEGAL	SEN	3.27%	1.3%	109	1,023	101	1,457	SUB-SAHARAN AFRICA
26	10/27	CZECH REPUBLIC	CZE	3.11%	3.1%	29	18,139	29	25,415	EASTERN EUROPE AND CENTRAL ASIA
27	2/4	PAKISTAN	PAK	3.11%	2.2%	111	955	107	1,336	SOUTH ASIA
28	7/16	KOREA, REP.	KOR	3.09%	3.9%	30	17,078	30	23.866	EAST ASIA AND PACIFIC
29	11/27	SLOVAK REPUBLIC	SVK	3.08%	4.4%	32	16,176	31	22,579	EASTERN EUROPE AND CENTRAL ASIA
30	12/27	POLAND	POL	3.07%	4.1%	40	11,273	38	15,727	EASTERN EUROPE AND CENTRAL ASIA
31	3/21	EL SALVADOR	SLV	3.06%	1.7%	82	3,424	79	4,770	LATIN AMERICA AND THE CARIBBEAN
32	13/27	ALBANIA	ALB	3.05%	5.2%	79	3,808	76	5,302	EASTERN EUROPE AND CENTRAL ASIA
33	4/16	LEBANON	LBN	3.05%	3.3%	48	8,175	46	11,373	MIDDLE EAST AND NORTH AFRICA
34	5/26	MADAGASCAR	MDG	3.03%	0.2%	124	438	123	608	SUB-SAHARAN AFRICA
35	4/21	GUATEMALA	GTM	3.02%	0.9%	84	2,661	85	3,693	LATIN AMERICA AND THE CARIBBEAN
36	5/21	COLOMBIA	COL	3.02%	2.4%	63	5,126	64	7,107	LATIN AMERICA AND THE CARIBBEAN
37	3/4	SRI LANKA	LKA	2.97%	4.1%	92	2,068	91	2,852	SOUTH ASIA
38	6/21	COSTA RICA	CRI	2.97%	2.1%	58	6,386	56	8,807	LATIN AMERICA AND THE CARIBBEAN
39	6/26	TANZANIA	TZA	2.93%	3.9%	121	503	121	691	SUB-SAHARAN AFRICA
40	14/27	CROATIA	HRV	2.92%	3.5%	36	14,222	32	19,528	EASTERN EUROPE AND CENTRAL ASIA
41	7/26	SOUTH AFRICA	ZAF	2.90%	2.2%	61	5,786	60	7,920	SUB-SAHARAN AFRICA
42	15/27	MACEDONIA, FYR	MKD	2.84%	2.3%	69	4,515	67	6,141	EASTERN EUROPE AND CENTRAL ASIA
43	16/27	TURKEY	TUR	2.83%	2.3%	47	8,215	47	11,168	EASTERN EUROPE AND CENTRAL ASIA

RANKING 2. EXPECTED GROWTH IN PER CAPITA GDP TO 2020

RANK EXP. GROWTH IN GDP P/C	REGIONAL RANKING EXP. GROWTH IN GDP P/C	COUNTRY NAME	ISO CODE	EXPECTED GROWTH IN GDP P/C 2009-2020	GROWTH IN GDP P/C 1999-2009	RANK INCOME 2009 [USD]	INCOME 2009 [USD]	RANK INCOME 2020	EXPECTED INCOME 2020 [USD]	REGION
44	5/16	SYRIAN ARAB REPUBLIC	SYR	2.78%	1.4%	86	2,474	87	3,346	MIDDLE EAST AND NORTH AFRICA
45	7/21	DOMINICAN REPUBLIC	DOM	2.78%	3.5%	66	4,637	66	6,272	LATIN AMERICA AND THE CARIBBEAN
46	17/27	GEORGIA	GEO	2.77%	6.2%	88	2,449	88	3,308	EASTERN EUROPE AND CENTRAL ASIA
47	18/27	LITHUANIA	LTU	2.76%	5.1%	41	11,141	40	15,034	EASTERN EUROPE AND CENTRAL ASIA
48	8/21	BRAZIL	BRA	2.73%	2.0%	46	8,230	48	11,067	LATIN AMERICA AND THE CARIBBEAN
49	19/27	SLOVENIA	SVN	2.72%	2.7%	27	23,726	27	31,881	EASTERN EUROPE AND CENTRAL ASIA
50	8/16	JAPAN	JPN	2.71%	0.6%	17	39,738	14	53,304	EAST ASIA AND PACIFIC
51	9/16	CAMBODIA	KHM	2.66%	6.3%	117	706	116	942	EAST ASIA AND PACIFIC
52	20/27	ESTONIA	EST	2.65%	5.0%	35	14,238	34	18,984	EASTERN EUROPE AND CENTRAL ASIA
53	21/27	LATVIA	LVA	2.63%	5.0%	38	11,616	39	15,454	EASTERN EUROPE AND CENTRAL ASIA
54	9/21	ARGENTINA	ARG	2.61%	2.3%	50	7,626	52	10,130	LATIN AMERICA AND THE CARIBBEAN
55	22/27	UZBEKISTAN	UZB	2.61%	5.1%	101	1,156	100	1,534	EASTERN EUROPE AND CENTRAL ASIA
56	6/16	MOROCCO	MAR	2.60%	3.5%	83	2,811	83	3,727	MIDDLE EAST AND NORTH AFRICA
57	10/21	NICARAGUA	NIC	2.60%	1.5%	108	1,069	102	1,417	LATIN AMERICA AND THE CARIBBEAN
58	11/21	HONDURAS	HND	2.59%	2.3%	93	1,918	94	2,540	LATIN AMERICA AND THE CARIBBEAN
59	23/27	RUSSIAN FEDERATION	RUS	2.58%	5.7%	45	8,684	45	11,491	EASTERN EUROPE AND CENTRAL ASIA
60	8/26	NAMIBIA	NAM	2.56%	2.7%	72	4,267	72	5,637	SUB-SAHARAN AFRICA
61	12/21	URUGUAY	URY	2.53%	2.0%	44	9,420	42	12,399	LATIN AMERICA AND THE CARIBBEAN
62	9/26	ETHIOPIA	ETH	2.53%	5.2%	127	344	126	453	SUB-SAHARAN AFRICA
63	13/21	PARAGUAY	PRY	2.50%	0.3%	91	2,242	90	2,941	LATIN AMERICA AND THE CARIBBEAN
64	7/16	ISRAEL	ISR	2.46%	1.6%	26	26,256	26	34,309	MIDDLE EAST AND NORTH AFRICA
65	4/4	BANGLADESH	BGD	2.40%	4.1%	120	551	119	715	SOUTH ASIA
66	14/21	JAMAICA	JAM	2.35%	0.6%	70	4,471	71	5,773	LATIN AMERICA AND THE CARIBBEAN
67	1/16	GERMANY	DEU	2.34%	0.8%	16	40,670	15	52,428	WESTERN EUROPE
68	10/16	SINGAPORE	SGP	2.30%	3.1%	19	36,537	19	46,943	EAST ASIA AND PACIFIC
69	2/16	PORTUGAL	PRT	2.30%	0.5%	28	21,903	28	28,136	WESTERN EUROPE
70	10/26	MALAWI	MWI	2.27%	1.1%	128	310	127	396	SUB-SAHARAN AFRICA
71	11/16	HONG KONG SAR, CHINA	HKG	2.26%	3.5%	23	30,065	23	38,450	EAST ASIA AND PACIFIC
72	12/16	LAO PDR	LAO	2.24%	4.8%	112	940	113	1,199	EAST ASIA AND PACIFIC
73	11/26	MAURITIUS	MUS	2.22%	3.2%	56	6,735	57	8,578	SUB-SAHARAN AFRICA
74	15/21	CUBA	CUB	2.22%	5.9%	62	5,596	63	7,126	LATIN AMERICA AND THE CARIBBEAN
75	3/16	ITALY	ITA	2.18%	-0.1%	21	35,084	21	44,497	WESTERN EUROPE
76	12/26	CÔTE D'IVOIRE	CIV	2.18%	-1.8%	106	1,106	103	1,402	SUB-SAHARAN AFRICA
77	4/16	UNITED KINGDOM	GBR	2.16%	1.2%	20	35,165	20	44,505	WESTERN EUROPE
78	13/26	GHANA	GHA	2.16%	3.1%	107	1,098	104	1,388	SUB-SAHARAN AFRICA
79	16/21	PERU	PER	2.13%	3.7%	71	4,469	73	5,635	LATIN AMERICA AND THE CARIBBEAN
80	17/21	ECUADOR	ECU	2.12%	3.3%	74	4,202	77	5,290	LATIN AMERICA AND THE CARIBBEAN
81	5/16	AUSTRIA	AUT	2.10%	1.3%	10	45,562	8	57,271	WESTERN EUROPE
82	6/16	FRANCE	FRA	2.09%	0.7%	15	41,051	16	51,566	WESTERN EUROPE
83	7/16	SPAIN	ESP	2.08%	1.2%	22	31,774	22	39,863	WESTERN EUROPE
84	14/26	LIBERIA	LBR	2.07%	-1.3%	129	222	128	278	SUB-SAHARAN AFRICA
85	15/26	ZAMBIA	ZMB	2.06%	2.7%	110	990	112	1,239	SUB-SAHARAN AFRICA
86	18/21	CHILE	CHL	2.05%	2.6%	43	9,644	43	12,054	LATIN AMERICA AND THE CARIBBEAN

RANKING 2. EXPECTED GROWTH IN PER CAPITA GDP TO 2020

RANK EXP. GROWTH IN GDP P/C	REGIONAL RANKING EXP. GROWTH IN GDP P/C	COUNTRY NAME	ISO CODE	EXPECTED GROWTH IN GDP P/C 2009-2020	GROWTH IN GDP P/C 1999-2009	RANK INCOME 2009 [USD]	INCOME 2009 [USD]	RANK INCOME 2020	EXPECTED INCOME 2020 [USD]	REGION
87	8/16	SWEDEN	SWE	2.04%	1.5%	13	43,654	12	54,522	WESTERN EUROPE
88	9/16	FINLAND	FIN	2.03%	1.7%	11	44,581	11	55,630	WESTERN EUROPE
89	19/21	BOLIVIA	BOL	2.03%	1.7%	94	1,758	96	2,194	LATIN AMERICA AND THE CARIBBEAN
90	16/26	MOZAMBIQUE	MOZ	2.03%	4.6%	125	428	124	533	SUB-SAHARAN AFRICA
91	1/2	UNITED STATES	USA	2.01%	0.8%	9	45,989	9	57,260	NORTH AMERICA
92	24/27	TAJIKISTAN	TJK	1.95%	6.7%	116	716	117	885	EASTERN EUROPE AND CENTRAL ASIA
93	13/16	NEW ZEALAND	NZL	1.91%	1.2%	24	29,352	24	36,132	EAST ASIA AND PACIFIC
94	17/26	BOTSWANA	BWA	1.89%	3.5%	59	6,064	62	7,449	SUB-SAHARAN AFRICA
95	18/26	MALI	MLI	1.87%	2.9%	118	691	118	848	SUB-SAHARAN AFRICA
96	8/16	YEMEN, REP.	YEM	1.86%	1.0%	104	1,118	106	1,369	MIDDLE EAST AND NORTH AFRICA
97	10/16	BELGIUM	BEL	1.86%	1.0%	12	43,671	13	53,457	WESTERN EUROPE
98	25/27	KAZAKHSTAN	KAZ	1.82%	7.9%	53	7,257	55	8,853	EASTERN EUROPE AND CENTRAL ASIA
99	9/16	SAUDI ARABIA	SAU	1.80%	1.0%	34	14,799	37	18,011	MIDDLE EAST AND NORTH AFRICA
100	11/16	SWITZERLAND	CHE	1.78%	0.9%	3	63,629	2	77,233	WESTERN EUROPE
101	12/16	GREECE	GRC	1.77%	3.0%	25	29,240	25	35,476	WESTERN EUROPE
102	13/16	NETHERLANDS	NLD	1.72%	1.1%	8	47,917	7	57,784	WESTERN EUROPE
103	20/21	TRINIDAD AND TOBAGO	TTO	1.71%	5.9%	33	15,841	33	19,097	LATIN AMERICA AND THE CARIBBEAN
104	2/2	CANADA	CAN	1.67%	1.1%	18	39,599	18	47,520	NORTH AMERICA
105	14/16	IRELAND	IRL	1.65%	1.9%	6	51,049	5	61,138	WESTERN EUROPE
106	15/16	DENMARK	DNK	1.63%	0.5%	4	55,992	4	66,902	WESTERN EUROPE
107	14/16	MONGOLIA	MNG	1.52%	4.5%	96	1,573	98	1,858	EAST ASIA AND PACIFIC
108	10/16	OMAN	OMN	1.44%	2.8%	31	16,207	35	18,971	MIDDLE EAST AND NORTH AFRICA
109	26/27	TURKMENISTAN	TKM	1.34%	12.7%	77	3,904	81	4,521	EASTERN EUROPE AND CENTRAL ASIA
110	11/16	ALGERIA	DZA	1.28%	2.1%	76	4,029	80	4,632	MIDDLE EAST AND NORTH AFRICA
111	12/16	IRAN, ISLAMIC REP.	IRN	1.27%	3.5%	67	4,540	78	5,214	MIDDLE EAST AND NORTH AFRICA
112	27/27	AZERBAIJAN	AZE	1.25%	14.5%	65	4,899	74	5,617	EASTERN EUROPE AND CENTRAL ASIA
113	19/26	GUINEA	GIN	1.24%	0.7%	126	407	125	467	SUB-SAHARAN AFRICA
114	15/16	AUSTRALIA	AUS	1.23%	1.7%	14	42,279	17	48,355	EAST ASIA AND PACIFIC
115	21/21	VENEZUELA, RB	VEN	1.23%	1.8%	39	11,490	41	13,138	LATIN AMERICA AND THE CARIBBEAN
116	13/16	UNITED ARAB EMIRATES	ARE	1.21%	1.6%	7	50,070	10	57,151	MIDDLE EAST AND NORTH AFRICA
117	20/26	CAMEROON	CMR	1.20%	1.1%	102	1,136	108	1,296	SUB-SAHARAN AFRICA
118	21/26	NIGERIA	NGA	1.16%	3.5%	103	1,118	110	1,270	SUB-SAHARAN AFRICA
119	16/16	NORWAY	NOR	1.08%	1.1%	1	79,089	1	88,980	WESTERN EUROPE
120	14/16	LIBYA	LBY	0.99%	2.1%	42	9,714	49	10,828	MIDDLE EAST AND NORTH AFRICA
121	22/26	GABON	GAB	0.99%	-0.6%	51	7,502	59	8,362	SUB-SAHARAN AFRICA
122	15/16	QATAR	QAT	0.90%	NA	2	69,754	3	77,008	MIDDLE EAST AND NORTH AFRICA
123	16/16	PAPUA NEW GUINEA	PNG	0.89%	0.1%	100	1,172	109	1,292	EAST ASIA AND PACIFIC
124	16/16	KUWAIT	KWT	0.82%	2.6%	5	54.260	6	59,391	MIDDLE EAST AND NORTH AFRICA
125	23/26	CONGO, REP.	COG	0.65%	2.3%	85	2,601	92	2,794	SUB-SAHARAN AFRICA
126	24/26	SUDAN	SDN	0.55%	4.8%	98	1,294	105	1,374	SUB-SAHARAN AFRICA
127	25/26	ANGOLA	AGO	0.54%	7.5%	75	4,081	82	4,329	SUB-SAHARAN AFRICA
128	26/26	MAURITANIA	MRT	0.29%	1.0%	113	919	115	949	SUB-SAHARAN AFRICA

