Labor Market Imbalances: Shortages, Surpluses, or What?

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There are two competing narratives about how the labor market in the United States will develop over the next decade or two. One view is that the country faces an impending labor shortage due to demographic forces reducing the growth of U.S. labor supply. The other holds that the country faces an impending surplus of labor due to globalization increasing the supply of competitors for U.S. workers.

The Impending Shortage narrative, which has attracted attention from business and policy groups, is that the retirement of the baby boomer generation will create a great labor shortage. Slower growth of new entrants from colleges and universities, an increased proportion of young workers from minority groups, and inadequate training in science and math will produce a shortage of the skills the United States needs to maintain itself as the world's leading economy. The message to policymakers is to forget about the sluggish real wage growth of the past three decades, the deterioration in pensions and employer-provided healthcare, and fears of job loss from offshoring or low-wage imports. Instead focus on helping business find workers given the impending shortage.

These shortage claims stress problems in attracting U.S. citizens into science and engineering. Many leaders of the scientific establishment and high-tech firms have complained that the United States faces a future shortfall of scientists and engineers and have asked for governmental policies to address this problem. The National Academy of Sciences (2006), the Association of American Universities (2006), and the Government-University-Industry Research Roundtable of the National Academy of Sciences (2003) have issued reports arguing for increasing the supply of

scientific and engineering talent in the United States. The heads of Intel, Microsoft, and other high-tech firms have spoken out on this issue as well. Responding to the business community, in his 2006 State of the Union Address President Bush announced the American Competitiveness Initiative to stress the importance of investing in our science and engineering workforce.

But the claim of coming labor shortages goes beyond science and engineering. Demographic projections of the U.S. labor supply that show a sharp reduction in the growth of the workforce through 2050, as shown in Table 4.1, have aroused concern in the business and policy community. Reporting the consensus from the Aspen Institute's Domestic Strategy Group (2003), David Ellwood stated that "CEOs, labor leaders, community leaders, all came to the unanimous conclusion that we will have a worker gap that is a very serious one" (cited by Overholt 2004). A 2003 *Fortune* headline declared "Believe It or Not, a Labor Shortage Is Coming" for virtually all workers (Fisher 2003).

Table 4.1
U.S. Labor Supply, 1950–2000, and Projected Labor Supply, 2000–2050

	Labor Supply in millions	Change in millions
1950	62.2	—
1960	69.6	7.4
1970	82.8	13.2
1980	106.9	24.1
1990	125.8	18.9
2000	140.9	15.1
2010	157.7	16.8
2020	164.7	7.0
2030	170.1	5.4
2040	180.5	10.4
2050	191.8	11.3

Source: 2000–2050, Toossi (2002); 1950–1990, United States Census, http://www.census.gov/statab/hist/02HS0029.xls.

Believers in the impending shortage story generally favor increased immigration, particularly of highly skilled workers through H1B and other visas; increased spending on education and technological innovation; and guest worker programs to keep a sizeable flow of less-skilled but legal immigrants coming to the country. Proponents of the shortage scenario regard many of these immigrants as complements rather than substitutes for U.S. workers. Greater education and training of U.S. citizens, particularly of disadvantaged minorities, is advocated as well.

The Globalization Surplus narrative, which has attracted attention as part of the discussion about how the current mode of globalization is playing out, takes the opposite tack. Unlike the shortage story, this tale holds that the spread of capitalism around the world, particularly to China and India, has generated a labor surplus that threatens wage rates in advanced and higher-wage developing countries. Trade, offshoring, global sourcing of jobs, and flows of capital to the low-wage giants combine to reduce the demand for workers in manufacturing and tradable services in advanced countries and in moderate-income developing countries.

At first, the advent of huge numbers of workers from China and India into the global capitalist system seemed to offer a boon to most workers in advanced countries. The labor force is less skilled in the emerging global giants than in the advanced economies. According to the Heckscher-Ohlin model, skilled workers in the advanced countries would benefit from the new trading opportunities, while only the relatively small number of unskilled workers in these economies would lose. If all workers in the North were sufficiently educated, they would avoid competing with low-paid foreign labor and would benefit from the low-priced products produced in the developing countries. Competition from low-wage workers in China and India might create problems for apparel workers in South Africa and Central and Latin America but not for machinists in the advanced North. The "North-South" trade model that analyzes how technology affects trade between advanced and developing countries implied that trade would benefit workers in the North, who had exclusive access to the most modern technology. More low-wage workers in the developing world would lead to greater production of the goods in which the South specialized, driving down their prices.

Tell it to Lou Dobbs! The offshoring of computer jobs, the United States' trade deficits even in high technology sectors, and the global sourcing strategies of major American firms have challenged this sanguine view. The economic entry of China, India, and the ex-Soviet Union shifted the global capital-labor ratio massively against workers. Expansion of higher education in developing countries has increased the world's supply of highly educated workers and allowed the emerging giants to compete with the advanced countries, even in the leading edge sectors that the North-South model assigned to the North as its birthright.

In this paper I assess these two competing visions, particularly the demographic and economic projections on which they are based. I reject the notion that the retirement of the baby boomers and slow growth of the U.S. workforce will create a future labor shortage. Instead, I favor the argument that the increased supplies of skilled labor in low-wage countries will squeeze highly skilled as well as less-skilled U.S. workers. I examine the problem of attracting homegrown American talent to science and engineering in the face of increasing supplies of highly qualified students and workers from lower-wage countries. Going beyond the United States, I argue that the expansion of global capitalism to China, India, and the former Soviet bloc has initiated a critical transition period for workers around the world. As the low-income countries catch up with the advanced countries, the pressure of low-wage competition from the new giants will battle with the growth of world productivity and the lower prices from goods produced in low-wage countries to determine the well-being of workers in higher income economies. While U.S. wages will not be set in Beijing, how workers fare in China, India, and other rapidly developing low-wage countries will become critical to the position of labor worldwide.

A Great Labor Shortage: An Angler's Tale

The most alarmist claims that the U.S. labor market faces a great worker shortage in the foreseeable future begin with the notion that total gross domestic product (GDP) should increase in the future at a rate comparable to the growth rate witnessed in the recent past. From 1980 to 2005, U.S. real GDP grew by 3.1 percent annually, with 1.4 percent due to the growth of labor supply and 1.7 percent due to the growth of labor productivity. The growth of the labor force is projected to drop in half, to 0.7 percent per year, which makes the 3.1 percent growth of GDP unsustainable absent increases in labor productivity above historical levels. To maintain past levels of GDP growth with 1.7 percent growth of labor productivity between 2005 and 2030, the United States would need 30 million workers more than the Bureau of Labor Statistics (BLS) has projected for that year's labor supply. The cry of impending shortages is the result of this type of analysis.

Despite the attention given to calculations of this kind, these predictions make little sense in terms of social welfare. From the perspective of standard welfare analysis, making a given growth rate of GDP the touchstone of economic policy is a cart-before-the-horse approach. As a wealthy country, the United States can increase GDP whenever it wants by admitting more immigrants. A massively larger labor supply would increase GDP but would reduce GDP per capita and real wages. The standard metrics for assessing how well an economy performs, GDP per capita, or productivity per hour worked, are more appropriate indicators of economic success than the volume of GDP irrespective of the size of the nation's population or workforce.

