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# Economic Letter

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*Ideas, like goods  
and services, also flow  
across borders and  
their globalization is  
well under way.*

## The Globalization of Ideas

by Anthony Landry

**G**lobalization is the process of increasing economic interdependence among nations. It is reflected in the growth of cross-border trade in goods and services. Ideas, like goods and services, also flow across borders and their globalization is well under way. From the U.S. to China, people are trading ideas and everyone is benefiting from it.

The global flow of ideas is apparent in the computers, smart phones, e-readers, MP3 players and other technologies that fill our everyday lives. Quantifying that flow is difficult; however, patent filings can provide indirect evidence on the production of ideas. Further, cross-border patenting—the patenting of one idea in several countries—can help trace the flow of ideas. What we learn from those data is that idea production has taken off in the developing BRIC economies (Brazil, Russia, India and China) and that exports and imports of ideas have grown substantially. This is happening not just in the BRICs, but also in the countries that have been the traditional locus of global idea production: the U.S., Germany and Japan.

Because ideas are intangible, measuring the impact of imported ideas on a country's economic well-being is challenging. Imported ideas can, however, arrive in a physical form—most importantly as new capital goods—whose impact on economic growth can be measured. Drawing on recent research, we can conclude that imports of capital goods have accounted for a sizeable fraction of the growth in U.S. labor productivity since the late 1960s.

But first, let's clarify a few ideas about ideas.

### What Is an Idea?

An idea is a set of instructions to produce a new good, to increase quality or to reduce costs. An idea is different from a good or a service



because it is nonrival: It can be used by different producers simultaneously. Therefore, an idea is not scarce in the same way that a good or service is scarce. A house under construction provides a good example to illustrate the concept of nonrivalry.<sup>1</sup> The land on which the house stands, the material of which it is constructed, and the tools, skills and labor hours of the carpenter who builds it are all rival goods. Using them to build one house means they cannot be used to build another house at the same time. By contrast, one idea can be used by an unlimited number of people simultaneously. A carpenter using the Pythagorean theorem to calculate the length of a triangle's side does not stop anyone else from doing the same thing at the same time.

Ideas are great engines of economic growth precisely because everybody can use them simultaneously. Once the cost of creating a new set of instructions has been incurred, the instructions can be used over and over again at no additional cost. Nobody needs to re-create an idea because it is already available for everybody to use. Therefore, the flow of an idea is as important as the idea itself—ideas become more valuable as the number of users increases. The value of the Pythagorean theorem increases with the number of houses under construction. If there are many carpenters in different parts of the world building houses, there are efficiency gains from sharing this idea. Because ideas are nonrival, there are gains from sharing them globally.

This is not to say that an idea should be used by everyone for free. An important aspect of innovation is the protection of ideas from imitators. A good can be nonrival but excludable—meaning that it's possible to limit its use, perhaps through legal means. Most ideas can be made excludable by intellectual property rights, often in the form of patents, trademarks or copyrights. For example, patents protect inventors from imitators making, using

and selling in countries where the patent is granted. Therefore, intellectual property rights and patent policies play an important role in the global flow of ideas.<sup>2</sup>

### The Global Flow of Ideas

Measuring the production of ideas and their flow is not easy. Ideas are intangible. We can, however, use the number of patent filings as indirect evidence of new ideas. The global flow of ideas is measured by cross-country patent statistics. While a single patent does not protect an idea worldwide, a single idea can be patented in a number of countries. Typically, patents are sought wherever inventors expect their ideas—designs for new products or production processes—to be made, used or sold. Therefore, we can use the distribution of patent applications as a proxy for the global flow of ideas.

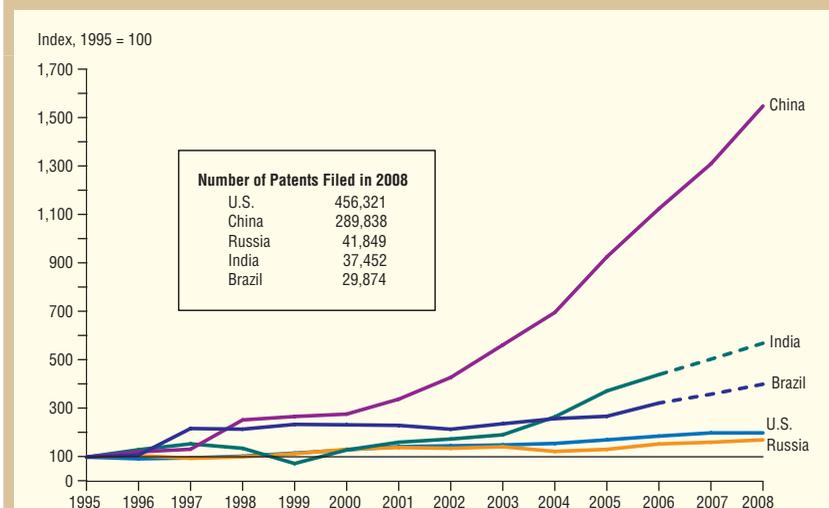
To date, the U.S., Japan and Germany have been the global locomotives of ideas. The landscape is changing, however, with patent filings growing rapidly in the BRIC econo-