MAP 2:

Countries are color coded according to their position in Ranking 2.

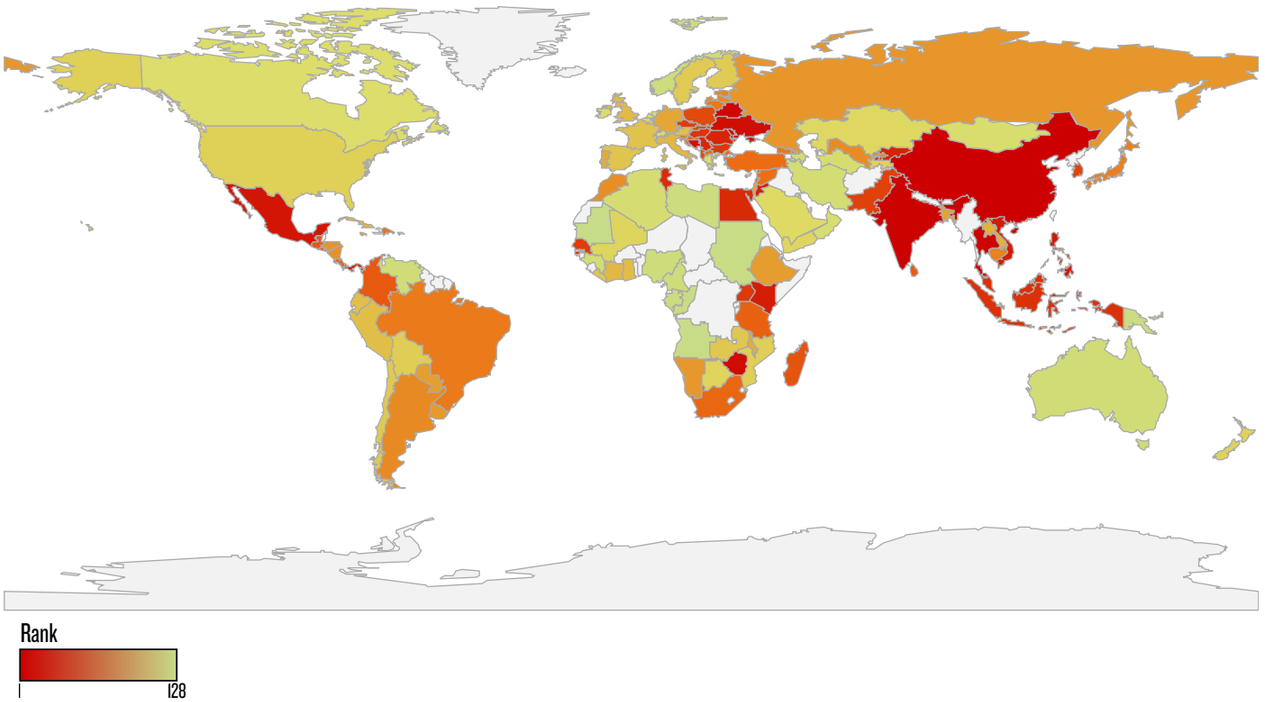
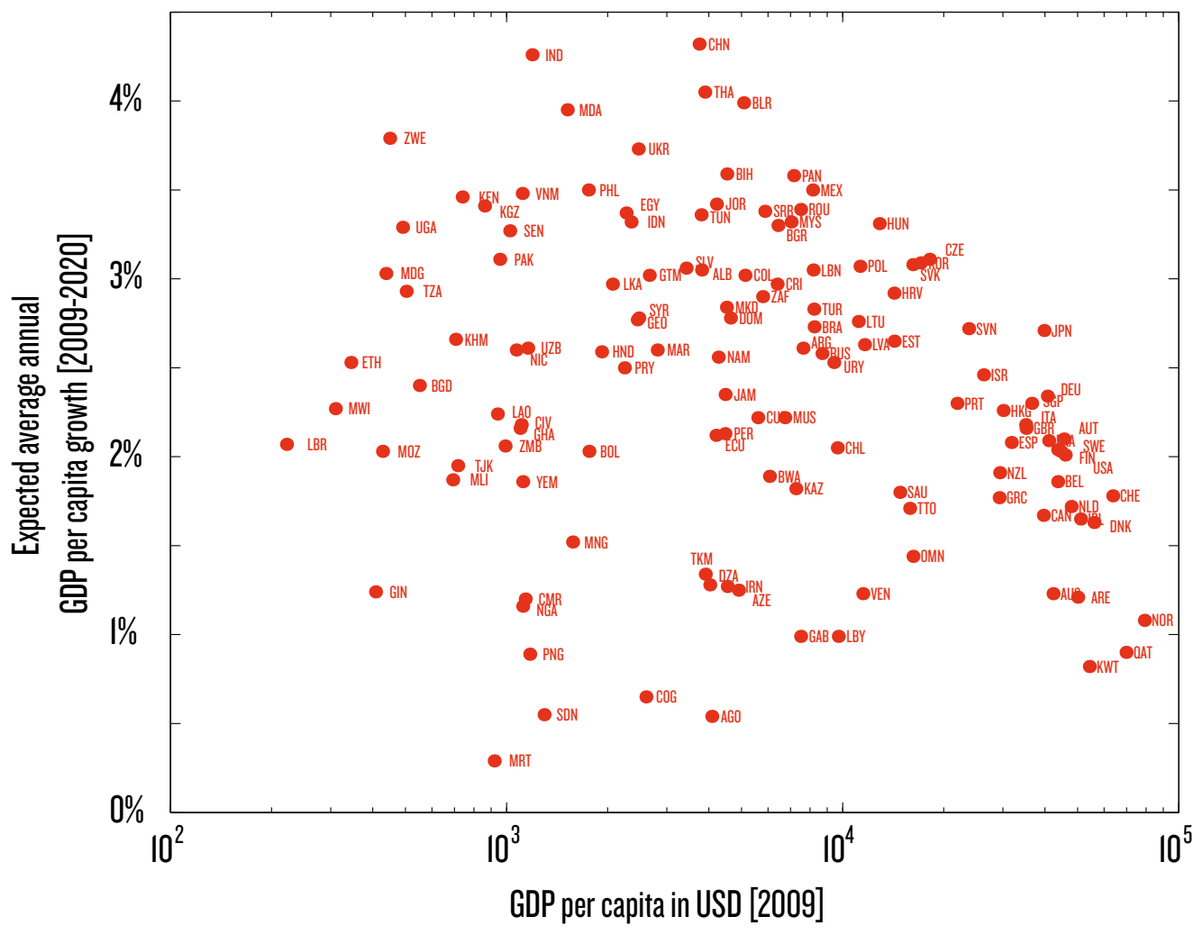


FIGURE 2:

Expected annual GDP per capita growth with respect to GDP per capita in 2009.



RANKING 3:

Expected GDP Growth to 2020

RANKING 3 shows the ranking for total GDP growth. This ranking is dominated by Uganda, Kenya and Tanzania. The three East African nations have a level of complexity that is higher than would be expected given their very low level of income, and occupy the positions 24, 13 and 39 of the rankings of growth in GDP per capita. However, they reach top of the total GDP growth because of their expected levels of high population growth (we use forecast of population growth rates to the year 2020 performed by United Nations[1]). With the exception of India and Guatemala, 8 out of the 10 countries at the top of Ranking 3 are from Africa. Also, the ranking shows that we expect India's total GDP growth to top China's. *Map 3* shows the geographic pattern of total GDP growth, and *Figure 3* plots total GDP growth as a function of GDP per capita.

BY REGION:

By region, in East Asia and the Pacific the expected leaders in GDP growth are Philippines (12), Malaysia (15) and China (20), while laggard is Australia (107). In South Asia the best performing country is expected to be India (8), while Bangladesh is the laggard (51). In Eastern Europe and Central Asia the top performers are the Kyrgyz Republic (21), Turkey (40) and Uzbekistan (43). The worst performers in this region are Latvia (114) and Georgia (121).

In Latin America the fastest growing countries are expected to be Guatemala (9), Panama (13) and Mexico (22), while the worst performance is expected in Trinidad and Tobago (119) and Cuba (128). Jordan (11), Egypt (14) and Yemen (16) are expected to lead GDP growth in Middle East and North Africa, while the laggards are Iran (117) and Libya (123).

GDP growth in Western Europe is expected to be lead by The United Kingdom (92), followed closely by Ireland (93). At the bottom of the list we expect to find Greece (126) and Norway (128).

[1] United Nations, Department of Economic and Social Affairs, Population Division (2011)