Still, these alarmist analyses do direct attention toward two important demographic developments. The first is that, barring a huge change in immigration policy, the U.S. workforce will grow more slowly than it has in the past half century or so. The second is that the labor force growth will be concentrated in minority groups that have historically obtained less education and thus possess lower work skills than the majority population. As a result, shortage analysts fear that the growth of skilled labor will decline and produce bottlenecks in production that could reduce growth of GDP per capita. Many argue that the United States could avoid these problems by investing in education and training in high-technology areas such as science and engineering, particularly among the disadvantaged minority groups who may otherwise not gain sufficient skills to do well in the economy.

Table 4.1 shows the number of people in the U.S labor force from 1950 to 2000 and the projected size of the labor force from 2000 to 2050. From 1950 to 2000, the U.S. labor force grew by 78.7 million

persons, or 127 percent. From 2000 to 2050, the projected growth of the labor force is 50.9 million persons, or 36 percent. This deceleration in the rate of growth is likely to be greatest from 2010 through 2030, when just 12.4 million additional persons are expected to join the U.S. labor force. The major reason for this reduced increase in the workforce is the ongoing retirement of the baby boomers, that cohort born between 1946 and 1964, taking place during these two decades. As the Chamber of Commerce's 2006 *State of American Business* report stated "We are staring right in the face of a severe worker shortage as 77 million baby boomers prepare to retire in the next few years— with a fewer number of younger workers available to replace them" (p. 13).

The rapid growth of the American workforce in the 1950s and 1960s came largely from increased numbers of woman workers. From 1970 through the 1990s, labor force growth came from immigration as well as from the continued influx of women into the workforce. In the 2000–2050 period, growth of the U.S. workforce is expected to come disproportionately from Hispanics and African Americans—groups with below-average education levels. The share of the U.S. population from disadvantaged minorities (African Americans, Hispanic, American Indians, Alaska Natives) is projected to rise from 25 percent in 2000 to 37 percent in 2050. Some analysts worry that as a result the U.S. workforce will become less skilled unless the country adopts new policies to help these groups improve their educational skills and attainment.

There are two problems with basing projections of future labor market imbalances on impending demographic developments. First, in the past, demographic changes have not been consistently associated with changes in labor market conditions, even for the young workers whose positions are most sensitive to changing market realities. As a case in point, labor supply grew slowly in Europe in the 1980s and the 1990s without creating a labor shortage or reducing high levels of youth unemployment. In the United States, young persons' wages fell relative to older workers when the baby boomers hit the job market in the 1970s (Freeman 1979, Welch 1979), but the wages of the young workers did not increase relative to older workers when smaller youth cohorts entered the market in the 1990s. The employment and earnings of young workers depends more on macroeconomic conditions, wage-setting institutions, and technological developments than on demography. Second, the United States is not a closed economy dependent only on domestic labor to produce goods and services. In the global economy, demographic and labor conditions in other countries affect the U.S. labor market. Globalization gives U.S. firms access to labor overseas through foreign direct investment, offshoring, or subcontracting, and access to foreign-born labor that immigrates to the United States. Hence, the claims of a coming labor shortage must be assessed in a global context.

As a first step toward doing this, I examined United Nations (UN) data on the actual and projected change in the population of a broad working age group of 15-59-year-olds (summarized in Table 4.2). Consistent with the BLS projections, the numbers in Table 4.2 show that the *increase* in the U.S. population among 15-59-year-olds drops from 44 million additional persons during 1975–2000 to 20 million during 2000–2025 and to 21 million from 2025 to 2050. But the projected declines in this age group are much greater in Western Europe and Japan. As a result, among these advanced countries the U.S. share of this working-age population rises from 50 percent to 62 percent. As for the two major highly populous developing countries, China's population aged 15-59 years is projected to rise through 2025 and then fall, as the single child policy affects the

Table 4.2
Trends in the Working Population Aged 15–59 Years

Country/Region	1975	2000	2025	2050
United States	132	176	196	217
Western Europe	99	113	100	86
Japan	71	79	65	49
U.S. share of (%)	44	48	54	62
China	497	829	913	787
India	335	594	869	939
World	2223	3636	4818	5404

Source: United Nations Population Division, DESA, *World Population Ageing 1950–2050*. http://www.un.org/esa/population/publications/worldageing 19502050./index.htm.

size of cohorts; India's population is expected to increase throughout the 2000–2050 period. The ratio of the Chinese population to the U.S. population will barely change from 2000 to 2050. For the world as whole, the UN projects that the number of persons aged 15–59 will increase massively, so that if enough of these persons gain appropriate labor skills, it would take a massive increase in demand for labor to generate labor shortages.

Doubling the Global Workforce is Like Swallowing a Whale

Demographic trends aside, the global labor market changed greatly in the 1990s due to the addition of China, India, and the ex-Soviet bloc to the world economic system. During the Cold War era, these countries had trade barriers, self-contained capital markets, and little immigration to the advanced countries—all of which isolated their labor markets from those in the United States and the rest of the capitalist global world. The collapse of Soviet communism, China's decision to "marketize" its economy, and India's rejection of autarky greatly increased the supply of labor available to the global capitalist system. I estimate that if China, India, and the ex-Soviet bloc had remained outside of the global economy, there would have been about 1.46 billion workers in the global economy in 2000; see Figure 4.1. There were 2.93 billion workers in the global economy in 2000 because those countries joined the rest of the world; since 2.92 billion is twice 1.46 billion, I have called this transformation "The Great Doubling" (Freeman 2005b).

The effect of this huge increase in the world's workforce changed the balance between labor and capital in the global economy. Multinational firms could suddenly hire or subcontract work to low-wage workers in China, India, and the ex-Soviet bloc instead of hiring workers in the advanced countries or in other developing countries with higher wages. As result of the doubling of the global workforce, I estimate that in 2000 the ratio of capital to labor in the world economy fell to 61 percent of what it would have been in 2000 if China, India, and the ex-Soviet bloc had not joined the world economy. The reason the global capital-labor ratio fell was that China, India, and the ex-Soviet bloc did not bring much capital with them when they joined the global economy. India had

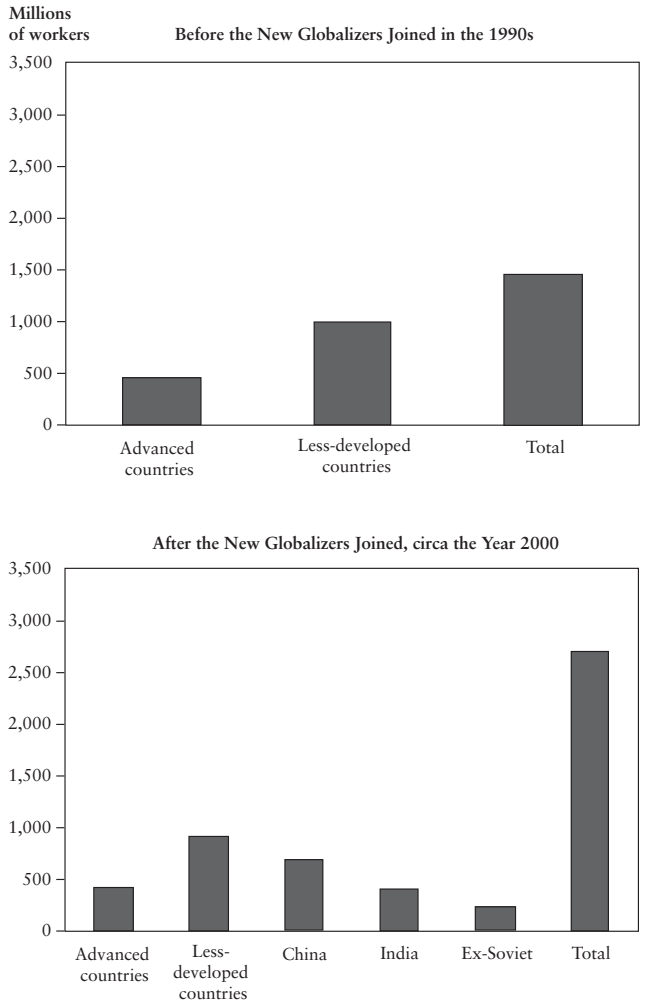

Figure 4.1
The Global Labor Supply Before and After the New Globalizers Joined the World Economy
Source: Tabulated from International Labour Organization data, laborsta.ilo.org.

