



Job Losses and Trade A Reality Check

by **Brink Lindsey**

Executive Summary

Fears about job losses and chronic job shortages are on the loose again. Over the past few years, millions of U.S. jobs have disappeared, and foreign competition is increasingly taking the blame. Manufacturing jobs are supposedly fleeing to China, while service-sector jobs are being “offshored” to India.

Job losses are always painful, and the recent recession and sluggish recovery have meant real hardship for many Americans. It is important, however, to shun hysteria and demagoguery in assessing what is going on with the labor market and why. The employment picture today is that of a temporary, cyclical shortage of jobs caused by the recent downturn; there is no permanent shortage of good jobs on the horizon.

Even in good times, job losses are an inescapable fact of life in a dynamic market economy. Old jobs are constantly being eliminated as new positions are created. Total U.S. private-sector jobs increased by 17.8 million between 1993 and 2002. To produce that healthy net increase, a breath-

taking total of 327.7 million jobs were added, while 309.9 million jobs were lost. In other words, for every one new net private-sector job created during that period, 18.4 gross job additions had to offset 17.4 gross job losses.

International trade contributes only modestly to this frenetic job turnover. Between 2000 and 2003, manufacturing employment dropped by nearly 2.8 million, yet imports of manufactured goods rose only 0.6 percent. Meanwhile, despite the new offshoring trend, the Department of Labor is forecasting a 35 percent increase in computer- and math-related jobs over the next decade.

Calls for new trade restrictions to preserve current jobs are misguided. There is no significant difference between jobs lost because of trade and those lost because of new technologies or work processes. All of those job losses are a painful but necessary part of the larger process of innovation and productivity increases that is the source of new wealth and rising living standards.

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The total number of jobs in the U.S. economy is first and foremost a function of the size of the labor force.

Is globalization sending the best American jobs overseas? That question has been at the center of trade policy debates for decades now. In the 1980s, setbacks for major industries at the hands of Japanese competition led to claims that the U.S. economy was undergoing “deindustrialization.” In the 1990s, Ross Perot famously predicted that the North American Free Trade Agreement would result in a “giant sucking sound” as jobs went south; later in the decade, market critics warned of a “race to the bottom” in which U.S. multinational corporations moved jobs to wherever wages were lowest and environmental regulations were most lax.

In the past couple of years, the recession and subsequent sluggish recovery have stoked anxieties about job security generally—and, in particular, the threat to job security posed by intensifying foreign competition. Today China and India have replaced Japan and Mexico as the most feared foreign threats to U.S. employment. The world’s two most populous countries are supposedly combining to land a one-two punch on American workers: manufacturing jobs are fleeing to China while service-sector jobs are being “offshored” to India.

This paper responds to fears about trade-related job losses—and the demagoguery that

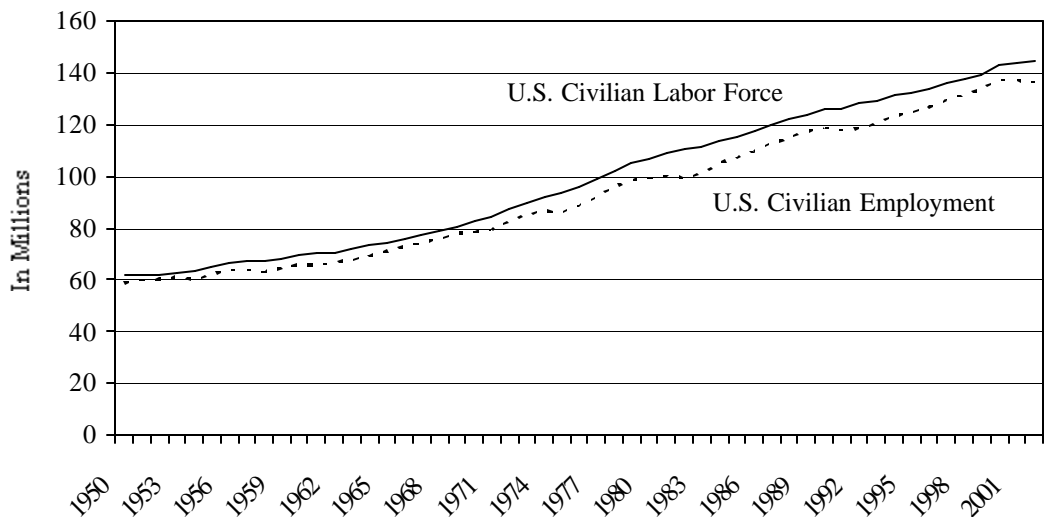
exploits those fears—by putting the issue into proper context. Facts and figures presented here demonstrate that trade is only one element in a much bigger picture of incessant turnover in the U.S. job market. Furthermore, these data make clear that the overall trend in that market is toward more and better jobs for American workers. While job losses are real and sometimes very painful, it is important—indeed, for the formulation of sound public policy, it is vital—to distinguish between the painful aspects of progress and outright decline.