RANKING 3. EXPECTED GDP GROWTH TO 2020

RANK EXPECTED GDP GROWTH	REGIONAL RANK EXPECTED GDP GROWTH	COUNTRY NAME	ISO CODE	EXPECTED GDP GROWTH 2009-2020	GROWTH 1998-2008	RANK INCOME 2009 [USD]	INCOME 2009 [USD]	RANK INCOME 2020	EXPECTED INCOME 2020 [USD]	EXPECTED POPULATION GROWTH	REGION
1	1/26	UGANDA	UGA	6.41%	4.1%	122	490	120	700	3.11%	SUB-SAHARAN AFRICA
2	2/26	KENYA	KEN	6.10%	0.9%	115	738	114	1,073	2.64%	SUB-SAHARAN AFRICA
3	3/26	TANZANIA	TZA	6.07%	3.8%	121	503	121	691	3.14%	SUB-SAHARAN AFRICA
4	4/26	ZIMBABWE	ZWE	5.93%	-7.1%	123	449	122	676	2.14%	SUB-SAHARAN AFRICA
5	5/26	MADAGASCAR	MDG	5.85%	1.0%	124	438	123	608	2.82%	SUB-SAHARAN AFRICA
6	6/26	SENEGAL	SEN	5.82%	1.6%	109	1,023	101	1,457	2.55%	SUB-SAHARAN AFRICA
7	7/26	MALAWI	MWI	5.60%	0.6%	128	310	127	396	3.33%	SUB-SAHARAN AFRICA
8	1/4	INDIA	IND	5.51%	5.4%	99	1,192	97	1,886	1.25%	SOUTH ASIA
9	1/21	GUATEMALA	GTM	5.50%	1.2%	84	2,661	85	3,693	2.48%	LATIN AMERICA AND THE CARIBBEAN
10	8/26	ZAMBIA	ZMB	5.25%	2.3%	110	990	112	1,239	3.19%	SUB-SAHARAN AFRICA
11	1/16	JORDAN	JOR	5.18%	3.9%	73	4,216	68	6,101	1.76%	MIDDLE EAST AND NORTH AFRICA
12	1/16	PHILIPPINES	PHL	5.14%	2.8%	95	1,752	93	2,560	1.64%	EAST ASIA AND PACIFIC
13	2/21	PANAMA	PAN	4.97%	4.0%	54	7,155	51	10,529	1.39%	LATIN AMERICA AND THE CARIBBEAN
14	2/16	EGYPT, ARAB REP.	EGY	4.94%	3.1%	90	2,270	89	3,268	1.57%	MIDDLE EAST AND NORTH AFRICA
15	2/16	MALAYSIA	MYS	4.83%	3.5%	55	7,030	53	10,071	1.51%	EAST ASIA AND PACIFIC
16	3/16	YEMEN, REP.	YEM	4.83%	0.9%	104	1,118	106	1,369	2.97%	MIDDLE EAST AND NORTH AFRICA
17	9/26	MALI	MLI	4.81%	3.2%	118	691	118	848	2.94%	SUB-SAHARAN AFRICA
18	2/4	PAKISTAN	PAK	4.80%	2.2%	111	955	107	1,336	1.69%	SOUTH ASIA
19	10/26	LIBERIA	LBR	4.67%	-0.1%	129	222	128	278	2.61%	SUB-SAHARAN AFRICA
20	3/16	CHINA	CHN	4.66%	9.4%	81	3,744	70	5,962	0.34%	EAST ASIA AND PACIFIC
21	1/27	KYRGYZ REPUBLIC	KGZ	4.61%	3.8%	114	860	111	1,244	1.20%	EASTERN EUROPE AND CENTRAL ASIA
22	3/21	MEXICO	MEX	4.56%	1.8%	49	8,143	44	11,894	1.05%	LATIN AMERICA AND THE CARIBBEAN
23	11/26	ETHIOPIA	ETH	4.52%	4.8%	127	344	126	453	1.99%	SUB-SAHARAN AFRICA
24	4/21	HONDURAS	HND	4.49%	2.3%	93	1,918	94	2,540	1.90%	LATIN AMERICA AND THE CARIBBEAN
25	4/16	THAILAND	THA	4.47%	3.8%	78	3,893	69	6,023	0.42%	EAST ASIA AND PACIFIC
26	4/16	SYRIAN ARAB REPUBLIC	SYR	4.45%	0.7%	86	2,474	87	3,346	1.67%	MIDDLE EAST AND NORTH AFRICA
27	5/16	VIETNAM	VNM	4.41%	5.9%	105	1,113	99	1,622	0.93%	EAST ASIA AND PACIFIC
28	12/26	CÔTE D'IVOIRE	CIV	4.37%	-2.0%	106	1,106	103	1,402	2.19%	SUB-SAHARAN AFRICA
29	13/26	GHANA	GHA	4.36%	3.1%	107	1,098	104	1,388	2.20%	SUB-SAHARAN AFRICA
30	5/16	TUNISIA	TUN	4.31%	3.9%	80	3,792	75	5,456	0.95%	MIDDLE EAST AND NORTH AFRICA
31	14/26	MOZAMBIQUE	MOZ	4.26%	4.7%	125	428	124	533	2.23%	SUB-SAHARAN AFRICA
32	6/16	INDONESIA	IDN	4.22%	3.4%	89	2,349	86	3,363	0.91%	EAST ASIA AND PACIFIC
33	5/21	COLOMBIA	COL	4.22%	1.8%	63	5,126	64	7,107	1.20%	LATIN AMERICA AND THE CARIBBEAN
34	6/21	COSTA RICA	CRI	4.21%	3.0%	58	6,386	56	8,807	1.24%	LATIN AMERICA AND THE CARIBBEAN
35	15/26	NAMIBIA	NAM	4.15%	2.7%	72	4,267	72	5,637	1.59%	SUB-SAHARAN AFRICA
36	7/21	PARAGUAY	PRY	4.15%	0.5%	91	2,242	90	2,941	1.65%	LATIN AMERICA AND THE CARIBBEAN
37	6/16	ISRAEL	ISR	4.03%	1.8%	26	26,256	26	34,309	1.57%	MIDDLE EAST AND NORTH AFRICA
38	8/21	DOMINICAN REPUBLIC	DOM	3.93%	3.8%	66	4,637	66	6,272	1.14%	LATIN AMERICA AND THE CARIBBEAN
39	9/21	NICARAGUA	NIC	3.92%	2.7%	108	1,069	102	1,417	1.33%	LATIN AMERICA AND THE CARIBBEAN
40	2/27	TURKEY	TUR	3.88%	2.4%	47	8,215	47	11,168	1.05%	EASTERN EUROPE AND CENTRAL ASIA
41	7/16	CAMBODIA	KHM	3.84%	7.6%	117	706	116	942	1.18%	EAST ASIA AND PACIFIC
42	7/16	SAUDI ARABIA	SAU	3.82%	0.9%	34	14,799	37	18,011	2.02%	MIDDLE EAST AND NORTH AFRICA
43	3/27	UZBEKISTAN	UZB	3.76%	4.7%	101	1,156	100	1,534	1.15%	EASTERN EUROPE AND CENTRAL ASIA

RANKING 3. EXPECTED GDP GROWTH TO 2020

RANK EXPECTED GDP GROWTH	REGIONAL RANK EXPECTED GDP GROWTH	COUNTRY NAME	ISO CODE	EXPECTED GDP GROWTH 2009-2020	GROWTH 1998-2008	RANK INCOME 2009 [USD]	INCOME 2009 [USD]	RANK INCOME 2020	EXPECTED INCOME 2020 [USD]	EXPECTED POPULATION GROWTH	REGION
44	16/26	GUINEA	GIN	3.73%	1.3%	126	407	125	467	2.49%	SUB-SAHARAN AFRICA
45	17/26	NIGERIA	NGA	3.72%	3.1%	103	1,118	110	1,270	2.55%	SUB-SAHARAN AFRICA
46	10/21	EL SALVADOR	SLV	3.71%	2.4%	82	3,424	79	4,770	0.65%	LATIN AMERICA AND THE CARIBBEAN
47	8/16	LEBANON	LBN	3.71%	2.3%	48	8,175	46	11,373	0.66%	MIDDLE EAST AND NORTH AFRICA
48	4/27	BELARUS	BLR	3.66%	8.1%	64	5,075	61	7,806	-0.33%	EASTERN EUROPE AND CENTRAL ASIA
49	3/4	SRI LANKA	LKA	3.66%	4.1%	92	2,068	91	2,852	0.69%	SOUTH ASIA
50	11/21	BOLIVIA	BOL	3.59%	1.4%	94	1,758	96	2,194	1.56%	LATIN AMERICA AND THE CARIBBEAN
51	4/4	BANGLADESH	BGD	3.59%	4.0%	120	551	119	715	1.18%	SOUTH ASIA
52	9/16	MOROCCO	MAR	3.53%	3.0%	83	2,811	83	3,727	0.94%	MIDDLE EAST AND NORTH AFRICA
53	8/16	LAO PDR	LAO	3.52%	4.9%	112	940	113	1,199	1.28%	EAST ASIA AND PACIFIC
54	12/21	BRAZIL	BRA	3.50%	2.1%	46	8,230	48	11,067	0.77%	LATIN AMERICA AND THE CARIBBEAN
55	13/21	ARGENTINA	ARG	3.44%	1.9%	50	7,626	52	10,130	0.82%	LATIN AMERICA AND THE CARIBBEAN
56	9/16	KOREA, REP.	KOR	3.42%	4.8%	30	17,078	30	23,866	0.33%	EAST ASIA AND PACIFIC
57	5/27	TAJIKISTAN	TJK	3.42%	6.8%	116	716	117	885	1.47%	EASTERN EUROPE AND CENTRAL ASIA
58	18/26	SOUTH AFRICA	ZAF	3.37%	2.5%	61	5,786	60	7,920	0.48%	SUB-SAHARAN AFRICA
59	14/21	ECUADOR	ECU	3.35%	2.6%	74	4,202	77	5,290	1.24%	LATIN AMERICA AND THE CARIBBEAN
60	6/27	CZECH REPUBLIC	CZE	3.35%	3.8%	29	18,139	29	25,415	0.23%	EASTERN EUROPE AND CENTRAL ASIA
61	7/27	ALBANIA	ALB	3.33%	6.0%	79	3,808	76	5,302	0.28%	EASTERN EUROPE AND CENTRAL ASIA
62	8/27	MOLDOVA	MDA	3.33%	5.2%	97	1,516	95	2,321	-0.62%	EASTERN EUROPE AND CENTRAL ASIA
63	19/26	CAMEROON	CMR	3.30%	1.3%	102	1,136	108	1,296	2.10%	SUB-SAHARAN AFRICA
64	9/27	BOSNIA AND HERZEGOVINA	BIH	3.28%	5.0%	68	4,525	65	6,669	-0.30%	EASTERN EUROPE AND CENTRAL ASIA
65	10/16	HONG KONG SAR, CHINA	HKG	3.28%	4.0%	23	30,065	23	38,450	1.02%	EAST ASIA AND PACIFIC
66	11/16	SINGAPORE	SGP	3.27%	4.1%	19	36,537	19	46,943	0.96%	EAST ASIA AND PACIFIC
67	10/27	SERBIA	SRB	3.24%	3.9%	60	5,872	58	8,467	-0.14%	EASTERN EUROPE AND CENTRAL ASIA
68	15/21	PERU	PER	3.23%	3.7%	71	4,469	73	5,635	1.10%	LATIN AMERICA AND THE CARIBBEAN
69	11/27	SLOVAK REPUBLIC	SVK	3.23%	5.0%	32	16,176	31	22,579	0.15%	EASTERN EUROPE AND CENTRAL ASIA
70	10/16	UNITED ARAB EMIRATES	ARE	3.23%	1.7%	7	50,070	10	57,151	2.02%	MIDDLE EAST AND NORTH AFRICA
71	12/27	UKRAINE	UKR	3.19%	7.0%	87	2,468	84	3,694	-0.54%	EASTERN EUROPE AND CENTRAL ASIA
72	20/26	ANGOLA	AGO	3.19%	7.8%	75	4,081	82	4,329	2.65%	SUB-SAHARAN AFRICA
73	11/16	QATAR	QAT	3.16%	NA	2	69,754	3	77,008	2.26%	MIDDLE EAST AND NORTH AFRICA
74	13/27	HUNGARY	HUN	3.15%	4.0%	37	12,868	36	18,420	-0.16%	EASTERN EUROPE AND CENTRAL ASIA
75	14/27	ROMANIA	ROU	3.15%	5.7%	52	7,500	50	10,823	-0.24%	EASTERN EUROPE AND CENTRAL ASIA
76	12/16	OMAN	OMN	3.13%	2.8%	31	16,207	35	18,971	1.69%	MIDDLE EAST AND NORTH AFRICA
77	15/27	POLAND	POL	3.10%	4.4%	40	11,273	38	15,727	0.03%	EASTERN EUROPE AND CENTRAL ASIA
78	12/16	PAPUA NEW GUINEA	PNG	3.01%	-0.2%	100	1,172	109	1,292	2.13%	EAST ASIA AND PACIFIC
79	13/16	KUWAIT	KWT	3.00%	2.6%	5	54,260	6	59,391	2.17%	MIDDLE EAST AND NORTH AFRICA
80	13/16	MONGOLIA	MNG	2.99%	5.0%	96	1,573	98	1,858	1.46%	EAST ASIA AND PACIFIC
81	14/16	NEW ZEALAND	NZL	2.91%	1.8%	24	29,352	24	36,132	1.00%	EAST ASIA AND PACIFIC
82	21/26	GABON	GAB	2.90%	-1.5%	51	7,502	59	8,362	1.91%	SUB-SAHARAN AFRICA
83	16/27	SLOVENIA	SVN	2.90%	4.2%	27	23,726	27	31,881	0.18%	EASTERN EUROPE AND CENTRAL ASIA
84	16/21	URUGUAY	URY	2.90%	1.5%	44	9,420	42	12,399	0.37%	LATIN AMERICA AND THE CARIBBEAN
85	22/26	SUDAN	SDN	2.89%	4.7%	98	1,294	105	1,374	2.35%	SUB-SAHARAN AFRICA
86	17/27	MACEDONIA, FYR	MKD	2.89%	2.8%	69	4,515	67	6,141	0.06%	EASTERN EUROPE AND CENTRAL ASIA