little capital because it was one of the lowest income countries in the world. China was also very poor and destroyed some of its capital stock during the Maoist period. The former Soviet empire had a high investment rate and was wealthier than China or India, but invested primarily in military goods and heavy industry instead of in computer-driven technologies or in the production and delivery of consumer products. One lesson from German reunification was that much of the civilian capital stock in the old Soviet bloc was either outmoded or so pollutant as to be basically worthless.

Gaining access to the capital stock and technology in the advanced countries has greatly benefited workers in China, India, and, to a lesser extent, in the ex-Soviet bloc. Firms in advanced countries offshore jobs to India, fund joint ventures in China, import manufactured goods from China, set up research facilities in India and China, and subcontract production to them and to other low-wage countries. In Europe, German manufacturers set up plants in Eastern Europe, where wages are far below those in Germany, and look longingly at Ukraine, where wages are even lower than in Eastern Europe. By giving firms a new supply of low-wage labor, the doubling of the global workforce has weakened the bargaining position of workers in the advanced countries and in many developing countries as well. Firms threaten to move facilities to lower-wage locations or to import products made by low-wage workers if their current work force does not accept lower wages or less favorable working conditions, demands to which there is no strong labor response. The result is a very different globalization than the International Monetary Fund, the World Bank, and other international trade and financial organizations envisaged two decades ago when they developed their policy recommendations for the integration of the world economy.

What about Skills and Technology?

The difference between the skills of workers in the United States and those in low-wage countries was in the forefront of the debate over the impact of the North American Free Trade Agreement with Mexico on U.S. workers. Proponents of the treaty argued that the United States would gain high-skilled jobs from increased trade with Mexico, while

at the same time it exported less-skilled low-wage jobs to Mexico. All U.S. workers had to do to benefit from globalization was to invest more in human capital. The proponents also promised that the ensuing boom in Mexico would reduce the flow of illegal immigrants to the United States, and thus lessen labor competition at the bottom of the U.S. job market. The argument that the United States and other advanced countries should gain skilled jobs while losing less-skilled jobs would seem to apply even more strongly to China and India than it did to Mexico. The average Chinese and Indian worker has lower skills than the average Mexican worker because so many of the former are peasants with limited education—relatively few have university training. Perhaps the right way to consider these workers are as *complements* rather than *substitutes* for American workers, foreign workers who will increase U.S. demand for educated labor relative to less-educated labor, and thus create a greater potential shortage of skills in the United States.

Yet the current global labor market has not developed according to this scenario, which relies on differences in human capital endowments and the presumed inability of low-wage countries to educate many persons to world standards. Instead, countries around the world, including the new giants, have invested heavily in higher education, so that the number of college and university students and graduates outside the United States has grown rapidly relative to the number in the United States. Table 4.3 shows that the U.S. share of enrollment in higher education declined

Table 4.3
U.S. Share of Highly Educated Workers, 1970–2000 and 2010

U.S. Global Share of College Enrollments (%)	
1970	30
2000	14
U.S. Global Share of Science and Engineering Ph.D.s	
1975	40
2010	15

Source: Freeman 2006a

dramatically from the 1970s through the 2000s. In 1970 approximately 30 percent of university enrollment worldwide was in the United States. In 2000, the U.S. proportion of university enrollment worldwide was 14 percent. Similarly, at the Ph.D. level, the U.S. share of doctorates produced globally has fallen from about 50 percent in the early 1970s to a projected level of 15 percent in 2010. Some of the growth of higher education overseas has been the result of European countries rebuilding their university systems following the destruction of World War II, and of Japan and South Korea investing in university education. By the mid-2000s, several European Union countries and South Korea were sending a larger proportion of their young citizens to university than was the United States (OECD 2005).

But highly populous low-wage countries have also invested heavily in higher education. Brazil, China, India, Indonesia—almost any country you can name—have more than doubled university student enrollments in the 1980s and 1990s (Freeman 2006b). China has made a particularly large investment in science and engineering, so that by 2010 it will graduate more Ph.D.s in science and engineering than the United States. While the quality of graduate training is higher in the United States than in China, it will surely improve in quality over time. India has produced many computer programmers and engineers.

To find out how well graduates in developing countries can compete with those from advanced countries in the global labor market, in 2005 the McKinsey Global Institute asked recruiters for multinational firms the proportion of graduates from developing and transition economies that they viewed as good job candidates. The recruiters came up with numbers ranging from 10 percent to 20 percent, depending on the occupation and country. Strong English language skills were a key factor in this assessment, so many of the workers that the multinationals did not feel met their requirements could undoubtedly do world-class work for firms in their own countries and languages. But even 10 to 20 percent of an increasing number of graduates from developing countries adds immensely to the supply pool from which multinationals fill vacancies.

In sum, the early 1990s notion that skilled workers in the United States need not worry about competition from equally skilled workers in low-income countries because developing countries have fewer graduates per capita does not fit with current reality. With an increased supply of highly educated persons from low-wage developing countries, multinational firms can offshore high-skilled work and hire graduates from universities worldwide. At the same time, large numbers of highly educated immigrants can come to the United States to work.

Scientists and Engineers as a Special Case?

As noted, the scientific and technological establishment believes that the United States confronted a shortfall of science and engineering workers in the early to mid-2000s. But past experience with expected shortages of scientists and engineers suggests that we view such claims skeptically. The first time the United States worried about shortfalls in the science and engineering workforce was in the late 1950s and early 1960s, prompted by the Soviet Union's surprise launch of Sputnik in 1957. Congress responded by enacting the National Defense Education Act of 1958 and by increasing federally funded research and development, much of it focused on aeronautics and space. The immediate result of the increase in research and development was a rapid rise in the earnings of scientists and engineers, so the U.S. labor market confirmed the shortage claim. Given the time required for the new fellowships and higher wages to increase the supply of scientists and engineers, the supply/demand balance had indeed shifted in favor of workers.