1. The Number of Jobs Grows Naturally with the Population

As Figure 1 shows vividly, the total number of jobs in the U.S. economy is first and foremost a function of the size of the labor force.¹ As the population grows, the number of people in the work force grows; as the labor supply increases, market forces absorb that supply and deploy labor among different sectors of the economy.

Consider all the major events that increased the supply of labor over the past half century covered by Figure 1: the baby boom, the surge in

Figure 1
U.S. Civilian Labor Force and Employment



Source: *Economic Report of the President 2004*.

work force participation by women, and rising rates of immigration after decades of restrictionist policies. Consider as well the key developments that slashed demand for certain kinds of labor: the growing competitiveness of foreign producers and falling U.S. barriers to imports; the move by U.S. companies toward globally integrated production operations and the consequent relocation of many operations overseas; the deregulation of the transportation, energy, and telecommunications industries and the wrenching restructuring that followed; and, most important, wave after wave of labor-saving technological innovation, from containerization that replaced longshoremen to dial phones that replaced switchboard operators to factory-floor robots that replaced assembly-line workers to computers that replaced back-office clerks to automatic teller machines that replaced bank tellers to voice mail that replaced receptionists.

Yet in the face of all this flux, no chronic shortage of jobs ever materialized. Over those tumultuous five decades, a growing economy and functioning labor markets were all that was needed to accommodate huge shifts in labor supply and demand. Now and in the future, sound macroeconomic policies and continued flexibility in labor markets will suffice to generate increasing employment, notwithstanding the rise of China and India and the ongoing advance of digitization.

2. The Composition of Jobs Is Changing Constantly

The steady increase in total employment shown in Figure 1 masks the frenetic dynamism of the U.S. labor market. That figure tracks *net* changes in the number of jobs; *gross* changes—total new positions added, total existing positions eliminated—are much greater in magnitude. Large numbers of jobs are being shed constantly, even in good times; total employment continues to increase only because even larger numbers of jobs are being created.

The extent of normal job churn is revealed by the weekly statistics on new claims for unemployment insurance. According to economist Brad DeLong, a weekly figure of 360,000 new claims is roughly consistent with a stable unemployment rate.² In other words, when the unemployment rate holds steady—that is, total employment grows fast enough to absorb the ongoing increase in the labor force—some 18.7 million people will lose their jobs and file unemployment insurance claims over the course of a year. Meanwhile, even more people will get new jobs.

More detailed—and even more dramatic—evidence of job turnover is presented in Table 1.³ According to data compiled by the U.S. Department of Labor's Bureau of Labor Statistics, total

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Table 1
Job Turnover (thousands)

Year	Job Gains	Job Losses	Net Change
1993	29,665	27,032	2,633
1994	30,783	27,621	3,162
1995	31,459	29,079	2,380
1996	32,504	30,061	2,443
1997	33,725	30,757	2,968
1998	34,637	31,805	2,832
1999	35,614	32,924	2,690
2000	35,104	33,143	1,961
2001	32,491	35,442	-2,951
2002	31,691	32,047	-356
Total	327,673	309,911	17,762

Source: Bureau of Labor Statistics.

For every one new net private-sector job created from 1993 to 2002, 18.4 gross job additions had to offset 17.4 gross job losses.

U.S. private-sector employment rose by 17.8 million during the decade from 1993 to 2002. To produce that healthy net increase, a breathtaking total of 327.7 million jobs were added, while 309.9 million jobs were lost. In other words, for every one new net private-sector job created during that period, 18.4 gross job additions had to offset 17.4 gross job losses.

In light of those facts, it is impossible to give credence to claims that job losses in this or that sector constitute a looming catastrophe for the U.S. economy as a whole. Of course, particular industries may encounter difficulties, and involuntary unemployment is always difficult for the individuals and families subjected to it. In the enormous and dynamic U.S. economy, however, it is as inevitable that some companies and industries will shrink as it is that others will expand. Local challenges and problems should not be confused with national crises.

3. Challenging, High-Paying Jobs Are Becoming More Plentiful, Not Less

The ongoing growth in total employment is frequently dismissed on the ground that most of the

new positions being created are low-paying, dead-end “McJobs.” The facts, however, show otherwise.

