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Who's Afraid of the Big Bad Dragon? How Chinese Trade Boosts Innovation

By Nick Bloom

Introduction: Innovate or Die?

Twin specters are haunting the United States and Europe: the growing economic power of China and fears about where the West's own growth will come from after the crisis. They have been driven by the tremendous growth of imports from China, as shown in Figure 1. But our research suggests that the dramatic rise in Chinese imports into Europe and the United States is actually good news for our economic prospects, encouraging the best firms in the developed world to get even better and powering the innovations that provide future growth.

Take footwear, a classic low-tech sector that conventional wisdom says should have all been offshored to China. Many

Western shoe manufacturers have disappeared, but some are innovating in designs that serve parts of the market where China is less able to compete.

For example, Massai Barefoot Technology (MBT), which makes posture-correcting shoes, began when Karl Muller, a Swiss engineer with a bad back, relieved his condition by walking barefoot on Korean grass. He patented a design to emulate the effect, which has gone on to great success and now attracts many imitators.

Companies that can find a niche for high-end style or technology can prosper in the face of stiff competition. Vermont-based Burton is a leading snowboard manufacturer

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About the Author

Nick Bloom is an associate professor of economics at Stanford University and a research fellow of SIEPR.



He works on the impact of uncertainty on economic activity (very much linked to the current credit crunch), innovation and management and organizational practices across countries. He previously worked in McKinsey & Company, and HM Treasury (in London).

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but also successfully designs and produces sportswear clothing. Last year, Burton offshored the production of snowboards—not to low-wage China but to high-wage Innsbruck in Austria.

Firms like MBT and Burton have responded to the threat of China by investing in new technology, human capital, and by innovating in highly customized designs. So why were so few firms not already doing this kind of innovation? The answer is simple—enjoying the “easy life” producing old goods is more attractive than

coming up with new ones. But a big shock like trade integration with China lowers the opportunity costs of innovation and deters firms from coasting along with business as usual.

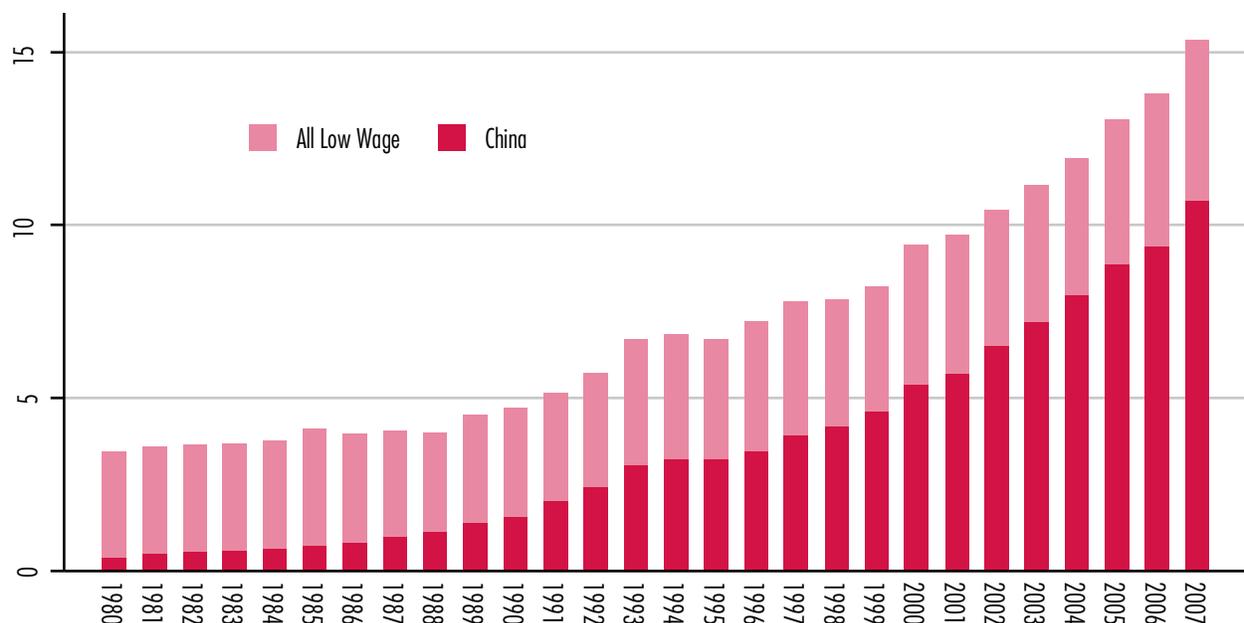
A Policy Experiment: Chinese Accession to the WTO

A big part of the shock hit when China joined the World Trade Organization in 2001 and quotas on most Chinese goods were eliminated. This led to a huge surge in imports and a battle between retailers

and manufacturers as the latter succeeded in getting some quotas reinstated. As a result, the famous “bra wars” of 2005 erupted as Chinese-made clothing—notably women’s underwear—piled up in European ports after unionized dock workers refused to unload ships carrying Chinese clothing.