The next two claims of shortages failed, however, to reflect reality. In the early 1980s, the National Science Foundation announced a shortage in scientists and engineers that turned out to be unjustified. The projected shortage was based on policymakers' erroneous use of data, which produced angry articles and editorials in *Science* and *Nature*, among other publications. As best one can tell, the claimed shortage came from a desire to reduce the cost of scientists and engineers to large firms (Weinstein n.d.). In the early 1990s, leaders of the scientific community again proclaimed an incipient shortage of scientists and engineers. Richard C. Atkinson, then president of the American Association for the Advancement of Science, predicted that by the year 2000, demand for scientists in the United States would outstrip supply by almost 400,000 persons (1990). But throughout the decade, indicators of the state of

the labor market (salaries, unemployment rates, the number of graduates and postdocs relative to tenure track job in academic institutions, and so on) for scientists and engineers showed no evidence of a shortage. From 1990 to 2000, earnings rose more slowly in science and engineering than in law, medicine, and related professions. While the booming 1990s did produce a shortfall of computer programmers and related specialists, this shortage disappeared in ensuing years as firms offshored work to lower-wage countries, notably India. The BLS subsequently reduced its projected increases in employment for computer and mathematical scientists over the next decade by 500,000 workers (Freeman 2006b). From the perspective of young persons choosing a career, prospects in science and engineering seemed highly uncertain and less lucrative than prospects in business, finance, law, or medicine.

During the 1990s boom, the United States greatly increased the employment of scientists and engineers. It did so despite fairly constant numbers of graduates in science and engineering among U.S. citizens or permanent residents. Much of the increased science and engineering employment took the form of "importing" large numbers of foreign-born students and workers in these disciplines. Table 4.4 shows how the share of foreign-trained workers in the U.S. labor market for scientists and engineers grew in this decade. The most telling statistics are that by 2000, over half of postdoctoral workers and of Ph.D. scientists and engineers below the age of 45 years were foreign born. The large increase in the proportion of bachelor's degree scientists and engineers from overseas is

Table 4.4
Huge Supplies Outside U.S. Raise Foreign-born Shares of Scientists and Engineers

	1990 (%)	2000 (%)
Bachelor's	11	17
Master's	19	29
Ph.D.	24	38
Ph.D.s <45	27	52
Postdocs	51	60

Source: Freeman 2005a

also striking, however, since there are many more workers in these fields with bachelor's degrees than with master's degrees or doctorates. Some of the foreign-born workers obtained their education in the United States and stayed here to work. But most of the scientists and engineers with bachelor's degrees employed in the United States—and roughly half of those with higher degrees—graduated overseas and came to fill jobs in this country.

The lesson from the 1990s regarding increased employment of science and engineering workers is clear: if the U.S. economy demands more highly skilled workers during the period of projected slow labor force growth, it can increase supplies by admitting more immigrants trained in fields with rising labor demand, as it did in the 1990s. The rising supply of highly educated persons overseas, many of whom major in science and engineering, suggests that as long as the United States is an attractive place to work and is open to immigration, it *cannot* experience a shortage in the science and engineering workforce.

This does not mean that the United States does not have a potential problem in the supply of its citizens going into science and engineering fields. It is possible that the country relies excessively on foreign-born talent in these areas. This dependence could risk a sudden decline in supply due to political problems, visa restrictions (as occurred for international graduate students post-9/11), or other factors outside the job market. Moreover, to the extent that native-born workers are more attuned to American economic and social realities, reduced numbers of scientists and engineers born in the United States could weaken the connection between science, engineering, and business that has made the United States a paragon of turning scientific knowledge into technological and business innovation. I would recast concern about shortages of science and engineering workers in the United States from supposed shortages of overall supply, an assertion which finds no support in labor market data, to concern about the balance between native- and foreign-born scientists and engineers in the workforce. If the problem is this balance, there are clear policies that could make science and engineering careers more lucrative and attractive to Americans. More spending on research and development would raise demand and wages relative to opportunities in other occupations. Provision of more and higher-valued scholarships

and fellowships would increase the supply of American workers entering these fields (Freeman, Chiang, and Chang 2005). Allocation of a larger share of research grants to young researchers as opposed to senior researchers would make the fields more attractive to young Americans. But as in the 1950s, this would require actual government spending, not just moral suasion.

The Challenge of Human Resource Leapfrogging

In the North-South model that trade economists use to analyze how technology affects trade between the advanced North and the developing South, the advanced countries monopolize cutting-edge innovative sectors while developing countries end up producing traditional products. The greater the rate of technological advance and the slower the spread of the newest technology to low-wage countries, the higher paid are workers in the North relative to workers in the South. The comparative advantage of advanced countries in high-technology sectors is rooted in those countries having more scientists, engineers, and other highly educated workers, relative to the overall workforce, than do developing countries.

In these sorts of analyses, the spread of higher education and modern technology to low-wage countries can reduce advanced countries' comparative advantage in high-tech sectors and adversely affect workers in the advanced countries as a result. Any country with a comparative advantage in a given sector can lose when another country can compete successfully in that sector. The increase in supply reduces the price of exports, with a potential loss of income for the original dominant exporter. If a foreign competitor gains comparative advantage in industries that have particularly desirable attributes—that employ large numbers of highly educated workers and offer great opportunities for rapid technological advancement—the country with the initial advantage has to shift resources to less desirable sectors: those with lower chances for productivity growth, with fewer good jobs, and so on.

The usual assumption regarding high-tech sectors is that only advanced countries have the educated workforce necessary for competing in these industries. In the 1980s, Americans got worked up when Japan seemed

to be producing better high-tech products than the United States. In the 1990s, the United States worried about the competition between Airbus and Boeing in the manufacturing of aircraft. No one entertained the notion that China or India would become major players in high technology leading-edge industries. In *Global Trade and Conflicting National Interest* (2001), Gomory and Baumol argue that trade between low-wage and high-wage countries invariably benefited both groups, while one country's advance could harm another through trade between countries with similar levels of development.

Yet the advance of China and India into high-tech sectors has made these analyses obsolete. China has moved rapidly up the technological ladder and has greatly increased its high tech exports. Over 750 multinational firms have set up research and development facilities in China. And in what is purported to be the next big industrial technology, nanotechnology, China's share of scientific research papers has risen greatly, making it one of the major centers of research in this area. India has not invested as much in science and engineering as China, but it has achieved a strong international position in information technology, and has also attracted major research and development investments, particularly in Bangalore.

How can low-income countries with few scientists and engineers relative to their entire workforces compete in high-technology industries?

These countries have moved to the technological frontier because success in high-tech fields depends on the absolute number of scientists and engineers, rather than on the relative number of science and engineering workers that belong to the overall workforce. It is not how many engineers per person that produces a technological breakthrough as much as the total number of engineers working on the problem. Put differently, there is an economy of scale in research, development, and innovation that enables large populous countries to reach the scientific and technological frontier. China and India can have a large footprint in high tech because they will have many highly educated scientists and engineers, not because they approach the advanced countries in science and engineering workers per capita. I have called the process of moving up the technological ladder by educating large numbers "human resource leapfrogging" since it uses human capital resources to leapfrog comparative advantage

from low-tech to high-tech sectors, contrary to the assumption of the North-South model. The low wages in these large populous countries, moreover, makes them formidable competitors for an advanced country because it gives them a potentially large cost advantage in attracting investment centered on research and development.

The bottom line is that the spread of modern technology and education to China and India will undo some of the advanced countries' monopoly in high-tech innovation and production. The North no longer has the lock on high tech that lies at the heart of the North-South model.