RANKING 3. EXPECTED GDP GROWTH TO 2020

RANK EXPECTED GDP GROWTH	REGIONAL RANK EXPECTED GDP GROWTH	COUNTRY NAME	ISO CODE	EXPECTED GDP GROWTH 2009-2020	GROWTH 1998-2008	RANK INCOME 2009 [USD]	INCOME 2009 [USD]	RANK INCOME 2020	EXPECTED INCOME 2020 [USD]	EXPECTED POPULATION GROWTH	REGION
87	17/21	CHILE	CHL	2.85%	2.6%	43	9,644	43	12,054	0.80%	LATIN AMERICA AND THE CARIBBEAN
88	1/2	UNITED STATES	USA	2.84%	1.6%	9	45,989	9	57,260	0.83%	NORTH AMERICA
89	23/26	BOTSWANA	BWA	2.84%	3.5%	59	6,064	62	7,449	0.95%	SUB-SAHARAN AFRICA
90	18/27	KAZAKHSTAN	KAZ	2.81%	8.3%	53	7,257	55	8,853	0.99%	EASTERN EUROPE AND CENTRAL ASIA
91	24/26	CONGO, REP.	COG	2.80%	1.3%	85	2,601	92	2,794	2.15%	SUB-SAHARAN AFRICA
92	1/16	UNITED KINGDOM	GBR	2.76%	2.1%	20	35,165	20	44,505	0.59%	WESTERN EUROPE
93	2/16	IRELAND	IRL	2.71%	3.7%	6	51,049	5	61,138	1.06%	WESTERN EUROPE
94	19/27	CROATIA	HRV	2.71%	3.9%	36	14,222	32	19,528	-0.21%	EASTERN EUROPE AND CENTRAL ASIA
95	25/26	MAURITIUS	MUS	2.69%	3.2%	56	6,735	57	8,578	0.47%	SUB-SAHARAN AFRICA
96	18/21	JAMAICA	JAM	2.66%	1.0%	70	4,471	71	5,773	0.31%	LATIN AMERICA AND THE CARIBBEAN
97	19/21	VENEZUELA, RB	VEN	2.64%	1.4%	39	11,490	41	13,138	1.41%	LATIN AMERICA AND THE CARIBBEAN
98	3/16	SPAIN	ESP	2.63%	2.0%	22	31,774	22	39,863	0.55%	WESTERN EUROPE
99	20/27	BULGARIA	BGR	2.62%	6.3%	57	6,423	54	9,178	-0.68%	EASTERN EUROPE AND CENTRAL ASIA
100	4/16	SWEDEN	SWE	2.61%	2.5%	13	43,654	12	54,522	0.57%	WESTERN EUROPE
101	5/16	FRANCE	FRA	2.58%	1.4%	15	41,051	16	51,566	0.48%	WESTERN EUROPE
102	15/16	JAPAN	JPN	2.57%	1.1%	17	39,738	14	53,304	-0.14%	EAST ASIA AND PACIFIC
103	2/2	CANADA	CAN	2.56%	1.9%	18	39,599	18	47,520	0.89%	NORTH AMERICA
104	21/27	ESTONIA	EST	2.56%	6.6%	35	14,238	34	18,984	-0.09%	EASTERN EUROPE AND CENTRAL ASIA
105	22/27	TURKMENISTAN	TKM	2.53%	13.6%	77	3,904	81	4,521	1.19%	EASTERN EUROPE AND CENTRAL ASIA
106	14/16	ALGERIA	DZA	2.53%	2.2%	76	4,029	80	4,632	1.26%	MIDDLE EAST AND NORTH AFRICA
107	16/16	AUSTRALIA	AUS	2.49%	2.2%	14	42,279	17	48,355	1.26%	EAST ASIA AND PACIFIC
108	26/26	MAURITANIA	MRT	2.48%	1.7%	113	919	115	949	2.19%	SUB-SAHARAN AFRICA
109	23/27	RUSSIAN FEDERATION	RUS	2.44%	7.3%	45	8,684	45	11,491	-0.14%	EASTERN EUROPE AND CENTRAL ASIA
110	24/27	LITHUANIA	LTU	2.35%	6.7%	41	11,141	40	15,034	-0.41%	EASTERN EUROPE AND CENTRAL ASIA
111	25/27	AZERBAIJAN	AZE	2.33%	14.3%	65	4,899	74	5,617	1.08%	EASTERN EUROPE AND CENTRAL ASIA
112	6/16	FINLAND	FIN	2.33%	3.0%	11	44,581	11	55,630	0.30%	WESTERN EUROPE
113	7/16	ITALY	ITA	2.31%	0.7%	21	35,084	21	44,497	0.12%	WESTERN EUROPE
114	26/27	LATVIA	LVA	2.25%	7.6%	38	11,616	39	15,454	-0.37%	EASTERN EUROPE AND CENTRAL ASIA
115	8/16	PORTUGAL	PRT	2.25%	1.1%	28	21,903	28	28,136	-0.05%	WESTERN EUROPE
116	9/16	AUSTRIA	AUT	2.24%	2.0%	10	45,562	8	57,271	0.14%	WESTERN EUROPE
117	15/16	IRAN, ISLAMIC REP.	IRN	2.18%	3.5%	67	4,540	78	5,214	0.92%	MIDDLE EAST AND NORTH AFRICA
118	10/16	GERMANY	DEU	2.17%	1.5%	16	40,670	15	52,428	-0.16%	WESTERN EUROPE
119	20/21	CUBA	CUB	2.14%	5.9%	62	5,596	63	7,126	-0.08%	LATIN AMERICA AND THE CARIBBEAN
120	11/16	SWITZERLAND	CHE	2.13%	1.3%	3	63,629	2	77,233	0.36%	WESTERN EUROPE
121	27/27	GEORGIA	GEO	2.13%	7.1%	88	2,449	88	3,308	-0.64%	EASTERN EUROPE AND CENTRAL ASIA
122	12/16	BELGIUM	BEL	2.12%	1.7%	12	43,671	13	53,457	0.27%	WESTERN EUROPE
123	16/16	LIBYA	LBY	2.08%	2.1%	42	9,714	49	10,828	1.09%	MIDDLE EAST AND NORTH AFRICA
124	13/16	NETHERLANDS	NLD	1.97%	1.9%	8	47,917	7	57,784	0.25%	WESTERN EUROPE
125	14/16	DENMARK	DNK	1.96%	1.3%	4	55,992	4	66,902	0.33%	WESTERN EUROPE
126	15/16	GREECE	GRC	1.96%	3.6%	25	29,240	25	35,476	0.18%	WESTERN EUROPE
127	21/21	TRINIDAD AND TOBAGO	TTO	1.95%	6.7%	33	15,841	33	19,097	0.24%	LATIN AMERICA AND THE CARIBBEAN
128	16/16	NORWAY	NOR	1.77%	1.6%	1	79,089	1	88,980	0.69%	WESTERN EUROPE

MAP 3:

Show the geographic pattern of total GDP growth.

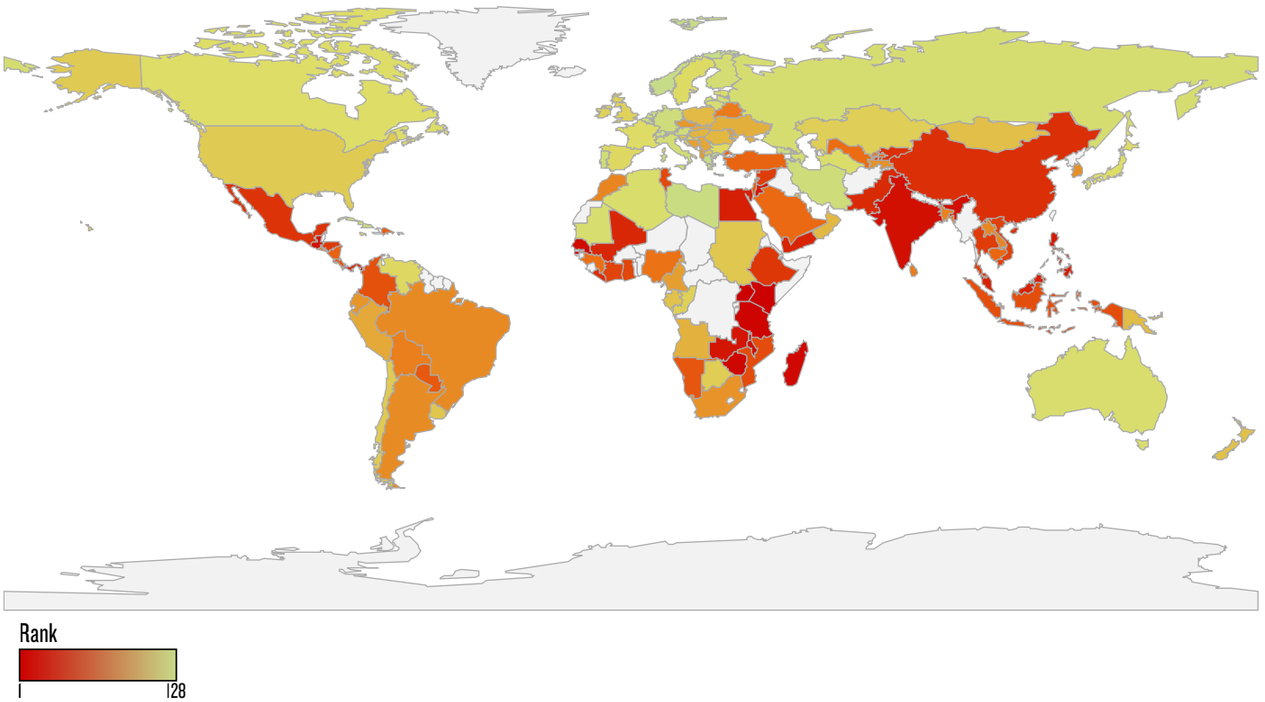
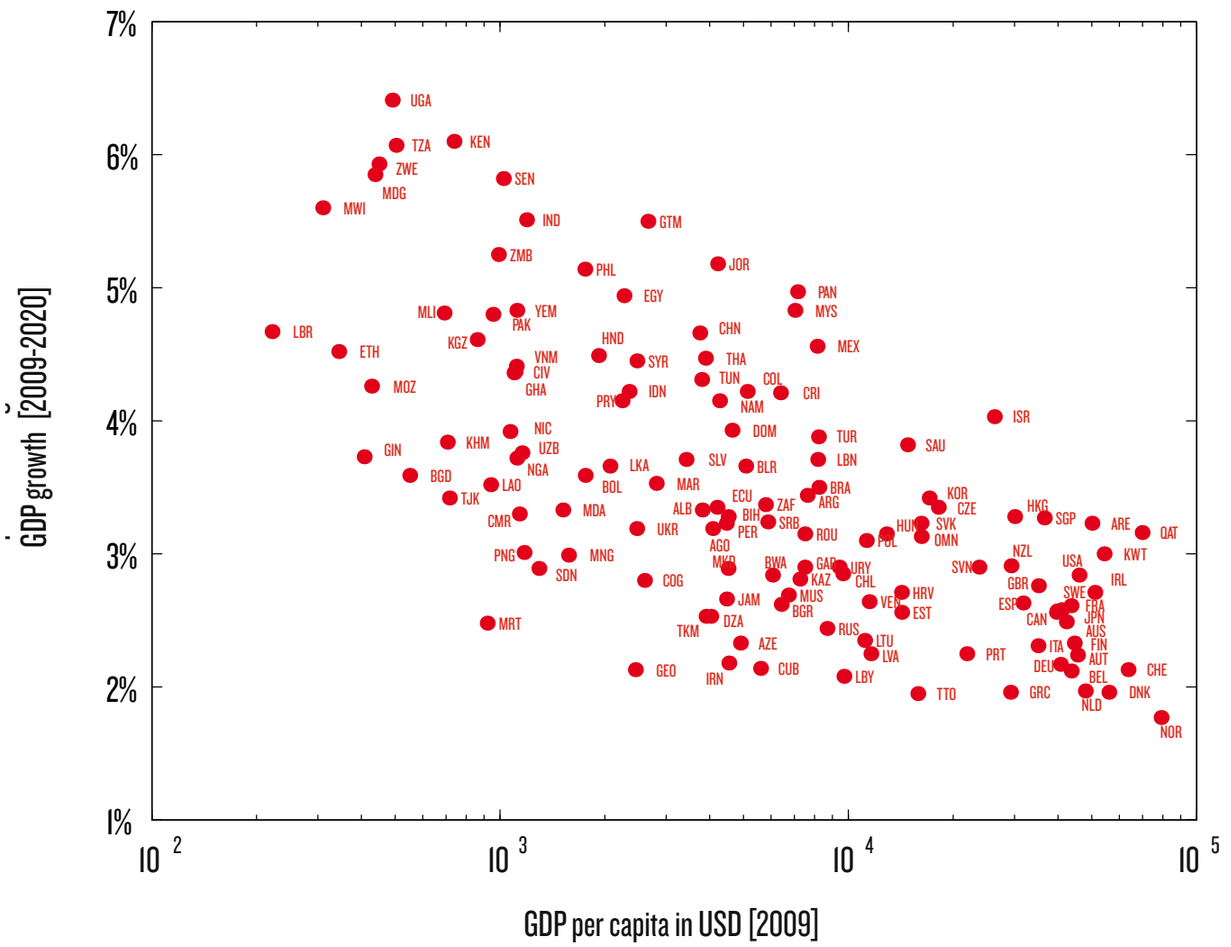


FIGURE 3:

Plots total GDP growth as a function of GDP per capita.