Management and professional specialty jobs have grown rapidly during the recent era of globalization. Between 1983 and 2002, the total number of such positions climbed from 23.6 million to 42.5 million—an 80 percent increase. In other words, these challenging, high-paying positions have jumped from 23.4 percent of total employment to 31.1 percent.⁴

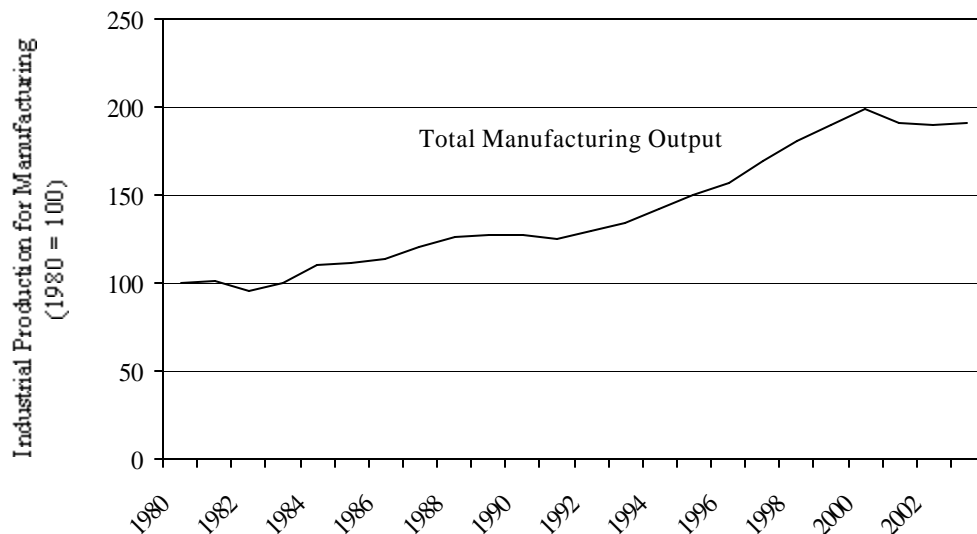
These high-quality jobs will continue growing in the years to come. According to projections for 2002–12 prepared by the Bureau of Labor Statistics, management, business, financial, and professional positions will grow from 43.2 million to 52.0 million—a 20 percent increase that will lift these jobs from 30.0 percent of total employment to 31.5 percent.⁵

4. “Deindustrialization” Is a Myth

Opponents of open markets frequently claim that unshielded exposure to foreign competition is destroying the U.S. manufacturing base. That charge is flatly untrue.

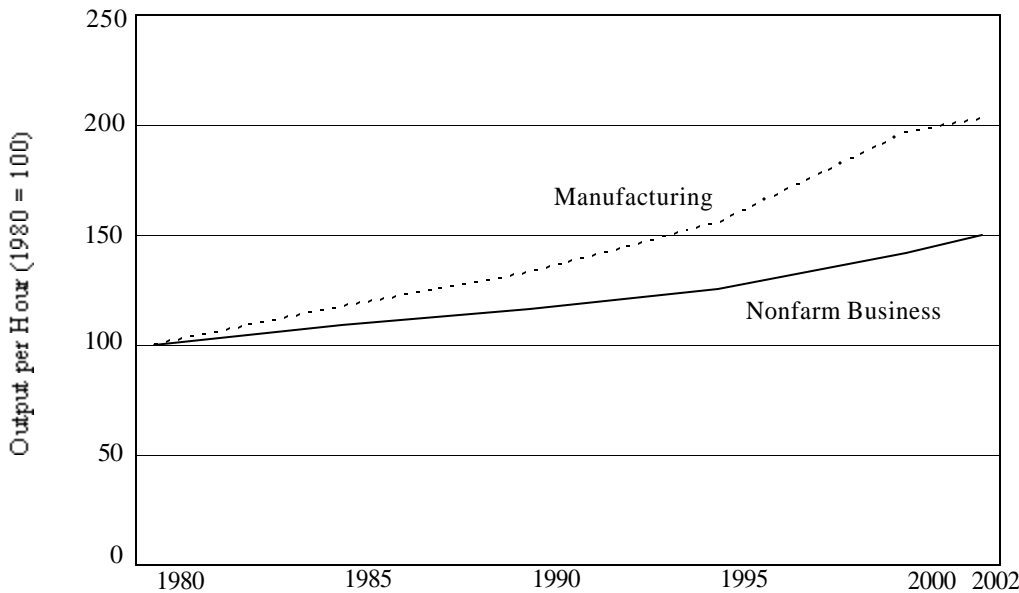
Figure 2 sets the record straight. Between 1980 and 2003, U.S. manufacturing output

Figure 2
U.S. Manufacturing Output



Source: *Economic Report of the President 2004*.