The Transition to the New Global Labor Market

The triumph of global capitalism has brought or will bring modern technology and business practices to most of humanity. Barring disaster, the world is on a historic transition to a truly global economy and labor market that should produce rough income parity among nations and make poverty history. The way the transition proceeds will have immense consequences for workers throughout the world. Workers in the countries that are new entrants to the global economy should do better, since capital and modern technology will flow to these locations, raising wages and introducing modern sector employment. Developing nations where wages exceed those in China and India face a big problem, as these countries will have to find their place in the global economy without engaging in head-on competition with the giants in low-wage industries. Workers in the United States and other advanced countries will benefit from the low-priced goods from China and India, but will suffer from enhanced labor market competition.

Joining the global capitalist system has improved the economic position of workers in China and India. These two countries have been leaders in economic growth and in the reduction of poverty. In China, poverty has fallen sharply from the 1980s to the present, despite China having one of the largest rises of inequality in the history of the world; this result makes China arguably the best case for trickle-down economics in the world. The earnings of Chinese workers in the urban sector have increased greatly. Estimated rates of change in real earnings vary across surveys and groups, but invariably show increases in real wages

for virtually all groups of workers. Using data from the Chinese Labor Statistical Yearkbook, Bannister (2005) estimated that the real earnings of urban manufacturing staff and workers more than doubled between 1990 and 2002. The annual rate of increase of real earnings was 6.7 percent. Data on the structure of wages show that increases in wages have been greater for the more educated and skilled workers than for other Chinese workers.

But during the 1990s, growth in China did little to advance the economic position of peasants. The rising inequality and lack of political freedom and of legitimate channels of protest presents a challenge to China and to the global transition process. There is a danger that if or when the Chinese economy runs into economic problems, this will create social disorder that in turn will reduce growth prospects. The Chinese government has developed policies to address the inequality problem, including a new labor law (enacted in June 2007) to strengthen the official trade unions and encourage formal labor contracts, but whether this will suffice to spread the benefits of economic growth more widely and preserve order if the economy suffers a major setback is uncertain.

Inequality, which has been moderately high in India, did not grow during the 1990s and 2000s. Wages appear to have risen overall, also at a rapid pace. One World Bank study estimates that from 1993–1994 to 1999–2000, real wages in India grew by 29 percent—an increase of 4.3 percent a year (Glinskaya and Lokshin 2005)—which is a lower pace than in China but still a sizeable increase. The structure of wages in India has also shifted to favor more skilled and educated labor.

Workers in many of the developing countries in Africa, Asia, and Latin America have not done well in the 1990s and the early 2000s. Employment in Latin America, South Africa, and in parts of Asia has shifted from the formal sectors historically associated with economic advancement to informal sectors, where work is precarious, wages and productivity low, and occupational risks and hazards great. The backlash against the current model of globalization in Latin America reflects this failure. No advanced country has improved its living standards by shifting labor from industry to the informal sector.

Researchers have just begun to explore in depth the causes of the growing informalization of labor in developing countries. I suspect that China

and India's entry to the world economy has contributed to the informalization, along with the failure of the Washington Consensus-style policies in many countries. The entry of China and India has transformed many developing countries from low-wage competitors with advanced countries to high-wage competitors with China and India. Wages in Peru or El Salvador are three times those in China or India. Mexico is a more expensive site for manufacturing blue jeans than China. Labor costs in South Africa are also far above those in China and India. Producing generic low-cost goods and services for the global marketplace—activities that if undertaken in the 1980s might have given these developing countries a place in the world economy—is not a recipe for success in the 1990s and the 2000s, given China and India's low-wage competitive advantage.

How workers in the advanced countries will fare in the global economic transition will depend upon how improvements in global productivity and reductions in prices that the new giants will bring to the world economy will interact with the labor market pressure for wage concessions to compete with China and India. Ideally, the increased number of scientists and engineers and the worldwide spread of high-tech sectors will accelerate the rate of technological advance enough to raise living standards in all countries, the United States and other advanced countries will retain comparative advantage in enough leading sectors to remain hubs in the global development of technology, and the world savings rate will rise so that the global capital-labor ratio increases rapidly. In the United States, increased social services and social infrastructure—national health insurance, for instance—may be needed to improve living standards if workers cannot gain real wage increases. As GDP in the United States will continue to grow, a key policy issue should be finding ways to distribute the benefits of this growth beyond the super-wealthy Americans who have benefited the most from the past two decades of economic policy and growth.

Conclusion

I conclude that in the coming decades, the demographic developments associated with slower population growth will be trumped by the forces

of globalization associated with the doubling of the world's workforce. How this "great doubling" plays out will determine the future supply/demand balances in the global labor market. Because the transition to a truly global labor market will be a lengthy, decades-long process, the economic and labor market policies enacted by individual countries, the international community, unions, and firms may help determine whether this process proceeds smoothly, awkwardly, or—invisible hand forbid—aborts.

How long might it take the global economy to absorb the huge workforces present in China, India, and other developing countries? The recoveries of Western Europe and Japan after World War II and South Korea after the Korean War provide some historical guideposts. Under the Marshall Plan, the United States sent capital to Europe that helped those countries reconstruct their economies rapidly. In turn, Europe's recovery created markets for American products, while rapid increases in European wages kept U.S. workers from facing low-wage competition. Similarly, the United States helped Japan develop into a market democracy with the capability of challenging the United States in many technically advanced sectors. South Korea's progress from one of the poorest economies in the world to an advanced economy in about 50 years is even more remarkable, since that country had never before been among the leading global economies. If China maintains its successful development and its wages double every decade, as occurred in the 1990s, in about 30 years Chinese wages would approach levels seen today in the advanced countries. India's wage convergence will take longer. My assessment is that, barring unforeseen difficulties, the successful transition to a truly integrated global labor force will take 40 to 50 years.

Besides the postwar success of Europe, Japan, and South Korea, there are examples of unsuccessful transitions too—the reunification of East Germany with West Germany is the most recent case. The German government acted as if, despite the legacy of nearly half a century of communism, low-income East Germany would meld seamlessly and rapidly with the wealthier capitalist West. Germany offered extensive welfare programs to keep workers in the East, but did not raise taxes to fund a massive Marshall Plan-style program to rebuild the East's economy.

German unions sought wage parity between East and West rather than allowing wage differences to reflect productivity differences. The healthiest economy in Europe was transformed into one of the sickest, with high unemployment and sluggish growth. Reconstruction of the South after the American Civil War was an even greater failure. It took over a century for the South to achieve something akin to economic parity with the rest of the United States. The better part of the history of the American South in the twentieth century was prolonged economic and social oppression of African Americans. By limiting their educational and economic opportunities, rather than joining with African Americans to move their economies forward, the South retarded its economic progress.

If my assessment and predictions are correct, then the overriding goal of global labor market policy during the next decade should be assuring that the absorption of China, India, and the ex-Soviet bloc into world capitalism goes as smoothly as possible. The policy bent in the United States and elsewhere should go in the direction of favoring labor rather than capital, which ought to be able to take care of itself in a global economy with twice as many workers, many available at low wages. There should be sustained international pressure on developing countries to raise their labor standards and to distribute the benefits of economic growth to their workers. And there should be efforts to maintain or improve living standards, if not wages, of all workers in the advanced countries so that even the less-skilled benefit from the movement to a global labor market.