mies (*Chart 1*). China's growth has far outperformed other countries, with a fifteenfold increase in patent filings since 1995. Brazil and India have also performed well, with an estimated four- and sixfold increase in patent filings since 1995.

Patent filings have grown quickly in China and other BRIC economies because of supply and demand factors. On the supply side, the BRIC economies have invested massive amounts of resources in research and development. On the demand side, the BRIC economies are becoming big consumers of ideas, driven by the increase in their market sizes.

Market size is a crucial determinant of whether it is profitable to develop and implement an idea. For example, a greater market size implies more sales and more units to be produced. Additionally, it implies that an idea can be embedded in an indefinite number of units without incurring further cost—thereby raising the value of the idea. This concept is what makes market size important.

Chart 1  
Growth in Patent Filings



NOTE: 2007–08 data for Brazil and India are estimates extrapolated from 2006 numbers.

SOURCE: World Intellectual Property Organization, 2009.



Further, countries are importing and exporting more ideas. Nonresident patent filings—applications within a particular country by residents of another country—are our proxy for imports of ideas. Between 1995 and 2008, nonresident patent filings in the U.S. grew slightly more than twofold, while nonresident filings in Japan and Germany grew slightly less (*Chart 2*). Among the BRICs, however, the smallest gain was a twofold increase in Russia. Brazil, India and China experienced five- to tenfold increases in nonresident filings.

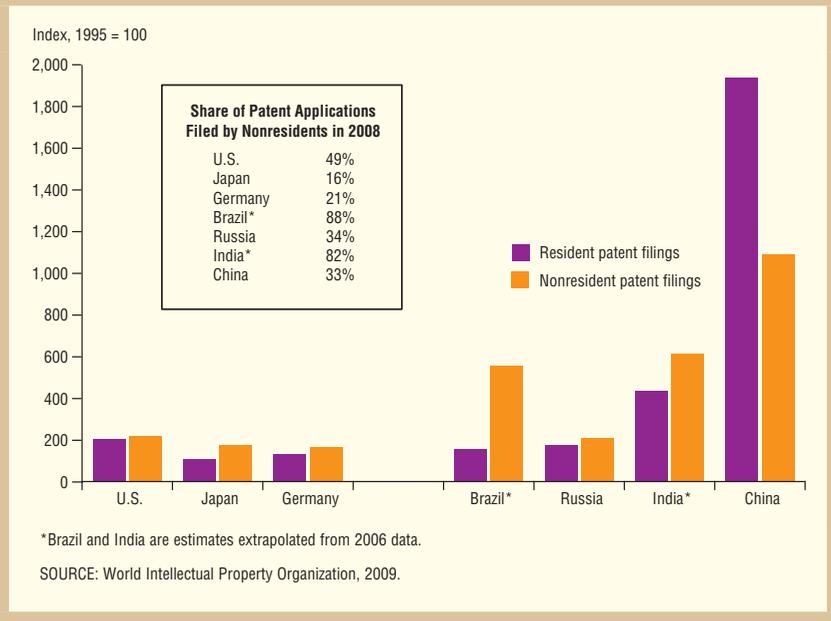
In all countries except China, growth in nonresident patent filings exceeded growth in resident patent filings. This effect is particularly strong in Brazil and India. Moreover, the share of nonresident patent filings exceeded 80 percent for both Brazil and India in 2008. Trade liberalization, the harmonization of intellectual property rights and increases in market size have influenced nonresidents to trade their ideas.

Not surprisingly, export activity has also grown. The number of ideas exported is the number of patent filings in all countries except the country of origin, which is the residence of the initial applicants. Export shares of ideas—calculated as the number of ideas exported from a country as a percentage of all ideas produced there—have increased in all the countries in our sample (*Chart 3*). For example, the U.S. export share of ideas increased to 40 percent in 2008 from 33 percent in 1995. This means that 40 percent of all patent filings by U.S. inventors were made outside the U.S. in 2008. The increase in export shares is even more dramatic for Japan, Germany and India.