Figure 3
U.S. Productivity Growth



Source: *Statistical Abstract of the United States: 2003*.

climbed a dizzying 93 percent. Yes, production fell during the recent recession, but it is now recovering: the industrial production index for manufacturing rose 2.2 percent between January and December 2003.⁶

It is true that manufacturing's share of gross domestic product has been gradually declining over time—from 27.0 percent in 1960 to 13.9 percent in 2002.⁷ The percentage of U.S. workers employed in manufacturing has likewise been falling—from 28.4 percent to 11.7 percent over the same period.⁸ The primary cause of these trends is the superior productivity of U.S. manufacturers. As shown in Figure 3, output per hour in the overall U.S. nonfarm business sector rose 50 percent between 1980 and 2002; by contrast, manufacturing output per hour shot up 103 percent.⁹ In other words, goods are getting cheaper and cheaper relative to services. Since this faster productivity growth has not been matched by a corresponding increase in demand for manufactured goods, the result is that Americans are spending relatively less on manufactures. Accordingly, manufacturing's shrinking share of the overall U.S. economy is actually a sign of American manufacturing prowess.

Exactly the same phenomenon has played out over a longer time period with respect to agriculture. In 1870, 47.6 percent of total U.S. employment was in agriculture; by 2002, the figure had fallen to 1.7 percent.¹⁰ In the future, manufacturing will in all likelihood continue down the path followed by agriculture: as strong productivity growth reduces the price of manufactured goods relative to services, manufacturing's share of the overall economy will continue to fall. People who bemoan this prospect don't recognize economic progress when they see it.

International trade has had only a modest effect on manufacturing's declining share of the U.S. economy. It is true that imports displace some domestic production; on the other hand, exports boost sales for U.S. manufacturers. Since the United States now runs a trade deficit in manufactured goods, the net effect of trade at present is to reduce the size of the manufacturing sector. Over time, however, the effect of the trade balance on manufacturing's share of GDP has not been large. As mentioned above, manufacturing's share of GDP declined from 27.0 percent to 13.9 percent between 1960 and 2002; if trade had been in balance throughout that period, the estimated

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decline would have been from 26.5 percent to 16.0 percent.¹¹ The basic picture thus remains the same even when the effects of trade are eliminated: a steady, relentless drop in manufacturing's share of economic activity.

5. Imports Have Not Been a Cause of Recent Manufacturing Job Losses

Employment in the manufacturing sector has taken a beating in recent years. Between 1965 and 2000, the total number of manufacturing jobs fluctuated between 16 million and 20 million; during the 1990s, the figure hovered between 16 million and 18 million.¹² Thus, although manufacturing jobs as a percentage of total employment have been shrinking steadily for decades, the absolute number of manufacturing jobs has been quite stable.

But starting in mid-2000, manufacturing employment went into a tailspin. Between July 2000 and October 2003, employment in the sector fell from 17.32 million to 14.56 million—a 16 percent decline, or a net loss of 2.76 million jobs.¹³

Although the job losses have been severe, the charge that those jobs were lost to foreign competition simply doesn't square with the facts. As shown in Table 2, manufacturing imports rose only 0.6 percent between 2000 and 2003; by contrast, manufacturing exports fell by 9.6 percent.¹⁴ In other words, during this period the drop in exports accounted for 91 percent of the growth in the manufacturing trade deficit.

Accordingly, imports played at best a trivial role in the recent sharp decline in manufacturing

employment. The main culprit was the worsening domestic market for manufactures during the recent recession—in particular, a big drop in business investment. Between the fourth quarter of 2000 and the third quarter of 2002, total fixed nonresidential investment fell by 14 percent.¹⁵ Looking beyond domestic economic factors, softening overseas markets rather than stiffening import pressure added significant downward pressure on U.S. manufacturing jobs. Consequently, those anti-trade interests that cite manufacturing job losses as a reason to turn away from trade liberalization couldn't be more wrong: expanding overseas markets and commercial opportunities for U.S. exporters would be a shot in the arm for manufacturing employment.

6. “Offshoring” Is Not a Threat to High-Tech Employment

Fears about vanishing manufacturing jobs have figured prominently in trade policy debates for decades. In recent months, those fears have been compounded by growing anxiety about trade-related job losses in the service sector. Advances in information and communications technologies now make it possible for many jobs—ranging from more routine clerical jobs like processing insurance claims and handling customer calls to positions in highly skilled occupations like software development and radiology—to be performed anywhere, with the work then transmitted electronically wherever it is needed.