I am not sure what policies would enable the developing countries that cannot compete with China and India in low-wage goods to improve conditions for their workers. Some countries may expand through the sale of natural resources, but mining and other resource industries employ relatively few people. Some emerging nations may be able to expand their domestic markets. I suspect that there is no simple answer about what to do in the face of the doubling of the global workforce, and that each country will have to craft a strategy dependent on its own unique circumstances.

Finally, if I am wrong and there is instead a great labor shortage in the foreseeable future, I believe that it will come not from demography but from catastrophic events that the shortage soothsayers ignore: a global pandemic that kills millions of people; climate change that destroys significant parts of economies; and/or political insanity that produces barriers to trade, migration, and capital flows around the world. With reasonable policies and a bit of luck, however, none of these events should be able suspend the movement toward a single and more egalitarian world economy.

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Comments on "Labor Market Imbalances: Shortages, Surpluses, or What?" by Richard B. Freeman

Surjit S. Bhalla

It is a real pleasure to comment on Richard Freeman's paper, especially as I agree with much that he says. Freeman offers a lot of very interesting data to substantiate the view that looming labor shortages are a mythic scenario and not a realistic one. Actually, my one major criticism of the paper is that he gives too much credence to the labor shortage view. I will dismiss it even more quickly than Freeman does. In my remarks, I want to emphasize the *other* side involving labor surplus, and to present some research that I have been working on that supplements Freeman's view. My main conclusion is that far from a labor shortage, the probability of an emerging global labor *surplus* has not been emphasized enough.

Labor surplus—where and how can it arise? Since we are now in a global economy, it will arise from increased global supply of labor. In this regard, two influences are operating. First, fertility rates around the world are dropping. We are witnessing the start of the great fertility decline in the developing world, not unlike that which happened in the developed world a half century earlier. Several developing countries, such as Iran, have fertility levels below 2 or below replacement levels. Other highly populated developing countries, such as Bangladesh and India, have rapidly falling fertility rates. In India the fertility rates are dropping by 0.1 child a year and should be close to 2 children per adult woman by 2010 or so.

The fertility decline should support the labor shortage view; however, the reason it does not is because such declines are strongly accompanied by an increase in the labor force participation rates (LFPR) of women. In India, female LFPR levels in urban areas are very low, registering only 15 percent in 1999–2000. These levels, however, are rising sharply, by about

1 percentage point a year. Parallel developments in other South Asian economies—along with the Middle East, the last remaining center of low female LFPR—means that effective labor supply will be increasing at a sharp rate.

The effects of this supply shock will be like what happened in the United States as women increasingly entered the labor force beginning in the 1960s. For instance, between 1960 and 1990, there is a well-known statistic that the U.S. real median wage rate stayed constant. A popular and convincing explanation for this unchanging real wage was the large increase in the labor supply that came from women's increasing labor force participation rates. In my view, the same pattern is going to take place in the developing world, and because of increasing education levels, it is likely to take place toward the upper end of the distribution. As Freeman has shown, the developing countries will continue to make large investments in education, particularly India and China. Some statistics on the evolution of labor supply at the upper end are revealing. The fastest growing segment is workers with postsecondary degrees. The growth rate of this segment is around 3.3 percent per year, double the rate of growth of the secondary school graduates, which is 1.6 percent per year. This relative pace is expected to continue, even though the overall growth in world labor supply is expected to decline to a 1 percent rate over the next decade, as compared to a 1.4 percent growth rate at present.

Let's examine some statistics on scientists and engineers, fields where the expected labor shortage is supposed to be high. The big numbers are that India produces 400,000 scientists and engineers a year, and China about 50 percent more, or 600,000, every year. That is a million new scientists and engineers from these two countries alone. In contrast, each year the United States produces about 70,000 to 100,000 scientists and engineers, while Europe doubles that amount. On the surface, these headline numbers are scary, but are exaggerated if the concern is, as it should be, with the quality of these highly skilled workers. Two points on quality: first, in the past, the *quality-adjusted ratio* in relative supplies was most likely unity, meaning that an Indian or Chinese worker had only one-tenth the quality of an American-trained engineer. Thus, ten times the supply might mean only one-tenth of effective quality-adjusted supply. Second, this quality is fast increasing because of pressures from

globalization. If one adds up the quantity and the quality, one obtains a skilled labor *surplus* scenario as the most likely outcome. This increase in supply will obviously have an effect on the wages of high-skilled workers around the world. When I say "wages," I am specifically thinking of "U.S. wages," but through those implications we can derive what is likely to happen elsewhere. And the effect will be to compress the present advantage of the skilled U.S. worker, a parallel development to the compression obtained at the low-skill end over the last three decades.

This conclusion indicates one of the few points of disagreement that I have with Freeman. He says that, to date, the expected increases in low-skilled wages have not shown up. For 100 years between the mid-nineteenth and the mid-twentieth centuries, world inequality increased steadily, and peaked around 1970. But global inequality declined considerably over the following 35 years, and that decrease is really attributable to the large increase in low-skilled workers, primarily from India and China. These two countries account for 40 percent of the world's population. This is the big supply shock that people have not, in my view, correctly appreciated or understood. The joint per capita income growth of these erstwhile poorest countries has been around 5.5 percent per year for the last 30 years. This movement has been a major cause for the decline in world inequality from its peak Gini of 66 in 1969 to around 62 today.

There have been many shocks to the world economy over the last century, but the China-India shock is likely to be the largest. Starting in the late 1950s, economic growth in Japan began to accelerate; joined with fast reconstruction growth in Europe, the world witnessed the first major postwar shock of fast world growth. (Interestingly, world growth in the last few years has just equaled this mid-1960s fast pace.) The second postwar phase of world growth, but on a lower scale, was provided by the East Asian economies in the 1970s and 1980s. The world's economic system absorbed these shocks very well. Yet these were small shocks—a little rainfall compared to the typhoon from China and India that has been unleashed on the world, starting in 1980 and continuing even now. It is this typhoon, and its consequences, that we are discussing today.

Some idea of the magnitude of this phenomenon can be gleaned from the following fact. Between 1500 and 1980, China and India moved from

having a share of world income (in purchasing power parity prices) equal to their own population share (meaning, average income in these two countries was equal to the world average income during the years 1500 to 1700), to a share in income equal to only 8 percent of world income (and 40 percent population share) in 1980. This low share was reflected in low average income, which was reflected in figures of large absolute poverty. Then came the period of fast growth in these two populous giants: by 2020, the joint income share of these two economies is likely to be 40 percent, and equal to their share in the world population. Thus, what China and India lost in 480 years (from 1500 to 1980), they are projected to regain in 48 years. This *is* the shock to the world economic system that promises to be the largest one ever experienced by the world, much bigger in terms of its impact than even the industrial revolution.