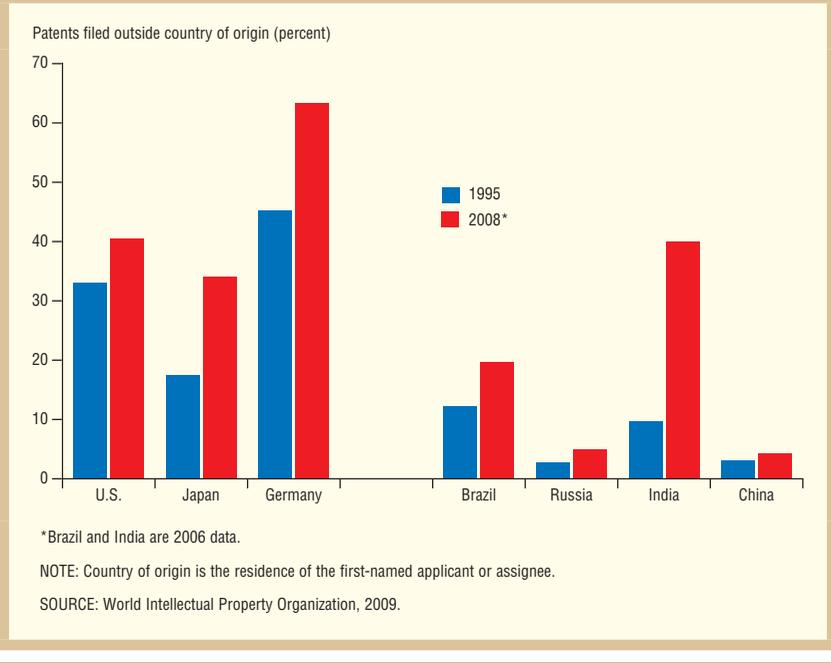
### Tangible Gains

Ideas are intangible, but sometimes they are embedded in the goods we trade. Capital goods such as machinery, electrical equipment, computers and software make up an important fraction of goods with

**Chart 2**  
**Import Growth of Ideas, 1995–2008**



**Chart 3**  
**Export Shares of Ideas**



embedded ideas. The design of new, more advanced capital goods provides incentives for continued investment and capital accumulation. In turn, the increased quantity and efficiency of the capital stock raise output.

The role played by imported capital goods in aggregate U.S. investment in equipment and software has increased 10 times over the past four decades: from 3.5 percent in 1967 to 36 percent in 2008.

The gains from capital-goods imports are substantial. In a recently published paper, Michele Cavallo and Anthony Landry find that capital-goods imports have accounted for 20 to 30 percent of the growth in U.S. output per hour since 1967.<sup>3</sup> Gains arise because it is possible to develop and produce ideas in separate locations. Today, a computer can be designed in the U.S., produced in Taiwan and imported back to the U.S. for consumption. Lower transportation costs and the creation, reallocation and integration of global production facilities have made it possible to move the physical production of an idea where labor costs are low. U.S. capital and labor can therefore be reallocated to more productive uses. This includes

the high-tech manufacture of aerospace and biotech products, health care equipment and computer electronics, for which the key drivers of production are ideas.

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## Notes

<sup>1</sup> This analogy comes from “The New Kaldor Facts: Ideas, Institutions, Population, and Human Capital,” by Charles I. Jones and Paul M. Romer, *American Economic Journal: Macroeconomics*, vol. 2, no. 1, 2010, pp. 224–45. Romer offers other examples in “What Parts of Globalization Matter for Catch-Up Growth?” *American Economic Review*, vol. 100, no. 2, 2010, pp. 94–98.

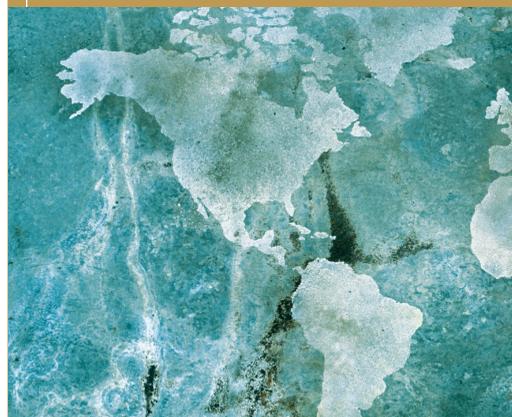
<sup>2</sup> Not all economists agree that ideas should be made excludable; see, for example, *Against Intellectual Monopoly*, by Michele Boldrin and David K. Levine, New York: Cambridge University Press, 2008.

<sup>3</sup> See “The Quantitative Role of Capital Goods Imports in U.S. Growth,” by Michele Cavallo and Anthony Landry, *American Economic Review*, vol. 100, no. 2, 2010, pp. 78–82.

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