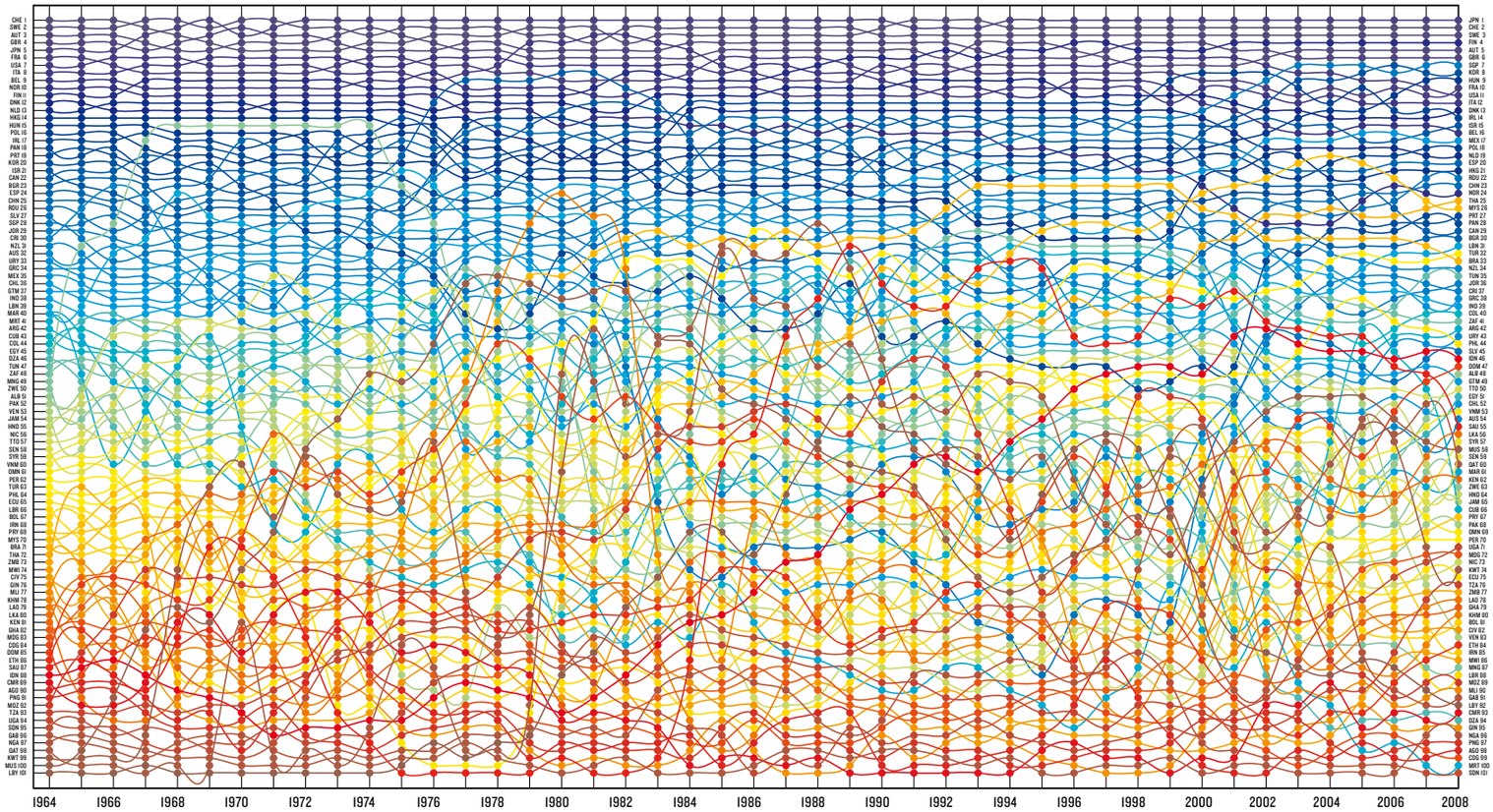


RANKING 4:

Change in Economic Complexity (1964-2008)

FIGURE 4.1:

Evolution of the ranking of countries based on ECI between 1964 and 2008. Please see pages 352-353 for a larger version.



RANKING 4 looks at changes in economic complexity. Here countries are ranked according to the change in ECI experienced between 1964 and 2008. Because of data availability, this ranking is limited to 101 countries. The countries that improved the most during this period are Mauritius, Thailand and Malaysia. Other countries that underwent substantial transformation during this period were Singapore, Indonesia, Brazil, Dominican Republic and Turkey. All of these were countries that dramatically transformed their economies during this forty-four year period (*see Part 1, Section 5: How does economic complexity evolve?*). These transformations can be seen in detail in their respective country pages. *Figure 4.1* shows the change in ECI observed between 1964 and 2008 as a function of a country's current level of income. *Map 4* illustrates the spatial distribution of these changes. *Figure 4* provides a visual representation of the change in ECI rankings. Here, each line represents a country, and the vertical position of the line indicates the position on the ranking for a given year. Lines were assigned a color using a perfect gradient according to their ranking in the initial year (1964). This helps identify movements in the ranking of economic complexity during the observed period.

BY REGION:

By region, in East Asia and the Pacific the countries that changed their economic complexity the most were Thailand (2), Malaysia (3), Singapore (4) and Indonesia (5). China occupies the 31st position in this ranking. The relatively low position of China in this ranking reflects the fact that China's transformation built on a productive structure that was more sophisticated than that of many of its regional neighbors. The laggards of this region are Papua New Guinea (78), Australia (95) and Mongolia (97).

In South Asia the best performing country was Sri Lanka (16), while Pakistan (73) is the laggard.

In Eastern Europe and Central Asia the top performers were Turkey (10) and Romania (19). The lack of historical data for the region is substantial, however, since many of the countries in the region used to belong to the Soviet Union and we do not have good data on their productive structure.

In Latin America the countries that experienced the largest change in economic complexity were Brazil (7), Dominican Republic (8) and Mexico (12). The laggards were El Salvador (86), Chile (87) and Venezuela (92). In the Middle East and North Africa, Saudi Arabia (9), Libya (11) and Tunisia (20) were the countries that increased their ECI the most, while the laggards were Morocco (90), which used to be one of the most complex economies of the region, Iran (91) and Algeria (98).

Finally, in Western Europe the change in ECI between 1964 and 2008 is dominated by that of Finland (26), Spain (39) and Ireland (46) and the laggards of the region were Portugal (84), Belgium (89) and Norway (96). We note that Western Europe is a region in which all countries have always had positive values of the ECI, which limits the range of potential positive changes.

RANKING 4. CHANGE IN ECONOMIC COMPLEXITY (1964-2008)

ECONOMIC COMPLEXITY INDEX

RANKING Δ ECI (64-08)	REGIONAL RANKING Δ ECI (64-08)	COUNTRY NAME	ISO CODE	1964	1968	1978	1988	1998	2008	Δ ECI (64-08)	Δ ECI (98-08)	RANKING Δ ECI (98-08)	REGIONAL RANKING Δ ECI (98-08)	REGION
1	1/22	MAURITIUS	MUS	-1.99	-0.92	0.42	-0.18	-0.63	-0.31	1.68	0.32	36	10/22	SUB-SAHARAN AFRICA
2	1/16	THAILAND	THA	-0.67	-0.61	0.14	0.09	0.17	0.81	1.48	0.65	11	1/16	EAST ASIA AND PACIFIC
3	2/16	MALAYSIA	MYS	-0.67	-0.49	-0.02	0.02	0.48	0.76	1.43	0.28	43	9/16	EAST ASIA AND PACIFIC
4	3/16	SINGAPORE	SGP	0.59	0.57	0.66	0.84	1.22	1.64	1.05	0.42	24	6/16	EAST ASIA AND PACIFIC
5	4/16	INDONESIA	IDN	-1.04	-1.04	-0.89	-0.62	-0.19	-0.01	1.03	0.18	51	10/16	EAST ASIA AND PACIFIC
6	2/22	UGANDA	UGA	-1.48	-1.42	-0.78	-1.32	-1.14	-0.49	0.99	0.65	10	3/22	SUB-SAHARAN AFRICA
7	1/21	BRAZIL	BRA	-0.74	-0.55	0.31	0.60	0.68	0.24	0.98	-0.43	104	19/21	LATIN AMERICA AND THE CARIBBEAN
8	2/21	DOMINICAN REPUBLIC	DOM	-1.05	-0.95	0.34	-0.34	-0.72	-0.06	0.98	0.66	9	6/21	LATIN AMERICA AND THE CARIBBEAN
9	1/14	SAUDI ARABIA	SAU	-1.02	-0.93	-2.64	0.51	0.22	-0.20	0.82	-0.42	103	13/14	MIDDLE EAST AND NORTH AFRICA
10	1/6	TURKEY	TUR	-0.35	-0.49	0.31	0.38	0.28	0.44	0.79	0.17	53	9/6	EASTERN EUROPE AND CENTRAL ASIA
11	2/14	LIBYA	LBY	-2.09	-2.31	-2.07	0.08	-0.72	-1.30	0.78	-0.58	114	15/14	MIDDLE EAST AND NORTH AFRICA
12	3/21	MEXICO	MEX	0.39	0.24	0.74	0.80	0.80	1.14	0.76	0.35	30	9/21	LATIN AMERICA AND THE CARIBBEAN
13	3/22	TANZANIA	TZA	-1.21	-1.11	-0.66	-1.17	-1.25	-0.64	0.57	0.61	12	4/22	SUB-SAHARAN AFRICA
14	4/22	KENYA	KEN	-0.84	-0.68	0.15	-0.87	-1.12	-0.28	0.56	0.84	3	1/22	SUB-SAHARAN AFRICA
15	5/16	PHILIPPINES	PHL	-0.46	-0.18	0.25	-0.15	-0.31	0.03	0.50	0.34	32	8/16	EAST ASIA AND PACIFIC
16	1/3	SRI LANKA	LKA	-0.73	-0.89	-0.15	-0.47	-0.64	-0.27	0.46	0.37	27	1/3	SOUTH ASIA
17	6/16	JAPAN	JPN	1.87	1.93	1.49	2.11	2.21	2.32	0.45	0.11	57	11/16	EAST ASIA AND PACIFIC
18	7/16	KOREA, REP.	KOR	1.04	0.97	0.89	0.93	0.94	1.47	0.43	0.53	19	4/16	EAST ASIA AND PACIFIC
19	2/6	ROMANIA	ROU	0.53	0.88	0.86	1.04	0.64	0.94	0.40	0.29	40	5/6	EASTERN EUROPE AND CENTRAL ASIA
20	3/14	TUNISIA	TUN	-0.08	0.12	0.20	0.18	-0.02	0.29	0.37	0.31	38	5/14	MIDDLE EAST AND NORTH AFRICA
21	4/14	LEBANON	LBN	0.11	0.86	0.53	0.35	0.08	0.40	0.30	0.32	37	4/14	MIDDLE EAST AND NORTH AFRICA
22	5/14	QATAR	QAT	-0.73	-2.31	-3.61	0.29	-0.79	-0.44	0.29	0.35	29	2/14	MIDDLE EAST AND NORTH AFRICA
23	3/6	ALBANIA	ALB	-0.18	0.10	0.39	-0.09	-0.37	0.09	0.26	0.46	21	2/6	EASTERN EUROPE AND CENTRAL ASIA
24	5/22	GHANA	GHA	-1.13	-0.97	-0.62	-1.22	-1.18	-0.87	0.26	0.31	39	11/22	SUB-SAHARAN AFRICA
25	6/22	MADAGASCAR	MDG	-0.85	-0.89	-0.60	-1.40	-1.14	-0.59	0.25	0.54	18	6/22	SUB-SAHARAN AFRICA
26	1/15	FINLAND	FIN	1.47	1.64	1.21	1.64	1.85	1.71	0.24	-0.13	77	4/15	WESTERN EUROPE
27	4/6	HUNGARY	HUN	1.19	1.15	0.91	0.99	1.01	1.43	0.24	0.42	23	3/6	EASTERN EUROPE AND CENTRAL ASIA
28	8/16	VIETNAM	VNM	-0.40	-0.02	0.02	-0.60	-0.59	-0.18	0.22	0.41	25	7/16	EAST ASIA AND PACIFIC
29	4/21	PARAGUAY	PRY	-0.68	-0.60	-0.16	-0.71	-0.22	-0.47	0.21	-0.25	87	14/21	LATIN AMERICA AND THE CARIBBEAN
30	7/22	SENEGAL	SEN	-0.49	-0.30	-0.36	-0.78	-0.97	-0.29	0.20	0.68	7	2/22	SUB-SAHARAN AFRICA
31	9/16	CHINA	CHN	0.74	0.75	0.57	0.40	0.33	0.89	0.15	0.57	16	3/16	EAST ASIA AND PACIFIC
32	8/22	SOUTH AFRICA	ZAF	-0.02	-0.20	0.22	0.13	0.41	0.13	0.15	-0.28	91	18/22	SUB-SAHARAN AFRICA
33	5/21	TRINIDAD AND TOBAGO	TTO	-0.45	0.10	-0.08	-0.41	-0.06	-0.31	0.15	-0.25	86	13/21	LATIN AMERICA AND THE CARIBBEAN
34	6/14	KUWAIT	KWT	-1.36	-0.89	-1.94	0.69	-0.55	-1.22	0.14	-0.67	117	16/14	MIDDLE EAST AND NORTH AFRICA
35	6/21	COLOMBIA	COL	0.06	-0.23	0.03	0.11	0.28	0.20	0.14	-0.08	72	12/21	LATIN AMERICA AND THE CARIBBEAN
36	7/14	SYRIAN ARAB REPUBLIC	SYR	-0.42	-0.17	-0.29	-0.14	-0.98	-0.29	0.13	0.69	6	1/14	MIDDLE EAST AND NORTH AFRICA
37	2/3	INDIA	IND	0.12	0.29	0.40	0.19	0.21	0.25	0.13	0.04	63	4/3	SOUTH ASIA
38	8/14	ISRAEL	ISR	1.04	0.78	0.95	1.18	1.24	1.16	0.13	-0.08	73	8/14	MIDDLE EAST AND NORTH AFRICA
39	2/15	SPAIN	ESP	0.81	0.89	1.05	1.20	1.13	0.93	0.12	-0.19	81	7/15	WESTERN EUROPE
40	9/22	GABON	GAB	-1.48	-1.30	-1.40	-1.62	-0.93	-1.36	0.11	-0.44	105	19/22	SUB-SAHARAN AFRICA
41	7/21	COSTA RICA	CRI	0.22	0.63	-0.04	-0.44	-0.54	0.28	0.06	0.81	4	3/21	LATIN AMERICA AND THE CARIBBEAN
42	9/14	EGYPT, ARAB REP.	EGY	-0.07	-0.04	0.22	-0.14	-0.30	-0.02	0.05	0.28	42	6/14	MIDDLE EAST AND NORTH AFRICA
43	10/22	CÔTE D'IVOIRE	CIV	-0.92	-1.02	-0.58	-1.63	-1.43	-0.87	0.05	0.56	17	5/22	SUB-SAHARAN AFRICA