The WTO accession provides a natural experiment for examining the effect of Chinese competition, an opportunity we exploit in our research. In the largest-ever study of the impact of China on Western

FIGURE 1.
Share of All Imports In The EU And U.S. From China and All Low-Wage Countries



Notes: Low-wage countries are defined as countries <5% GDP/capita relative to the US 1972-2001.



technological change, we track the performance of more than half a million manufacturing firms in 12 European countries over the past decade.

We look in detail at firm investments in information technology (IT), patenting, research and development expenditure (R&D), and productivity growth across all sectors. And we then use detailed information on European textile, clothing, and footwear import quotas to quantify the “natural experiment” offered by WTO accession. More recent work using U.S. data shows a similar story, but we will concentrate on the European results, which are more finalized due to the easier access to European innovation and IT data.

The China Effect of Technology and Jobs

A startling finding is that around 15 percent of technical change can be attributed directly to competition from Chinese imports, an annual benefit of almost \$10 billion to European countries. Firms have responded to the threat of Chinese imports by increasing their productivity through adopting better information technology, higher spending on R&D, and increased patenting. Unsurprisingly, these

lead to major increases in productivity.

Overall, our findings are consistent with a “trapped factor” explanation of how trade from China drives innovation in exposed firms. The intuition behind this model is that some factors of production are costly to move between firms because of adjustment costs and sunk investment (e.g., firm-specific skills). Chinese imports reduce the relative profitability of making low-tech products but since firms cannot easily dispose of their “trapped” labor and capital, the shadow cost of innovating and producing a new good has fallen. Hence, by reducing the profitability of current low-tech products and freeing up inputs to innovate and produce new products, Chinese trade reduces the opportunity cost of innovation. This trapped factor model of innovation is something we have been jointly developing with fellow SIEPR economist Paul Romer.

But not all firms have seized the opportunity to innovate. Many inefficient low-tech firms have been much more likely to shed jobs and disappear. This in itself raises productivity through the brutal force of natural

selection, as economic activity is reallocated away from inefficient enterprises to their more nimble-footed competitors. About a third of the overall effect of Chinese competition occurs in the form of this “creative destruction.” Practically, we find that investing in technology can do much to shield firms from the negative impacts of Chinese competition.

Figure 2 illustrates creative destruction in action. The left-hand panel is for plants in industries where there was relatively slow growth of Chinese imports (the bottom quintile including sectors like pharmaceuticals and medical devices). Unsurprisingly, high-tech firms grew faster than low-tech firms (we show this for IT intensity, but the same is true using patents or productivity). The right-hand side panel compares job growth with the industries where Chinese import growth was going through the roof (sectors like furniture, apparel, and textiles). Job growth in high-tech plants was around 10 percent in both sectors. But the establishments that really were suffering were the low-tech plants (the bottom 20 percent of IT-intensive firms). Their employment shrank by around 20 percent compared with only 10

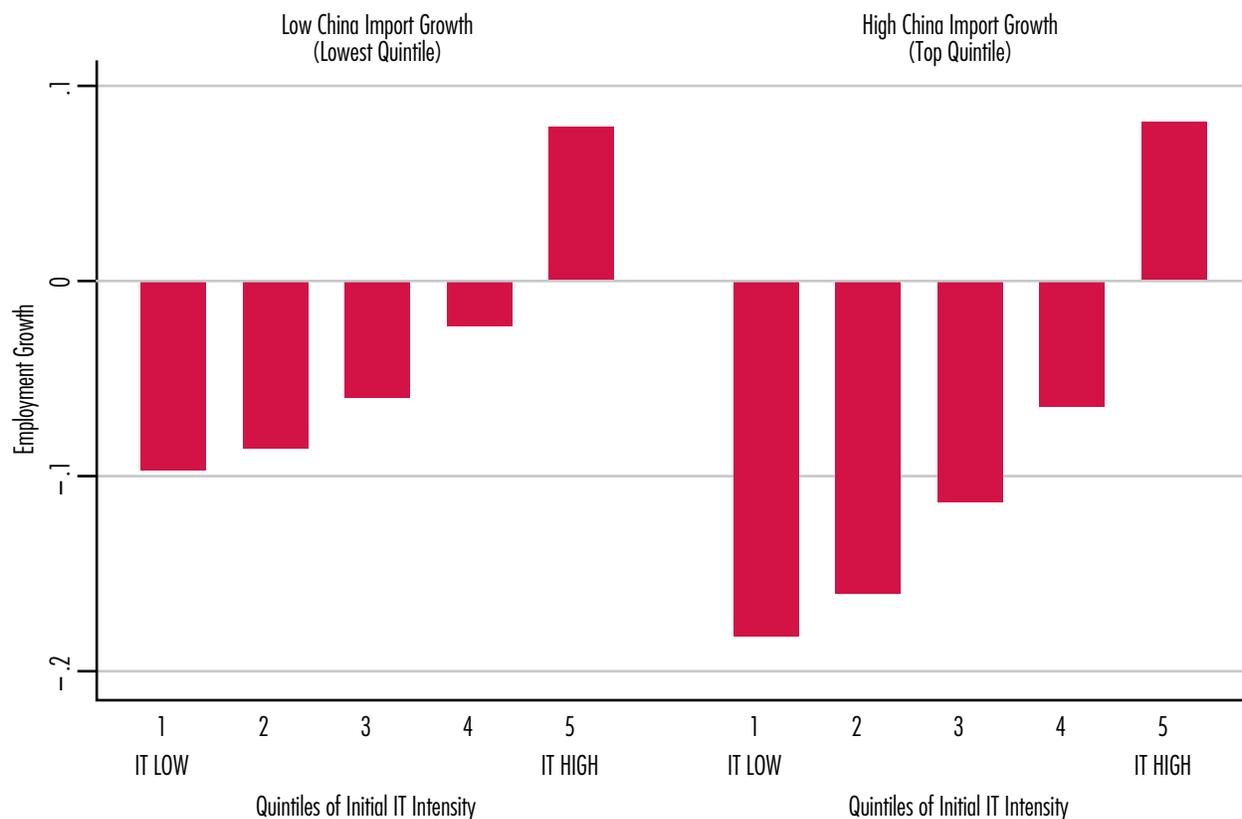
percent in industries less subject to Chinese import competition. And this underestimates the effect, as these are survivors. We also found that China increased exit rates of low-tech firms, but not high-tech firms.