In particular, the offshoring of information technology (IT) jobs to India and other low-

Table 2
U.S. Manufacturing Trade (cumulative from January to October)

	2000 (\$bn)	2003 (\$bn)	Change (%)
Exports	571.6	517.0	-9.6
Imports	844.9	849.8	0.6
Balance	-273.3	-332.8	-21.8

Source: U.S. Bureau of the Census.

wage countries has received a flurry of recent attention. According to a survey of hiring managers conducted by the Information Technology Association of America, 12 percent of IT companies have already outsourced some operations to foreign countries.¹⁶ As for future trends, Forrester Research has predicted in a widely cited study that 3.3 million white-collar jobs—including 1.7 million back-office positions and 473,000 IT jobs—will move overseas between 2000 and 2015.¹⁷

Employment in IT-related occupations has experienced a significant decline recently. In 2002, the total number of IT-related jobs stood at 5.95 million—down from the 2000 peak of 6.47 million.¹⁸ Although some of those jobs were lost because of offshoring, the major culprits were the slowdown in demand for IT services after the Y2K buildup, followed by the dot-com collapse and the broader recession. Moreover, it should be remembered that the recent drop in employment has occurred after a dramatic buildup. In 1994, 1.19 million people were employed as mathematical and computer scientists; by 2000, that figure had jumped to 2.07 million—a 74 percent increase.¹⁹ As of

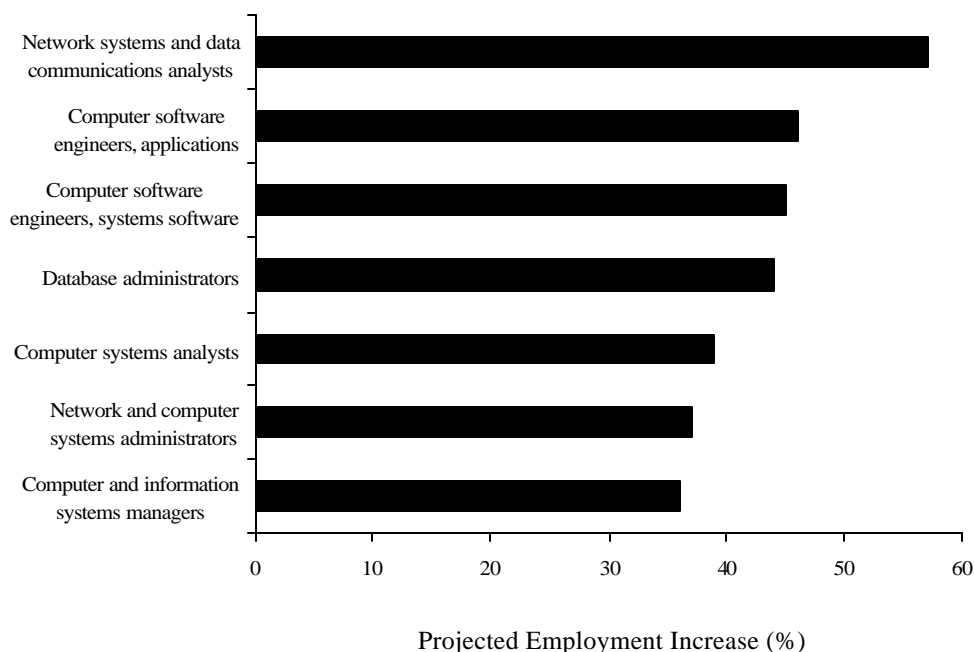
2002, the figure stood at 2.03 million—still 71 percent higher than in 1994.²⁰

Despite the trend toward offshoring, IT-related employment is expected to see healthy increases in the years to come. According to Department of Labor projections, the total number of computer and mathematical occupations will jump from 3.02 million in 2002 to 4.07 million in 2012—a 35 percent increase over the decade.²¹ Of the 30 specific occupations projected to grow fastest during the decade, 7 are computer related (see Figure 4 for the growth rates of the fastest-growing computer-related occupations).²² Thus, the recent downturn in IT-related employment is likely only a temporary break in a larger trend of robust job growth.

The wild claims that offshoring will gut employment in the IT sector are totally at odds with reality. The IT job losses projected by Forrester amount to fewer than 32,000 per year—relatively modest attrition in the context of total IT-related employment of nearly six million. These job losses, meanwhile, will be offset by new IT-related jobs as computer and mathematical occupations continue to boom. The doomsayers are thus confusing a cyclical downturn with a permanent trend.

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Figure 4
Projected Growth Rates for Computer-Related Occupations, 2002–12



Source: Bureau of Labor Statistics.

7. The Globalization of Services Creates Enormous Opportunity for U.S. Industry

Offshoring of IT services to India and elsewhere has been made possible by ongoing advances in computer and communications technologies. If those advances pose a threat to U.S.-based IT services industries, it should be possible to trace the emergence of that threat in trade statistics, since offshoring registers as an increase in services imports.