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RANKING Δ ECI (64-08)	REGIONAL RANKING Δ ECI (64-08)	COUNTRY NAME	ISO CODE	1964	1968	1978	1988	1998	2008	Δ ECI (64-08)	Δ ECI (98-08)	RANKING Δ ECI (98-08)	REGIONAL RANKING Δ ECI (98-08)	REGION
44	8/21	ECUADOR	ECU	-0.66	-0.89	-0.52	-0.81	-0.85	-0.62	0.04	0.23	46	10/21	LATIN AMERICA AND THE CARIBBEAN
45	9/21	ARGENTINA	ARG	0.09	-0.05	0.43	0.28	0.39	0.11	0.01	-0.28	90	15/21	LATIN AMERICA AND THE CARIBBEAN
46	3/15	IRELAND	IRL	1.22	1.10	1.10	1.44	1.57	1.23	0.01	-0.34	98	14/15	WESTERN EUROPE
47	10/16	CAMBODIA	KHM	-0.71	-1.06	0.09	-0.82	-1.19	-0.70	0.01	0.48	20	5/16	EAST ASIA AND PACIFIC
48	11/22	MOZAMBIQUE	MOZ	-1.08	-0.71	-0.49	-0.10	-0.38	-1.08	0.01	-0.70	119	23/22	SUB-SAHARAN AFRICA
49	12/22	ETHIOPIA	ETH	-0.88	-0.92	-0.60	-0.77	-1.06	-0.89	-0.01	0.17	52	15/22	SUB-SAHARAN AFRICA
50	13/22	NIGERIA	NGA	-1.38	-1.45	-1.50	-1.71	-1.65	-1.42	-0.04	0.23	47	13/22	SUB-SAHARAN AFRICA
51	4/15	SWITZERLAND	CHE	2.04	1.89	1.44	1.90	2.08	1.93	-0.10	-0.14	78	5/15	WESTERN EUROPE
52	10/21	PERU	PER	-0.45	-0.73	0.00	-0.04	-0.26	-0.58	-0.12	-0.32	92	16/21	LATIN AMERICA AND THE CARIBBEAN
53	5/15	SWEDEN	SWE	2.00	1.88	1.46	2.02	2.03	1.86	-0.14	-0.17	79	6/15	WESTERN EUROPE
54	6/15	AUSTRIA	AUT	1.96	1.87	1.39	1.78	1.80	1.81	-0.15	0.01	65	2/15	WESTERN EUROPE
55	11/16	NEW ZEALAND	NZL	0.47	0.32	0.58	0.57	0.47	0.29	-0.18	-0.18	80	14/16	EAST ASIA AND PACIFIC
56	11/21	GUATEMALA	GTM	0.09	0.32	-0.36	-0.84	-0.86	-0.10	-0.19	0.76	5	4/21	LATIN AMERICA AND THE CARIBBEAN
57	12/21	PANAMA	PAN	1.02	1.14	0.03	0.30	-0.13	0.83	-0.19	0.96	2	2/21	LATIN AMERICA AND THE CARIBBEAN
58	13/21	JAMAICA	JAM	-0.15	-0.08	0.12	-0.53	-0.78	-0.34	-0.20	0.44	22	8/21	LATIN AMERICA AND THE CARIBBEAN
59	Ia	LAO PDR	LAO	-0.67	-0.60	-0.47	-1.11	-0.83	-0.88	-0.21	-0.05	70	13/16	EAST ASIA AND PACIFIC
60	7/15	DENMARK	DNK	1.50	1.40	1.18	1.59	1.54	1.27	-0.23	-0.27	88	12/15	WESTERN EUROPE
61	5/6	POLAND	POL	1.26	1.08	0.94	1.11	1.02	1.02	-0.24	0.00	66	15/6	EASTERN EUROPE AND CENTRAL ASIA
62	14/21	URUGUAY	URY	0.35	0.26	0.58	0.49	0.44	0.11	-0.24	-0.33	97	18/21	LATIN AMERICA AND THE CARIBBEAN
63	8/15	GREECE	GRC	0.46	0.31	0.64	0.20	0.26	0.21	-0.25	-0.04	69	3/15	WESTERN EUROPE
64	10/14	JORDAN	JOR	0.58	0.82	1.03	0.42	0.43	0.33	-0.25	-0.11	75	10/14	MIDDLE EAST AND NORTH AFRICA
65	15/21	HONDURAS	HND	-0.23	-0.13	-0.31	-0.97	-1.09	-0.52	-0.28	0.57	15	7/21	LATIN AMERICA AND THE CARIBBEAN
66	14/22	CAMEROON	CMR	-1.12	-0.71	-0.61	-1.83	-1.73	-1.40	-0.29	0.32	35	9/22	SUB-SAHARAN AFRICA
67	11/14	OMAN	OMN	-0.30	-1.13	-2.45	0.18	-0.33	-0.60	-0.30	-0.27	89	11/14	MIDDLE EAST AND NORTH AFRICA
68	16/21	NICARAGUA	NIC	-0.36	0.08	-0.29	-0.93	-1.32	-0.66	-0.31	0.66	8	5/21	LATIN AMERICA AND THE CARIBBEAN
69	13/16	HONG KONG SAR, CHINA	HKG	1.33	1.37	0.92	0.88	0.42	1.02	-0.31	0.60	13	2/16	EAST ASIA AND PACIFIC
70	17/21	BOLIVIA	BOL	-0.57	-0.60	-0.21	-0.99	-0.56	-0.88	-0.31	-0.32	93	17/21	LATIN AMERICA AND THE CARIBBEAN
71	9/15	FRANCE	FRA	1.79	1.68	1.30	1.67	1.67	1.47	-0.31	-0.20	83	9/15	WESTERN EUROPE
72	1/2	UNITED STATES	USA	1.78	1.76	1.35	1.58	1.81	1.45	-0.33	-0.36	99	1/2	NORTH AMERICA
73	3/3	PAKISTAN	PAK	-0.06	-0.12	0.19	-0.49	-0.72	-0.40	-0.34	0.33	34	2/3	SOUTH ASIA
74	10/15	UNITED KINGDOM	GBR	1.92	1.87	1.36	1.81	1.92	1.56	-0.36	-0.37	101	15/15	WESTERN EUROPE
75	11/15	NETHERLANDS	NLD	1.41	1.37	1.08	1.39	1.37	1.04	-0.37	-0.33	96	13/15	WESTERN EUROPE
76	15/22	SUDAN	SDN	-1.39	-1.15	-0.79	-0.89	-1.08	-1.77	-0.38	-0.69	118	22/22	SUB-SAHARAN AFRICA
77	18/21	CUBA	CUB	-0.03	-0.40	-0.17	-0.39	-0.62	-0.43	-0.40	0.19	50	11/21	LATIN AMERICA AND THE CARIBBEAN
78	14/16	PAPUA NEW GUINEA	PNG	-1.17	-1.10	-1.04	-1.60	-1.55	-1.58	-0.41	-0.02	67	12/16	EAST ASIA AND PACIFIC
79	12/15	ITALY	ITA	1.72	1.74	1.29	1.61	1.54	1.31	-0.41	-0.23	85	11/15	WESTERN EUROPE
80	6/6	BULGARIA	BGR	1.00	0.71	0.80	1.11	0.65	0.59	-0.42	-0.06	71	17/6	EASTERN EUROPE AND CENTRAL ASIA
81	16/22	LIBERIA	LBR	-0.70	-0.64	-0.60	-1.48	-0.60	-1.13	-0.43	-0.52	112	20/22	SUB-SAHARAN AFRICA
82	2/2	CANADA	CAN	1.02	1.04	1.06	0.97	1.02	0.57	-0.45	-0.45	107	2/2	NORTH AMERICA
83	17/22	ZAMBIA	ZMB	-0.47	-1.26	-0.09	-0.39	-0.96	-0.93	-0.46	0.03	64	16/22	SUB-SAHARAN AFRICA
84	13/15	PORTUGAL	PRT	1.17	1.06	0.85	0.69	0.57	0.70	-0.47	0.13	55	1/15	WESTERN EUROPE
85	18/22	MALI	MLI	-0.63	-0.85	-0.20	-0.62	-1.48	-1.10	-0.48	0.38	26	7/22	SUB-SAHARAN AFRICA
86	19/21	EL SALVADOR	SLV	0.51	0.67	0.23	-0.61	-1.03	0.03	-0.48	1.05	1	1/21	LATIN AMERICA AND THE CARIBBEAN

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87	20/21	CHILE	CHL	0.20	0.10	0.28	-0.07	0.12	-0.31	-0.52	-0.44	106	20/21	LATIN AMERICA AND THE CARIBBEAN
88	19/22	GUINEA	GIN	-0.93	-1.02	-0.94	-1.86	-1.79	-1.44	-0.52	0.34	31	8/22	SUB-SAHARAN AFRICA
89	14/15	BELGIUM	BEL	1.67	1.54	1.24	1.53	1.60	1.08	-0.58	-0.52	111	16/15	WESTERN EUROPE
90	12/14	MOROCCO	MAR	0.20	-0.15	0.31	-0.18	-0.51	-0.40	-0.60	0.11	56	7/14	MIDDLE EAST AND NORTH AFRICA
91	13/14	IRAN, ISLAMIC REP.	IRN	-0.61	-0.68	-0.92	-0.86	-0.69	-1.23	-0.62	-0.54	113	14/14	MIDDLE EAST AND NORTH AFRICA
92	21/21	VENEZUELA, RB	VEN	-0.47	-0.19	-0.94	-0.19	0.25	-1.11	-0.64	-1.36	124	21/21	LATIN AMERICA AND THE CARIBBEAN
93	20/22	ANGOLA	AGO	-1.10	-1.08	-1.57	-1.01	-1.16	-1.79	-0.69	-0.64	115	21/22	SUB-SAHARAN AFRICA
94	21/22	CONGO, REP.	COG	-1.00	-0.88	-1.07	-1.61	-1.58	-1.71	-0.71	-0.12	76	17/22	SUB-SAHARAN AFRICA
95	15/16	AUSTRALIA	AUS	0.41	0.37	0.41	0.22	0.18	-0.32	-0.73	-0.50	109	16/16	EAST ASIA AND PACIFIC
96	15/15	NORWAY	NOR	1.53	1.59	1.13	1.26	0.99	0.78	-0.75	-0.21	84	10/15	WESTERN EUROPE
97	16/16	MONGOLIA	MNG	-0.08	-0.48	0.15	-0.02	-0.71	-1.17	-1.09	-0.46	108	15/16	EAST ASIA AND PACIFIC
98	14/14	ALGERIA	DZA	-0.01	-0.39	-0.26	0.50	-0.81	-1.21	-1.20	-0.40	102	12/14	MIDDLE EAST AND NORTH AFRICA
99	22/22	MAURITANIA	MRT	0.40	0.23	-0.12	-1.21	-1.01	-1.91	-2.31	-0.89	123	24/22	SUB-SAHARAN AFRICA
		UNITED ARAB EMIRATES	ARE			-3.61	0.53	-0.02	-0.11		-0.08	74	9/14	MIDDLE EAST AND NORTH AFRICA
		AZERBAIJAN	AZE					0.37	-1.22		-1.60	125	26/6	EASTERN EUROPE AND CENTRAL ASIA
		BANGLADESH	BGD			0.03	-0.62	-0.99	-0.89		0.11	58	3/3	SOUTH ASIA
		BOSNIA AND HERZEGOVINA	BIH					0.52	0.60		0.08	61	13/6	EASTERN EUROPE AND CENTRAL ASIA
		BELARUS	BLR					0.53	1.12		0.59	14	1/6	EASTERN EUROPE AND CENTRAL ASIA
		BOTSWANA	BWA						-0.62					
		CZECH REPUBLIC	CZE					1.52	1.63		0.10	59	11/6	EASTERN EUROPE AND CENTRAL ASIA
		GERMANY	DEU					2.18	1.98		-0.20	82	8/15	WESTERN EUROPE
		ESTONIA	EST					0.55	0.79		0.24	45	7/6	EASTERN EUROPE AND CENTRAL ASIA
		GEORGIA	GEO					0.48	-0.26		-0.74	120	23/6	EASTERN EUROPE AND CENTRAL ASIA
		CROATIA	HRV					0.79	0.99		0.20	49	8/6	EASTERN EUROPE AND CENTRAL ASIA
		KAZAKHSTAN	KAZ					0.21	-0.61		-0.82	122	25/6	EASTERN EUROPE AND CENTRAL ASIA
		KYRGYZ REPUBLIC	KGZ					0.09	-0.24		-0.33	95	19/6	EASTERN EUROPE AND CENTRAL ASIA
		LITHUANIA	LTU					0.42	0.68		0.27	44	6/6	EASTERN EUROPE AND CENTRAL ASIA
		LATVIA	LVA					0.22	0.59		0.37	28	4/6	EASTERN EUROPE AND CENTRAL ASIA
		MOLDOVA	MDA					0.11	0.27		0.15	54	10/6	EASTERN EUROPE AND CENTRAL ASIA
		MACEDONIA, FYR	MKD					0.01	-0.02		-0.02	68	16/6	EASTERN EUROPE AND CENTRAL ASIA
		MALAWI	MWI		-0.78	-0.65	-1.39	-1.31	-1.02		0.28	41	12/22	SUB-SAHARAN AFRICA
		NAMIBIA	NAM						-0.27					
		RUSSIAN FEDERATION	RUS					0.69	0.32		-0.36	100	20/6	EASTERN EUROPE AND CENTRAL ASIA
		SERBIA	SRB						0.64					
		SLOVAK REPUBLIC	SVK					1.33	1.38		0.05	62	14/6	EASTERN EUROPE AND CENTRAL ASIA
		SLOVENIA	SVN					1.43	1.52		0.09	60	12/6	EASTERN EUROPE AND CENTRAL ASIA
		TAJIKISTAN	TJK					-0.24	-1.05		-0.81	121	24/6	EASTERN EUROPE AND CENTRAL ASIA
		TURKMENISTAN	TKM					-0.55	-1.22		-0.67	116	22/6	EASTERN EUROPE AND CENTRAL ASIA
		UKRAINE	UKR					0.88	0.56		-0.33	94	18/6	EASTERN EUROPE AND CENTRAL ASIA
		UZBEKISTAN	UZB					-0.15	-0.66		-0.51	110	21/6	EASTERN EUROPE AND CENTRAL ASIA
		YEMEN, REP.	YEM					-1.38	-1.04		0.33	33	3/14	MIDDLE EAST AND NORTH AFRICA
		ZIMBABWE	ZWE		1.15	-0.02	-0.52	-0.56	-0.33		0.23	48	14/22	SUB-SAHARAN AFRICA

MAP 4:

Illustrates the spatial dristribution of these changes.