This raises the obvious question: how is it that very large countries like India and China have been able to grow so fast, and sustain this pace over such a long period? A major factor, in my view, has been the nature of the exchange rate policies of the developing countries, primarily those of China but also including India. By keeping its exchange rate deeply undervalued, China has been able to grow fast, and faster than expected. Its GDP growth rate over the last 45 years has averaged more than 9 percent per annum, India 5.7 percent. One of the major stylized facts of development is that a country's "real exchange rate" appreciates with economic growth. (The real exchange rate is defined very simply as the ratio of the exchange rate in terms of the purchasing power parity and the exchange rate in terms of the U.S. dollar). This is the Balassa-Samuelson effect, meaning that as countries grow, the price level in these developing countries gravitates toward the price level in the developed world. This increase in the price level, an appreciation in the real exchange rate, is accompanied by increasing productivity. In the postwar era, every developing country has shown a large increase in the real exchange rate (RER). In China and in India, the ratio of the price level (the RER) was .4 or .5 in 1980, but today it is half that level. In every other country and region, the RER had a tendency to increase. In China, this pattern of development has been reversed with the real exchange rate declining with development. Instead of Chinese goods becoming relatively expensive, these have become relatively cheaper. This has been accomplished by the policy of not allowing the real exchange rate to appreciate; this nonappreciation helps exports to grow faster, imports to grow less. The net result is faster absolute growth, especially with regard to China's competitors and more especially with regard to the Western world.

Just to give you one statistic as to how distorted the situation is: if Chinese growth rates continue at the current levels or even decline somewhat—let's say to 7 percent per year for the next 20 years—the real exchange rate will have to appreciate by more than 300 percent in order for its per capita income level to reflect the RER and income relationship of a "typical" country. China's ultracompetitive exchange rate compounds the competitive situation for developed countries, and even the developing countries. This is the global imbalances problem.

We return to the idea of income inequality. The good news that emanates from this growth rate in developing countries is a decline in world income inequality. This decrease was caused first by *extra* wage growth among low-skilled workers, a major reason why the median real wage in the United States has stagnated. My prediction, consistent with what Freeman has discussed happening from 1960 to 1990 at the low end of the wage scale, is that in the future we will witness a compression of wages at the high end of the wage scale.

I will conclude by briefly touching on policy. What can the United States do to address these effects of globalization? Not much really. Training more people will not change the relative labor supply levels—the magnitudes are very different. The coming increase in global labor supply is a shock for which I do not think there is any policy response for any developed, or developing, economies. Economic theory says that if wages in the developing countries, particularly India and China, rise much faster, then less labor will be exported abroad. If technological and productivity changes occur, then everything changes. Freeman wrote a book titled *The Overeducated American,* which was published in 1976, but I think he was 30 years too early in his predictions. Yet the phenomenon he foresaw will now happen soon—there will be a dampening in the relative wage of highly skilled workers in the United States.

So, to conclude, there is not much the developed economies can do in terms of labor market policy or interest rate policy. I think there is a lot that can be done to reduce the pressures through macroeconomic policies

and, in particular, through exchange rate policies. The U.S. dollar needs to depreciate, especially with regard to East Asia, and this prescription is doubled with regard to the Chinese yuan. This depreciation will have the desired double effect—faster export and total growth in the United States, and somewhat less faster growth in China than 10 percent per year. This policy alone will help considerably in redressing the global imbalance problem of 10 percent current account surplus in China and a 6 percent deficit in the United States. This policy can help create more jobs in America and less overheating in China: a win-win situation for the global economy.

Comments on "Labor Market Imbalances: Shortages, Surpluses, or What?" by Richard B. Freeman

Alan V. Deardorff

I'm a person from the trade theory side of international economics. I suppose my purpose here is to provide the perspective of a standard trade economist on this issue, although at least one of my views is not a standard perspective shared among trade economists.

First of all, on the question of whether there is a looming labor shortage, Freeman's answer is no. Indeed, it is pretty obvious that is the right answer. Based on the addition to the world markets of China, India, and the former Soviet bloc, is there a labor surplus? On that score Freeman says yes. The real question is, what are the implications of this surplus?

Along the way, he mentions that China, by educating its workers so rapidly and through advances in technology, is going to leapfrog comparative advantage. I will come back to this point later, but for now I will remark that for a trade economist, that is an interesting idea. The underlying concern, although it was not mentioned much in what Freeman said today, is that from this process the United States and other developed countries are going to lose comparative advantage.

Freeman also mentioned that other developing countries are going to lose out in competition with China and India. What I want to do is address some of these ideas. On the labor shortage issue, I will say practically nothing because I agree with him. On the surplus issue, I disagree. While it is true that in some sense the world's labor supply has grown, I disagree with Freeman on what the implications of that will be. I have a few small points to say about trade theory and how that fits into all of this. These are quibbles with his argument, as I'm not exactly disagreeing with him, but simply going a little beyond what he said.

I'll begin with my quibbles about trade theory. Freeman cites two standard models of trade theory. The first is the Heckscher-Ohlin model, in which rich countries have a comparative advantage based on skilled labor, what we usually mention today rather than capital. In the context of that model, if a big part of the world with a lot of unskilled labor suddenly appears on the global economic stage, then that's going to benefit the skilled labor in the rich countries. There are also going to be some gains for countries as a whole, but perhaps some losses for unskilled labor. That is very standard stuff in the Heckscher-Ohlin model. Freeman also cites what he calls the North-South model, but I am not exactly sure which model this is—it rather sounds like Vernon's product-cycle model. Regardless of the name, the North-South model is a very sensible model in which the rich countries have a technological advantage. These countries have some technologies that their southern neighbors do not have, so even if the goods that the rich countries produce with these technologies use resources the rich do not have much of, the rich countries may still have a comparative advantage. These high-technology nations export the goods they produce to the rest of the world. Again, if the world economy gets bigger as a result of these less-technologically advanced "southern"countries suddenly joining in, then this addition expands the demand for everything, and the rich countries benefit too. The traditional trade theoretic way of looking at this development would say, hey, no problem. Welcome China and welcome India—they are going to make us better off. Well, Freeman says things are not quite playing out this way. However, we have some variations on traditional trade theory to address this scenario. One is that China is adding an awful lot of skilled workers to the global economy. Freeman gave us some numbers on China's educational investment in science and engineering, so China is getting an awful lot of skilled workers. As a result, it is starting to export some goods that we thought were our prerogative because of our supposed comparative advantage in skilled workers. In terms of comparative advantage, that is one way that leapfrogging can happen.

China is exporting the types of goods that we in the United States used to export, and that is going to hurt us. Similarly, China is engaging in a lot of research and development. Now it makes sense that in order to catch up, they would try to acquire the technologies that we have

and they do not. That's a standard part of the traditional trade model: countries that are behind will move ahead in technology by imitating the technologically advanced countries. But Freeman's paper discusses the fact that China is not just imitating, but innovating, and in some areas moving the frontier of technology. He mentions that they are working in nanotechnology; again, presumably, this is going to allow them to acquire advantage in some products and services that we used to think were more exclusively our domain of expertise.

Freeman's paper suggests that at least two of these things are somehow contrary to trade theory, but in terms of the implications, these are exactly what trade theorists have considered. To the extent that the rest of the world acquires the resources or technology to produce the same goods more cheaply that we have been exporting, our terms of trade are going to worsen. In 2004 Samuelson got a lot of press for an article he wrote that described this aspect of globalization, but the fact is that there was nothing new about it when he published the article. For a long, long time, trade economists have been aware that we can lose some of our gains from trade if the rest of the world acquires whatever it was that provided our comparative advantage. That type of loss is quite consistent with traditional trade theory. What trade theorists might find interesting is why these countries are acquiring the technology or the resources to move ahead in the particular way that they are proceeding. Since they have a shortage of education, it seems pretty obvious that they should want to acquire it. As for the technology, I admit to a bit of bemusement as to why China is pursuing nanotechnology when presumably there are plenty of on-the-shelf technologies that they could pick up more cheaply. But since they are not exactly behaving according to the standard market economy model in all aspects of what they are doing, maybe that is why they are pursuing nanotechnology. It is possible that they see the benefits of being a leader in technology to be worth the costs, even though it draws heavily on what is for them a scarce resource. We've done some silly things, too, and some of them have actually worked out.