Yet the fact is that the United States runs a trade surplus in the IT services most directly affected by offshoring. In the categories of “computer and data processing services” and “data base and other information services,” U.S. exports rose from \$2.4 billion in 1995 to \$5.4 billion in 2002, while imports increased from \$0.3 billion to \$1.2 billion over the same period. Thus, the U.S. trade surplus in these services has expanded from \$2.1 billion to \$4.2 billion.²³

Meanwhile, the same technological advances that give rise to offshoring facilitate the international provision of all kinds of services—banking, accounting, legal assistance, engineering, telemedicine, and so on. The United States is a major exporter of services generally and runs a sizable trade surplus. In 2002, for example, services exports accounted for 30 percent of total U.S. exports, and exports exceeded imports by \$64.8 billion.²⁴ Accordingly, the increasing ability to provide services remotely is a commercial boon to many U.S.-based service industries. Although some jobs are doubtless at risk, the same trends that make offshoring possible are creating new opportunities—and new jobs—throughout the U.S. economy.

8. Offshoring Will Create New Jobs and Boost Economic Growth

Although offshoring does eliminate jobs, it also yields important benefits. To the extent

that companies can reduce costs by shifting certain operations overseas, they are increasing productivity. The process of competition ultimately passes the resulting cost savings on to consumers, which then spurs demand for other goods and services. Thus do productivity increases—whether caused by the introduction of new technology or new ways to organize work—translate into economic growth and rising overall living standards.

In particular, offshoring facilitates the diffusion of IT throughout the U.S. economy. According to Catherine Mann at the Institute for International Economics, globalized production of IT hardware—that is, the offshoring of computer-related manufacturing—accounted for 10 to 30 percent of the drop in hardware prices. The resulting increase in productivity encouraged the rapid spread of computer use and thereby added some \$230 billion in cumulative additional GDP between 1995 and 2002.

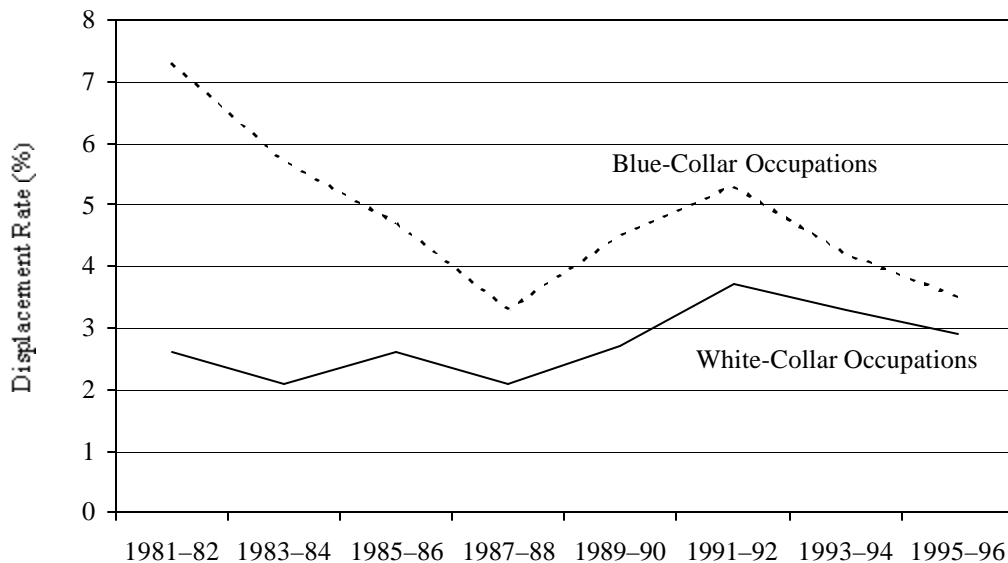
Offshoring offers the potential to take a similar bite out of IT software and services prices. The resulting price falls will promote the further spread of IT—and new business processes that take advantage of cheap IT. As Mann notes, health services and construction are two large and important sectors that today feature low IT intensity (as measured by IT equipment per worker) and below-average productivity growth. Diffusion of IT into these and other sectors could prompt a new round of productivity growth such as that provoked by the globalization of hardware production during the 1990s.²⁵

9. The Digital Revolution Has Been Eliminating White-Collar Jobs for Many Years

The attention now being paid to offshoring creates the impression that it is an utterly unprecedented phenomenon. The fact is, though, that the very same technological advances that are making offshoring possible have been eliminating large numbers of white-collar jobs for many years now.

The United States runs a trade surplus in the IT services most directly affected by offshoring.

Figure 5
Displacement Rates for Long-Tenured Workers



Source: Bureau of Labor Statistics.

The diffusion of IT throughout the U.S. economy has caused major shakeups in the job market over the past decade. Bank tellers have been replaced by automatic teller machines; receptionists and operators have been replaced by voice mail and automated call menus; back-office record-keeping and other clerical jobs have been replaced by computers; layers of middle management have been replaced by better internal communications systems. In all of these cases, jobs are not simply being transferred overseas; they are being consigned to oblivion by automation and the resulting reorganization of work processes.

The increased churn in white-collar jobs can be seen in the Department of Labor's statistics on displaced long-tenured workers, defined as workers who have lost jobs that they held for three years or more. Unsurprisingly, job displacement climbs during recessions and drops during expansions, yet the pattern of displacement has changed markedly over the past couple of decades.