What Policies Are Needed?

The job losses for some firms explain the political resistance to trade and why pressure is mounting to “do something.” But doling out export subsidies, threatening to label China a

“currency manipulator,” or erecting trade barriers (such as the 35 percent tariffs on tires in 2009) to protect the business and labor lobbies that are losing out are the wrong *continued on flap...*

FIGURE 2.
Employment Growth by Initial IT Intensity



Notes: This is job growth 2005-2000 in 21,000 plants in 12 European countries. The left-hand side panel contains industries where Chinese import growth 2000-2005 was in the bottom 20% (e.g., pharmaceuticals) and the left-hand side panel contains industries where Chinese import growth 2000-2005 was in the top 20% (e.g., apparel). “IT Low” (=1) are plants in the bottom 20% of computers per worker in 2000 and “IT high” (=5) are plants in the top 20% of computers per worker in 2000. Other quintiles of plant IT intensity are in ascending order (second lowest quintile =2, etc.).

Takeaway: Low-tech plants were shrinking everywhere, but they shrank much more in industries worse hit by the China shock (20% job loss vs. 10% job loss). By contrast high-tech plants grew by about 10% in all sectors—they were shielded from the China syndrome.



way to go. Such measures will merely delay restructuring, driving up domestic prices, and encouraging industries to invest more in lobbying than in innovation.

Openness improves overall prosperity, but the worry is that the burden of adjustment falls more heavily on the poor than on the rich. Standard economic theory puts this down to increased pressure on the wages and jobs of unskilled workers who are now competing with workers in Beijing, China, rather than just Birmingham, Alabama. Our data show that there will be a fall in demand for the less educated, because of a China-induced acceleration of technical change. The appropriate policy response is to increase human capital through education and training and easing the transition of displaced workers across jobs.

There are additional benefits of Chinese trade to those that increase the innovation rate of Western firms. For example, consumers have enjoyed lower prices. Anyone who has shopped in Walmart, Target,

or any other large store cannot miss the incredibly low prices of Chinese-produced consumer goods. Bigger export markets have also spurred investment. And offshoring has enabled such devices as the iPod and the iPad—produced in China but designed locally in Silicon Valley—to be created, because without the availability of cheap manufacturing many of these devices would never have been developed.

Conclusions: We Shouldn't be Afraid

China's rise is undoubtedly a political challenge. But trying to keep China down by freezing it out of the world trading system would surely have been more politically dangerous than keeping China engaged and thus aligning its economic incentives with those of the developed world. The Chinese Ming Dynasty shut out the West in the 14th century and technologically fell behind the West to such an extent that by the 1900s it was unable to defend itself against Western Colonial powers. The West should not reciprocate this

mistake by trying to shut out Chinese trade in the 21st century.

In fact the Chinese have a saying about haunting specters: "If you believe it, there will be, but if you don't, there will not." If Europe and the United States continue to encourage belief in the danger of Chinese trade to their own economies and try to weaken China through trade barriers, the specter of China will not disappear. On the contrary, the West's own growth would be enfeebled—and that would be unwelcome even in good times.

This article summarizes the following:

"Trade Induced Technical Change: The Impact of Chinese Imports on Innovation and Productivity" by Nick Bloom, Mirko Draca, and John Van Reenen, CEPR Discussion Paper No. <http://cep.lse.ac.uk/pubs/download/dp1000.pdf>;

"A Trapped Factor Model of Innovation" by Nick Bloom, Paul Romer, and John Van Reenen, http://cep.lse.ac.uk/textonly/_new/staff/vanreenen/pdf/trapped_factors7_2010.pdf.

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