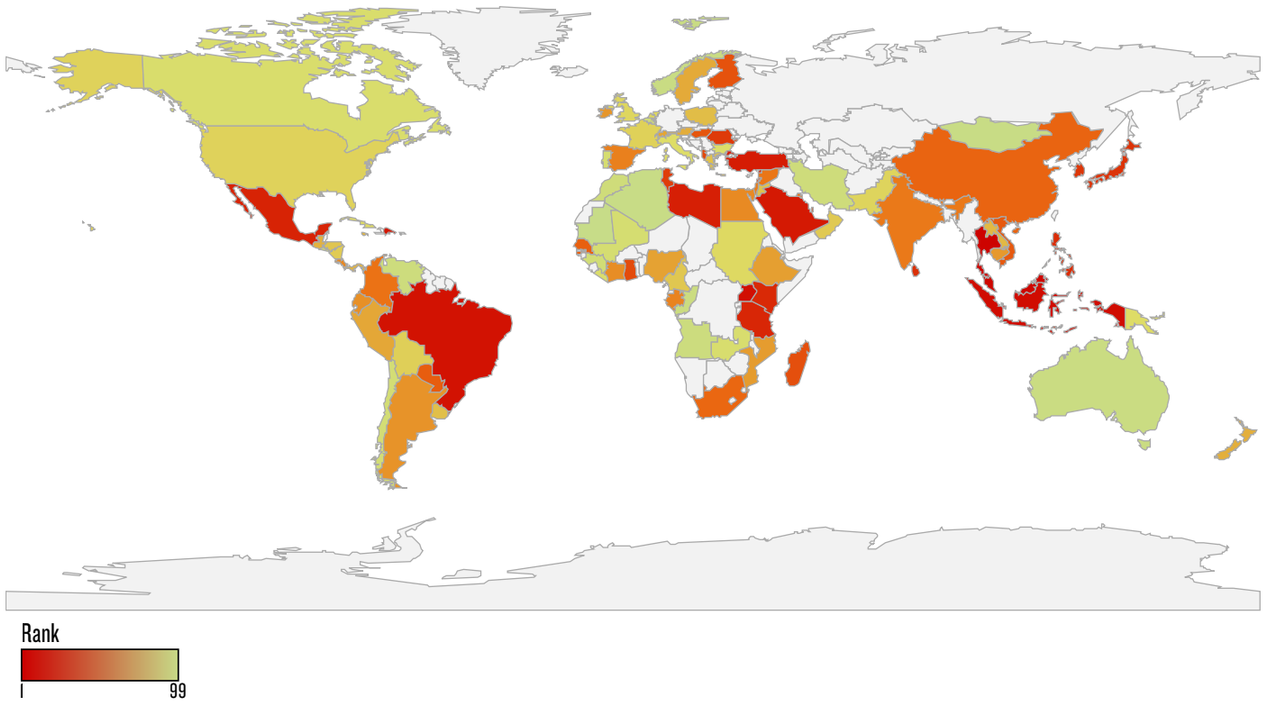
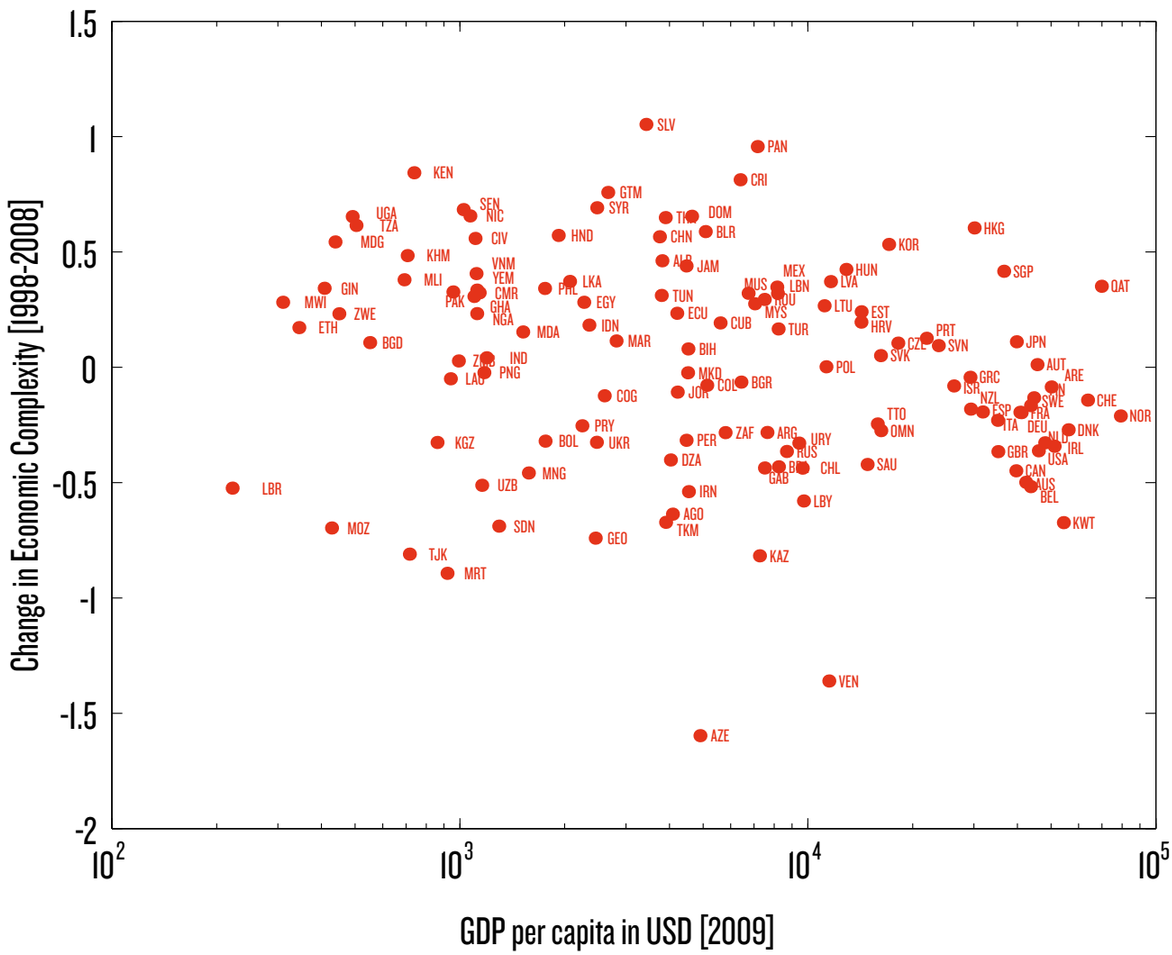


FIGURE 4:

Provides a visual representation of the change in ECI rankings.



RANKING 5:

Expected Contribution to World GDP Growth to 2020

Finally, RANKING 5 sorts countries according to their expected contribution to total world GDP growth in the period to 2020. As expected, the ranking is dominated by large economies. The United States and China are expected to be the largest contributors and are followed more distantly by Japan and India. What is worth highlighting from ranking 5 is the much larger importance of developing countries in the contribution to global growth. This is highlighted by the very large difference in incomes per capita between the top four countries. Consumers from China, India, Brazil and Mexico will now be a more important part of global economic dynamism, but, given that their lower incomes, their needs are radically different from those of the richer countries that have until now led the growth process. This will shape important changes in the demand structure of future growth. *Figure* 5 illustrates Ranking 5 by plotting the expected contribution to total GDP of each country as a function of GDP per capita. *Map* 5 shows the spatial distribution of Ranking 5.

BY REGION:

In Western Europe the top contributors to world GDP growth will be Germany (5), France (6) and United Kingdom (7). In Eastern Europe and Central Asia, Russia (14), Turkey (15) and Poland (20) are expected to be the leaders. Brazil (8), Mexico (10), Argentina (22) and Colombia (23) will be the largest Latin American contributors. In the Middle East and North Africa, the top contributors are Saudi Arabia (18), Egypt (24) and Israel (33).

In South Asia, the top contributor to world GDP growth will be India (4) followed distantly by Pakistan (31). South Africa (28), Nigeria (38) and Angola (62) will lead the regional ranking in Sub-Saharan Africa.

RANKING 5. EXPECTED CONTRIBUTION TO WORLD GDP GROWTH TO 2020

RANKING - CONTRIBUTION TO WORLD GDP GROWTH TO 2020	REGIONAL RANKING - CONTRIBUTION TO WORLD GDP GROWTH TO 2020	COUNTRY NAME	ISO CODE	CONTRIBUTION TO WORLD GDP GROWTH TO 2020	REGION
1	1/2	UNITED STATES	USA	22.41%	NORTH AMERICA
2	1/16	CHINA	CHN	14.21%	EAST ASIA AND PACIFIC
3	2/16	JAPAN	JPN	7.11%	EAST ASIA AND PACIFIC
4	1/4	INDIA	IND	4.89%	SOUTH ASIA
5	1/16	GERMANY	DEU	3.88%	WESTERN EUROPE
6	2/16	FRANCE	FRA	3.64%	WESTERN EUROPE
7	3/16	UNITED KINGDOM	GBR	3.33%	WESTERN EUROPE
8	1/21	BRAZIL	BRA	3.22%	LATIN AMERICA AND THE CARIBBEAN
9	4/16	ITALY	ITA	2.63%	WESTERN EUROPE
10	2/21	MEXICO	MEX	2.44%	LATIN AMERICA AND THE CARIBBEAN
11	5/16	SPAIN	ESP	2.12%	WESTERN EUROPE
12	2/2	CANADA	CAN	1.88%	NORTH AMERICA
13	3/16	KOREA, REP.	KOR	1.63%	EAST ASIA AND PACIFIC
14	1/27	RUSSIAN FEDERATION	RUS	1.63%	EASTERN EUROPE AND CENTRAL ASIA
15	2/27	TURKEY	TUR	1.41%	EASTERN EUROPE AND CENTRAL ASIA
16	4/16	INDONESIA	IDN	1.37%	EAST ASIA AND PACIFIC
17	5/16	AUSTRALIA	AUS	1.26%	EAST ASIA AND PACIFIC
18	1/16	SAUDI ARABIA	SAU	0.85%	MIDDLE EAST AND NORTH AFRICA
19	6/16	NETHERLANDS	NLD	0.83%	WESTERN EUROPE
20	3/27	POLAND	POL	0.75%	EASTERN EUROPE AND CENTRAL ASIA
21	6/16	THAILAND	THA	0.71%	EAST ASIA AND PACIFIC
22	3/21	ARGENTINA	ARG	0.61%	LATIN AMERICA AND THE CARIBBEAN
23	4/21	COLOMBIA	COL	0.59%	LATIN AMERICA AND THE CARIBBEAN
24	2/16	EGYPT, ARAB REP.	EGY	0.58%	MIDDLE EAST AND NORTH AFRICA
25	7/16	SWEDEN	SWE	0.58%	WESTERN EUROPE
26	7/16	MALAYSIA	MYS	0.58%	EAST ASIA AND PACIFIC
27	8/16	SWITZERLAND	CHE	0.56%	WESTERN EUROPE
28	1/26	SOUTH AFRICA	ZAF	0.55%	SUB-SAHARAN AFRICA
29	9/16	BELGIUM	BEL	0.54%	WESTERN EUROPE
30	8/16	PHILIPPINES	PHL	0.53%	EAST ASIA AND PACIFIC
31	2/4	PAKISTAN	PAK	0.48%	SOUTH ASIA
32	5/21	VENEZUELA, RB	VEN	0.48%	LATIN AMERICA AND THE CARIBBEAN
33	3/16	ISRAEL	ISR	0.47%	MIDDLE EAST AND NORTH AFRICA
34	10/16	AUSTRIA	AUT	0.46%	WESTERN EUROPE
35	4/16	UNITED ARAB EMIRATES	ARE	0.42%	MIDDLE EAST AND NORTH AFRICA
36	9/16	HONG KONG SAR, CHINA	HKG	0.39%	EAST ASIA AND PACIFIC
37	5/16	IRAN, ISLAMIC REP.	IRN	0.39%	MIDDLE EAST AND NORTH AFRICA
38	2/26	NIGERIA	NGA	0.38%	SUB-SAHARAN AFRICA
39	4/27	CZECH REPUBLIC	CZE	0.36%	EASTERN EUROPE AND CENTRAL ASIA
40	11/16	NORWAY	NOR	0.36%	WESTERN EUROPE
41	12/16	GREECE	GRC	0.34%	WESTERN EUROPE
42	13/16	IRELAND	IRL	0.34%	WESTERN EUROPE
43	10/16	SINGAPORE	SGP	0.34%	EAST ASIA AND PACIFIC