During the severe 1981-82 recession, blue-collar workers were especially hard hit. Some 58 percent of displaced workers had been previously employed in blue-collar occupations,

and the displacement rate for such workers stood at 7.3 percent. By contrast, white-collar workers were much less affected by the economic downturn: about one-third of displaced workers had previously held white-collar positions, and the displacement rate was a modest 2.6 percent (Figure 5).²⁶

The situation looked very different during the 1991-92 recession. White-collar workers bore more of the brunt of the downturn: more than half of all displaced workers had previously held white-collar jobs, and the displacement rate for those occupations had increased to 3.7 percent. Moreover, displacement rates for white-collar workers stayed relatively high even after the recession ended: the rate was 3.3 percent during 1993-94 and 2.9 percent during 1995-96 (see Figure 5). In other words, the rate of job loss for long-tenured white-collar workers was higher as the economic boom of the 1990s was getting under way than it had been during the harsh recession of the early 1980s.²⁷

Thus, well before the recent flap over offshoring, the digital revolution was rendering some white-collar jobs obsolete—while making possible the creation of other jobs. Off-

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shoring is merely the latest manifestation of a well-established process. The only difference is that, with offshoring, IT is facilitating the transfer of jobs overseas rather than substituting directly for those jobs. In either case, U.S. jobs are lost—the inevitable downside of technological progress and rising productivity. Why is this downside taken in stride when jobs are eliminated entirely yet considered unbearable when the jobs are taken up as hand-me-downs by Indians and other foreigners?

10. Fears That the U.S. Economy Is Running Out of Jobs Are Nothing New

Because of the recent recession, the U.S. economy has suffered from a shortage of jobs—as evidenced by the rise in the unemployment rate. There is a natural temptation under these conditions to fear that this temporary setback is the beginning of some permanent reversal of fortune—in other words, that the shortage of jobs is here to stay and will only grow worse.

To calm such fears, it is useful to recall that similar anxieties have surfaced before. Again and again over many decades, cyclical downturns in the economy have prompted predictions of permanent job shortages. And each time, those predictions were belied by the ensuing economic expansion.

Back in the 1930s, the brutal and persistent unemployment caused by the Great Depression gave rise to theories of “secular stagnation.” A number of leading economists—including, most prominently, Alvin Hansen of Harvard—argued that declining population growth and the increasing “maturity” of the industrial economy meant that private-sector job creation could no longer be relied upon to provide full employment. The stagnationist thesis eventually fell out of fashion once the postwar economic boom gathered steam.

The return of higher unemployment in the late 1950s and early 1960s led to a revival of the stagnationist fallacy—this time in the guise of

an “automation crisis.” The ongoing progress of factory automation, combined with the growing visibility of electronic computers, led many Americans to believe, once again, that the economy was running out of jobs. During the 1960 presidential campaign, John F. Kennedy, who ran on a pledge to “get the country moving again,” warned that automation “carries the dark menace of industrial dislocation, increasing unemployment, and deepening poverty.”²⁸ The American Foundation on Automation and Unemployment, a joint industry-labor group created in 1962, claimed breathlessly that automation was “second only to the possibility of the hydrogen bomb” in its challenge to the U.S. economic future.²⁹ For the record, U.S. employment in 1962 stood at 66.7 million jobs—roughly half the current total.³⁰

In the early 1980s, the coincidence of a severe recession and a string of competitive successes by Japanese producers at the expense of high-profile U.S. industries sparked predictions of the imminent “deindustrialization” of the American economy. As financier Felix Rohatyn complained in a fashion typical of the time: “We cannot become a nation of short-order cooks and saleswomen, Xerox-machine operators and messenger boys. . . . These jobs are a weak basis for the economy.”³¹ Along similar lines, Sen. Lloyd Bentsen (D-TX) fretted that “American workers will end up like the people in the biblical village who were condemned to be hewers of wood and drawers of waters.”³² It should be noted that U.S. manufacturing output has roughly doubled since 1982.

In the early 1990s, another recession resulted in yet another job-shortage scare. Ross Perot won 19 percent of the presidential vote in 1992 with a campaign that, among other things, railed against the “giant sucking sound” of jobs lost to Mexico and other foreign countries. That same year, Pulitzer Prize-winning journalists Donald L. Barlett and James B. Steele published their widely discussed jeremiad, *America: What Went Wrong?* about the decline and fall of the country’s middle class. That handwringing was followed in short order by one of the most remarkable expansions in U.S. economic history.

Again and again, serious and influential voices have raised the cry that the sky is falling. It never does. The root of their error is always the same: confusing a temporary, cyclical downturn with a permanent reduction in the economy's job-creating capacity.