So, is this a problem for us? Is it really true that we Americans are likely to lose from all of this? In the standard textbook trade model that we teach our lowest-level undergraduates, where there are just two goods and two countries, the answer would be yes, we are going to lose. If your

country is only exporting one good, but the other country learns to produce the same good, then you lose. You continue to lose until they surpass you enough so that you can start exporting the other good and restore some gains from trade. But move a little bit beyond that model to a world with lots of countries and lots of goods, and then it's not such a problem. Suppose we manufacture and export a lot of goods for which we have a comparative advantage. Then if other countries do indeed leapfrog and find one, two, or a hundred goods that they can export, that's just fine. We can stop exporting those things, but doing so does not mean we will not continue to gain from trade in many other goods and services.

There is no necessary reason why this leapfrogging is going to be a problem for us. Remember that this whole story of these countries' gains eroding our comparative advantage is a story only of our losses from the traditional gains from trade, meaning that the original terms of trade have simply worsened. But these terms of trade can only really worsen if the point is reached where we do not trade with these countries at all. If they end up actually exporting stuff to us cheaply, we start gaining from getting the cheap stuff. Again, getting beyond those very simple trade models, there are lots of other reasons for gains from trade, which these models do not address. Among these are gains in consumer welfare from having a variety of products from which to choose, technological spillovers that benefit the less-developed countries, increasing returns to scale, and so forth. I am not so worried that we in the advanced nations are going to lose our gains from trade. Or that we, on net, are going to lose at all from these developments, which seem a natural evolution of the world economy. Again, that does not mean that particular groups within our economy won't lose, such as the unskilled labor mentioned earlier, or some more-skilled workers whose counterparts become competitive abroad. But our country as a whole is most likely to benefit, and our attention should focus more on harvesting those benefits so as to compensate those who are hurt.

There is repeated mention of developed countries losing out because they have high wages. Trade economists continually hear this line that "oh dear, trade is going to be harmful for us because our wages are higher than the countries we have to compete with." That sentiment forgets that there is a reason for those higher wages: some sort of productivity

advantage to justify those wage differentials. Of course, there is the possibility that the wages could be artificially high because of labor market imperfections, union bargaining agreements, and those sorts of things. But given the normal functioning of markets, high wages reflect some actual productivity differential. Even I have been prone to misdiagnosing the problem. When I first heard the idea of the North American Free Trade Agreement, my initial thought was, how can we compete with the Mexicans? I had forgotten what I'd been teaching my students, and the same analysis applies when talking about South Africa not being able to compete with China. It is true, of course, that these two countries cannot compete across the board in everything. But trade theory tells us that each country will have a comparative advantage in some products, and the market will help them define what these advantages are. The worst that can happen is that they suffer some loss of their terms of trade, if the particular products that they were gaining from exporting get replaced by products from China, India, or whomever.

On the issue of a potential labor shortage, Freeman is right—it is just silly to seriously entertain this possibility. How about the idea of labor surplus? His point is that China's opening and the entry of all these other countries almost doubles the global labor supply. That assessment really seems right. Since there is no corresponding doubling of the capital stock, this does suggest that in an integrated world economy—where factor prices are going to be determined by the relative amounts of these various factors—labor's wages are going to fall worldwide, and capital is going to be better off. This is exactly what happens in the trade model taught to undergraduates. The Heckscher-Ohlin model predicts that global factor prices will equalize. Once an equalized factor price equilibrium is reached, world factor prices not only are the same everywhere but these are based upon world factor endowments. One can legitimately argue that, although the actual world endowment of labor hasn't gone up, the part that is participating in world markets has risen, and that ought to cause a big problem.

As a result, we will get increased competition in all labor categories because each one is expanding, partly due to the educational investment taking place in some developing countries. I don't disagree with the directional effects that Freeman identifies. I think he is absolutely right that

worldwide, on this account alone, there is going to be some downward pressure on wages, and some upward pressure in various countries on returns to capital. The downward wage pressures will differ by the different types of labor—we must not forget that technology is marching forward all the time and may well be bidding up the prices of skilled labor worldwide at the same time that other types experience downward pressure. In any case I think Freeman is quite right about the general pressures on wage rates.

My disagreement comes with the size of the effect: I expect these wage changes to be small. My reason for thinking that these are going to be small certainly does not derive from standard trade theory. As I said, the Heckscher-Ohlin model incorporates factor price equalization, but more and more in recent years I have been having some doubts about that prediction of the model, as I think have many other trade economists. We have always known that particular equilibrium of the model to be an extreme case of the more general trade model. It predicts what will happen if you have perfectly frictionless trade and factor endowments across the world that differ by small enough amounts. These conditions are what enable the result of factor price equalization. But more and more the evidence suggests that we are not in a world that conforms to this equilibrium of the Heckscher-Ohlin model. The question then becomes, what is the simplest manageable approximation to reality that we ought to be looking at when trying to model these effects? Is it the Heckscher-Ohlin integrated world economy of factor price equalization, or is it perhaps a situation of autarky in which we do not trade at all? Lately I have been thinking that autarky may provide a better approximation for understanding worldwide factor prices than does the extreme assumption of factor price equalization. Now the truth, of course, lies somewhere between the extremes, but much depends on which end we are closer to. If it is the case that we are closer to autarky than to the factor-price equalization equilibrium, then the globalization of world markets is going to pull the factor prices in the direction Freeman describes. However, these prices are not going to be very far from autarky, in the sense that the United States is going to stay rich. Our aggregate wages are going to stay high, but some wages may go down a little bit. In China and India, aggregate wages are going to come up a little bit. Will developing-country wages stay low forever? Hopefully, no, but most of their increase will result not from trade but from capital accumulation, education, and acquisition of technology.

What evidence supports the idea that the world may be closer to autarky than to the most extreme model of free trade? I will touch briefly on three reasons. In the trade literature, Daniel Trefler has noted the large amount of trade that is "missing." Of course we are all very impressed with how much world trade has grown in the last 50 years, but it is still a negligible fraction of what it ought to be according to the standard model of free trade. The current level of world trade is so small that you cannot see it on a graph compared to what would be needed to achieve factor price equalization according to our theories.

Second, much more obviously, there are international differences in factor prices. These differences are large and seem to be reasonably sustainable, which suggests that we may have a long, long way to go before global factor prices equalize.

Finally, what we have known for a long time but have only recently woken up to for the implications for trade, is that distance and borders are a whole lot more important than allowed for in the Heckscher-Ohlin model of factor price equalization. There is something going on in the contemporary world that is restraining the integration process. Measurable transportation costs are not large enough to explain why factor prices are not converging more rapidly than is currently the case, but we really do not know what it is that is impeding the process of integration. I do not dare call the culprit "dark matter," but there is something at work that is causing countries to behave much more like autarkic economies than like economies where factor prices equalize. I admit that none of these reasons are definitive, but all this evidence suggests to me that we should at least consider the possibility that the economic typhoon predicted from China and India is going to wash over us rather gently.