RANKING 5. EXPECTED CONTRIBUTION TO WORLD GDP GROWTH TO 2020

RANKING - CONTRIBUTION TO WORLD GDP GROWTH TO 2020	REGIONAL RANKING - CONTRIBUTION TO WORLD GDP GROWTH TO 2020	COUNTRY NAME	ISO CODE	CONTRIBUTION TO WORLD GDP GROWTH TO 2020	REGION
44	14/16	DENMARK	DNK	0.32%	WESTERN EUROPE
45	15/16	FINLAND	FIN	0.30%	WESTERN EUROPE
46	5/27	ROMANIA	ROU	0.29%	EASTERN EUROPE AND CENTRAL ASIA
47	16/16	PORTUGAL	PRT	0.28%	WESTERN EUROPE
48	6/21	CHILE	CHL	0.26%	LATIN AMERICA AND THE CARIBBEAN
49	11/16	VIETNAM	VNM	0.26%	EAST ASIA AND PACIFIC
50	6/16	KUWAIT	KWT	0.26%	MIDDLE EAST AND NORTH AFRICA
51	7/21	PERU	PER	0.24%	LATIN AMERICA AND THE CARIBBEAN
52	6/27	HUNGARY	HUN	0.23%	EASTERN EUROPE AND CENTRAL ASIA
53	12/16	NEW ZEALAND	NZL	0.21%	EAST ASIA AND PACIFIC
54	7/27	UKRAINE	UKR	0.20%	EASTERN EUROPE AND CENTRAL ASIA
55	7/16	ALGERIA	DZA	0.20%	MIDDLE EAST AND NORTH AFRICA
56	3/4	BANGLADESH	BGD	0.19%	SOUTH ASIA
57	8/16	MOROCCO	MAR	0.18%	MIDDLE EAST AND NORTH AFRICA
58	8/27	KAZAKHSTAN	KAZ	0.18%	EASTERN EUROPE AND CENTRAL ASIA
59	9/16	QATAR	QAT	0.18%	MIDDLE EAST AND NORTH AFRICA
60	9/27	SLOVAK REPUBLIC	SVK	0.16%	EASTERN EUROPE AND CENTRAL ASIA
61	10/16	SYRIAN ARAB REPUBLIC	SYR	0.14%	MIDDLE EAST AND NORTH AFRICA
62	3/26	ANGOLA	AGO	0.14%	SUB-SAHARAN AFRICA
63	8/21	GUATEMALA	GTM	0.13%	LATIN AMERICA AND THE CARIBBEAN
64	4/26	KENYA	KEN	0.12%	SUB-SAHARAN AFRICA
65	9/21	ECUADOR	ECU	0.11%	LATIN AMERICA AND THE CARIBBEAN
66	10/21	DOMINICAN REPUBLIC	DOM	0.11%	LATIN AMERICA AND THE CARIBBEAN
67	10/27	BELARUS	BLR	0.10%	EASTERN EUROPE AND CENTRAL ASIA
68	11/16	TUNISIA	TUN	0.10%	MIDDLE EAST AND NORTH AFRICA
69	11/27	CROATIA	HRV	0.09%	EASTERN EUROPE AND CENTRAL ASIA
70	4/4	SRI LANKA	LKA	0.09%	SOUTH ASIA
71	5/26	TANZANIA	TZA	0.09%	SUB-SAHARAN AFRICA
72	6/26	SUDAN	SDN	0.09%	SUB-SAHARAN AFRICA
73	12/16	JORDAN	JOR	0.08%	MIDDLE EAST AND NORTH AFRICA
74	13/16	OMAN	OMN	0.08%	MIDDLE EAST AND NORTH AFRICA
75	14/16	YEMEN, REP.	YEM	0.08%	MIDDLE EAST AND NORTH AFRICA
76	7/26	ETHIOPIA	ETH	0.08%	SUB-SAHARAN AFRICA
77	12/27	SERBIA	SRB	0.08%	EASTERN EUROPE AND CENTRAL ASIA
78	13/27	SLOVENIA	SVN	0.08%	EASTERN EUROPE AND CENTRAL ASIA
79	11/21	PANAMA	PAN	0.08%	LATIN AMERICA AND THE CARIBBEAN
80	15/16	LEBANON	LBN	0.07%	MIDDLE EAST AND NORTH AFRICA
81	12/21	COSTA RICA	CRI	0.07%	LATIN AMERICA AND THE CARIBBEAN
82	13/21	CUBA	CUB	0.07%	LATIN AMERICA AND THE CARIBBEAN
83	14/27	UZBEKISTAN	UZB	0.07%	EASTERN EUROPE AND CENTRAL ASIA
84	8/26	UGANDA	UGA	0.07%	SUB-SAHARAN AFRICA
85	16/16	LIBYA	LBY	0,07%	MIDDLE EAST AND NORTH AFRICA
86	9/26	GHANA	GHA	0.07%	SUB-SAHARAN AFRICA

RANKING 5. EXPECTED CONTRIBUTION TO WORLD GDP GROWTH TO 2020

RANKING - CONTRIBUTION TO WORLD GDP GROWTH TO 2020	REGIONAL RANKING - CONTRIBUTION TO WORLD GDP GROWTH TO 2020	COUNTRY NAME	ISO CODE	CONTRIBUTION TO WORLD GDP GROWTH TO 2020	REGION
87	15/27	BULGARIA	BGR	0.07%	EASTERN EUROPE AND CENTRAL ASIA
88	10/26	CÔTE D'IVOIRE	CIV	0.06%	SUB-SAHARAN AFRICA
89	16/27	AZERBAIJAN	AZE	0.05%	EASTERN EUROPE AND CENTRAL ASIA
90	14/21	URUGUAY	URY	0.05%	LATIN AMERICA AND THE CARIBBEAN
91	11/26	SENEGAL	SEN	0.05%	SUB-SAHARAN AFRICA
92	17/27	LITHUANIA	LTU	0.05%	EASTERN EUROPE AND CENTRAL ASIA
93	15/21	EL SALVADOR	SLV	0.05%	LATIN AMERICA AND THE CARIBBEAN
94	12/26	ZAMBIA	ZMB	0.04%	SUB-SAHARAN AFRICA
95	13/26	CAMEROON	CMR	0.04%	SUB-SAHARAN AFRICA
96	16/21	HONDURAS	HND	0.04%	LATIN AMERICA AND THE CARIBBEAN
97	17/21	BOLIVIA	BOL	0.04%	LATIN AMERICA AND THE CARIBBEAN
98	18/21	PARAGUAY	PRY	0.04%	LATIN AMERICA AND THE CARIBBEAN
99	14/26	MADAGASCAR	MDG	0.03%	SUB-SAHARAN AFRICA
100	18/27	BOSNIA AND HERZEGOVINA	BIH	0.03%	EASTERN EUROPE AND CENTRAL ASIA
101	19/27	LATVIA	LVA	0.03%	EASTERN EUROPE AND CENTRAL ASIA
102	20/27	TURKMENISTAN	TKM	0.03%	EASTERN EUROPE AND CENTRAL ASIA
103	15/26	MALI	MLI	0.03%	SUB-SAHARAN AFRICA
104	21/27	ESTONIA	EST	0.03%	EASTERN EUROPE AND CENTRAL ASIA
105	16/26	MOZAMBIQUE	MOZ	0.03%	SUB-SAHARAN AFRICA
106	13/16	CAMBODIA	KHM	0.02%	EAST ASIA AND PACIFIC
107	17/26	NAMIBIA	NAM	0.02%	SUB-SAHARAN AFRICA
108	22/27	ALBANIA	ALB	0.02%	EASTERN EUROPE AND CENTRAL ASIA
109	18/26	ZIMBABWE	ZWE	0.02%	SUB-SAHARAN AFRICA
110	19/21	TRINIDAD AND TOBAGO	TTO	0.02%	LATIN AMERICA AND THE CARIBBEAN
111	19/26	BOTSWANA	BWA	0.02%	SUB-SAHARAN AFRICA
112	20/26	GABON	GAB	0.02%	SUB-SAHARAN AFRICA
113	20/21	JAMAICA	JAM	0.02%	LATIN AMERICA AND THE CARIBBEAN
114	21/26	MALAWI	MWI	0.02%	SUB-SAHARAN AFRICA
115	22/26	CONGO, REP.	COG	0.01%	SUB-SAHARAN AFRICA
116	23/27	MACEDONIA, FYR	MKD	0.01%	EASTERN EUROPE AND CENTRAL ASIA
117	21/21	NICARAGUA	NIC	0.01%	LATIN AMERICA AND THE CARIBBEAN
118	14/16	PAPUA NEW GUINEA	PNG	0.01%	EAST ASIA AND PACIFIC
119	24/27	KYRGYZ REPUBLIC	KGZ	0.01%	EASTERN EUROPE AND CENTRAL ASIA
120	23/26	MAURITIUS	MUS	0.01%	SUB-SAHARAN AFRICA
121	15/16	LAO PDR	LAO	0.01%	EAST ASIA AND PACIFIC
122	25/27	GEORGIA	GEO	0.01%	EASTERN EUROPE AND CENTRAL ASIA
123	26/27	MOLDOVA	MDA	0.01%	EASTERN EUROPE AND CENTRAL ASIA
124	27/27	TAJIKISTAN	TJK	0.01%	EASTERN EUROPE AND CENTRAL ASIA
125	24/26	GUINEA	GIN	0.01%	SUB-SAHARAN AFRICA
126	16/16	MONGOLIA	MNG	0.01%	EAST ASIA AND PACIFIC
127	25/26	MAURITANIA	MRT	0.00%	SUB-SAHARAN AFRICA
128	26/26	LIBERIA	LBR	0.00%	SUB-SAHARAN AFRICA

MAP 5:

Shows the spatial distribution of Ranking 5.

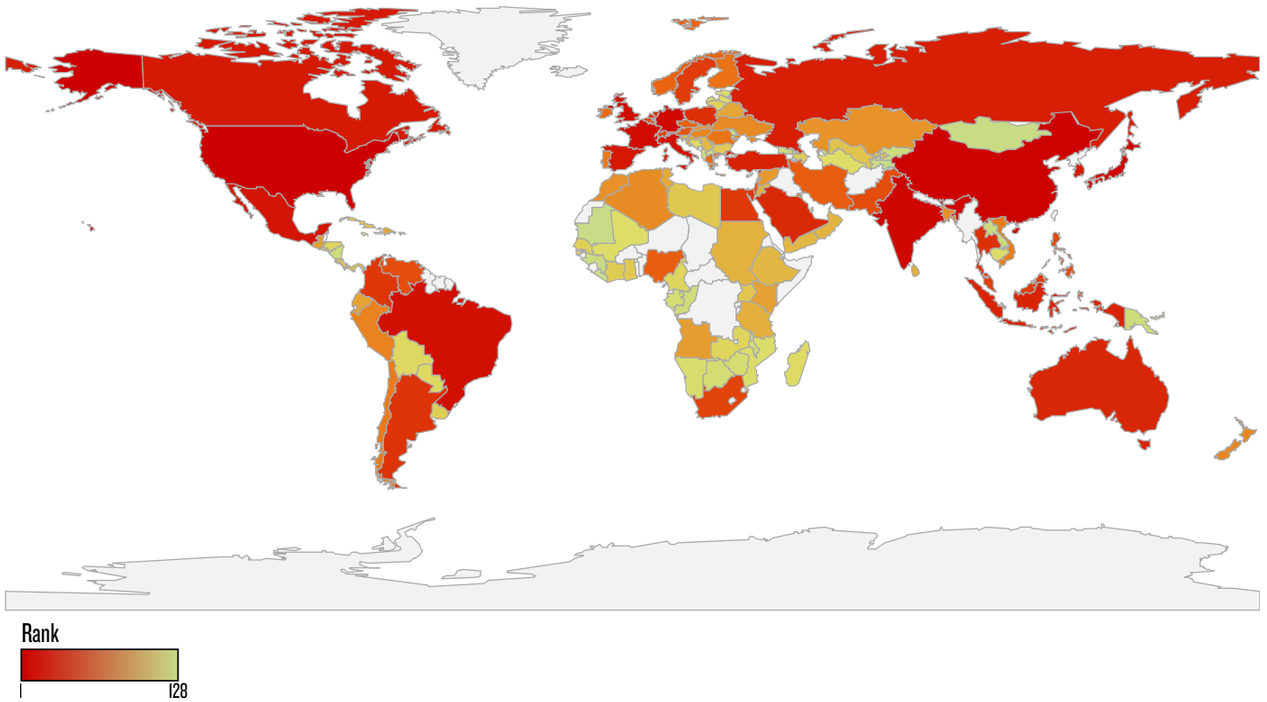


FIGURE 5:

Illustrates Ranking 5 by plotting the expected contribuyion to total GDP of each country as a fuction of GDP per capita.