Conclusion

In recent years, many Americans have lost their jobs and suffered hardship as a result. Many more have worried that their jobs would be next. There is no point in denying these hard realities, but just as surely there is no point in blowing them out of proportion. The U.S. economy is not running out of good jobs; it is merely coming out of a recession. And regardless of whether economic times are good or bad, some amount of job turnover is an inescapable fact of life in a dynamic market economy. This fact cannot be wished away by blaming foreigners; it cannot be undone with trade restrictions.

Public policy can lessen the pain of economic change. It can ease workers' transitions from one job to another; it can produce better educated and better trained workers who are capable of filling higher-paying, more challenging positions; it can promote sound growth and avoid, or at least minimize, economy-wide slumps. But there is no place for policies that seek to stifle change in the name of preserving existing jobs. The innovation and productivity increases that render some jobs obsolete are also the source of new wealth and rising living standards. Embracing change and its unavoidable disruptions is the only way to secure the continuing gains of economic advancement.

Notes

1. Data in Figure 1 were taken from Council of Economic Advisers, *Economic Report of the President 2004* (Washington: Government Printing Office, 2004), Table B-35, pp. 326-27, <http://www.gpoaccess.gov/eop/tables04.html>. Cited hereafter as *Economic Report of the President 2004*.

2. See various entries at http://www.j-bradford-delong.net/movable_type/2003_archives/cat_bu

[siness_cycle_unemployment.html](http://www.j-bradford-delong.net/movable_type/2003_archives/cat_bu).

3. Data in Table 1 are taken from Labor Department statistics on business employment dynamics, <http://www.bls.gov/bdm>.

4. U.S. Bureau of the Census, *Statistical Abstract of the United States: 2003*, Table no. 615, p. 399, <http://www.census.gov/prod/www/statistical-abstract-03.html>. Cited hereafter as *Statistical Abstract of the United States: 2003*.

5. See Daniel E. Hecker, "Occupational Employment Projections to 2012," *Monthly Labor Review* 127, no. 2 (February 2004): Table 1, p. 81, <http://www.bls.gov/opub/mlr/2004/02/art5full.pdf>.

6. *Economic Report of the President 2004*, Table B-51, p. 344.

7. *Ibid.*, Table B-12, p. 300.

8. These percentages were derived from employment data provided at <ftp://ftp.bls.gov/pub/suppl/empsit.ceseeb1.txt>.

9. *Statistical Abstract of the United States: 2003*, Table no. 633, p. 419.

10. U.S. Bureau of the Census, *The Statistical History of the United States from Colonial Times to the Present* (New York: Basic Books, 1976), p. 127; and *Economic Report of the President 2004*, Table B-35, p. 327.

11. In estimating the impact of the trade balance on manufacturing GDP, it is inappropriate to assume that a trade deficit (or surplus) reduces (or increases) manufacturing GDP on a dollar-for-dollar basis. Imports and exports are sales figures, while GDP is a measurement of value added (i.e., sales revenues minus the cost of all inputs). If a dollar of net imports displaces a dollar of domestic producers' sales, that sales dollar covers service inputs as well as goods inputs; those service inputs should not be deducted from manufacturing's contribution to GDP. Economists Paul Krugman and Robert Lawrence have estimated that a dollar of net imports translates into 60 cents of displaced manufacturing GDP. See Paul Krugman, *Pop Internationalism* (Cambridge, MA: MIT Press, 1997), p. 38. I have used that 60 percent figure to adjust 1960's trade surplus in manufactured goods as well as 2002's trade deficit. The underlying figures on trade balances and manufacturing GDP were taken from *Statistical History of the United States*, p. 889; *Statistical Abstract of the United States: 2003*, Table no. 1295, p. 813; and *Economic Report of the President 2004*, Table B-12, p. 300.

12. Employment figures compiled by the Bureau of Labor Statistics are available at <http://www.bls.gov>.

13. Ibid.
14. U.S. Bureau of the Census trade statistics by Standard International Trade Classification commodity groupings are available online at <http://censtats.census.gov/sitc.sitc.shtml>. Manufactured products are those in SITC sections 5-9.
15. *Economic Report of the President 2004*, Table B-1, p. 284.
16. Information Technology Association of America, "2003 Workforce Survey" (presented at National IT Workforce Convocation, Arlington, VA, May 5, 2003), p. 11. See <http://www.itaa.org/workforce/studies/03execsumm.pdf>.
17. John MacCarthy et al., "3.3 Million U.S. Services Jobs to Go Offshore," Forrester Research Tech Strategy Brief, November 11, 2002, <http://www.forrester.com>.
18. U.S. Department of Commerce, *Digital Economy 2003*, December 2003, p. 28, <http://www.esa.doc.gov/DigitalEconomy2003.cfm>.
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