

4 The Global Context for Technology and Trade

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The global context for technology and trade is a very broad topic. It involves understanding current global economic conditions, of which there are two features that particularly affect technology and trade: the current unevenness of economic growth around the world and the emergence of sustained worldwide disinflation.

We also need to address the role that technology plays in growth and the present state of American technology industries. Finally, there is the matter of the government's role in technology.

In economic strength the United States is currently the world's outlier. Last year our growth rate of 3.9 percent was the strongest in the OECD. By contrast, Western Europe grew 2.7 percent, Latin America 2.1 percent, and Asia contracted at a rate of 1.9 percent.

Total world gross domestic product (GDP) grew 1.6 percent last year. That is about half the decade's average. And we contributed half of world GDP last year, because while the world was growing very slowly, we were growing very fast. In fact, America's GDP has grown faster than the G-7 average every year since 1992, or throughout the current Administration. Compared to the 1970s and the 1980s, this is really quite extraordinary, and indeed could signify new trends on both sides of the comparison.

As the person who oversees the Census Bureau and the Bureau of Economic Analysis, I am not allowed to forecast. I am not allowed because if I get it right, people might think the books were cooked, and if I get it wrong, then I might look like I do not know what I am doing. So I do not forecast. But according to most private forecasters, this unusual global economic unevenness will continue this year. Right now

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the consensus forecast sees the United States growing by 3.3 percent or more in 1999, while world GDP ekes out about 1.6 percent growth again.

The encouraging news is that there are some signs that Asia is beginning to recover. The private consensus forecast for the region is 0.4 percent growth this year and 1.6 in 2000, compared to the decline of last year. South Korea is leading the turnaround. It grew at an annual rate of two to three percent in the fourth quarter of last year, and other tigers are also showing improvement. Before we breathe more easily, however, Japan is still in a deep recession, even as its financial markets improve, and China may still be slowing as well.

The consensus forecast for Latin America is not encouraging. Led by Brazil's recession, the region, particularly South America, is clearly slowing. But Mexico, our third largest trading partner, is doing well, and the forecasts for 2000—at least for Latin America—are still solid.

The worry is Europe. Germany's GDP declined in the fourth quarter; its exports slumped. But the European Central Bank has cut interest rates, and the consensus forecast sees Germany rebounding, and all of Europe growing 1.9 percent this year and 2.4 in 2000. So even in this rebound, this pattern of not only absolute American economic strength, but also of relative economic strength is expected to continue.

This uneven pattern of world growth can have at least a modest stimulative effect on technology. For example, the recession in Asia reflects in part an excess of export-led investment in the 1980s and the 1990s, which has produced excess manufacturing capacity. When Asia comes out of its recession, businesses there will likely focus less on expanding their capacity and more on productivity and profits, which means more focus on technology. Such a global tendency towards greater technology investment would be reinforced by another feature of the current economy, which is the steady decline in inflation.

Consumer prices in all developed countries rose only 1.9 percent last year. They are expected to rise 1.3 percent this year. These rates are very low, but the trend is not new. In fact, inflation has been falling worldwide for about 15 years. There are many factors at work here, including weak demand for commodities worldwide, especially outside the United States, and until recently the sharp decline in oil price. But most of the factors in global disinflation are not tied to the current business cycle, but rather are structural, such as the huge built-up overcapacity in many Asian manufacturing sectors. Trade liberalization and deregulation around the world have also placed downward pressure on global prices.

The globalization of capital markets has brought a new kind of competition among currencies, since international investors will pull their funds out of any currency in which they lose confidence. This has produced a sustained bias toward tighter fiscal and monetary policies around the world to reassure international investors, thus holding down prices worldwide. We see this in Europe, where this bias toward tighter fiscal policy has been written into law in the Maastricht Treaty. We see it in the United States in a debate over the budget surplus, in which there is virtually no discussion of spending the surplus.

But technology also plays a direct role in the current structural disinflation because technological innovation has reduced the real cost of certain crucial goods, especially information systems, telecommunications, and transportation. U.S. personal computer prices, for example, measured on a real basis, fell 13 percent in the fourth quarter of 1998 alone. And the strong productivity gains—driven in part by technology—also keep inflation low, even when labor markets are very tight.

I think it also works the other way; that is, disinflation can play a role in advancing technology. That is because disinflation reduces the ability of firms to raise their prices, and that tends to shift the focus of business strategy to cutting costs—which often means substituting capital for labor—and the focus of business investment to increasing productivity.

It has been said that we have been in, in part, an investment-led economic expansion. One of the most extraordinary facets of the recent record in business investment is that measured in real terms, 45 percent of the growth in business fixed investment over the last five years has been in information technologies—that is, American business is becoming highly intensive in information technologies.

Apart from these dynamics, I think technology has played a critical part in the current strong growth in the United States. By one estimate, information technologies—which account for about ten percent of GDP—have accounted for more than one-third of U.S. growth over the last five years. But this is not new. Many economists—Robert Solow, Edward Denison, Michael Boskin, and most recently, the Council of Economic Advisors—have estimated that economic innovation, broadly conceived, can account for 40-to-50 percent of all U.S. growth over the last century.

Now, by “innovation, conceived broadly” I mean the development of not only new products, processes, and materials, but also new ways of financing, marketing, and distributing goods, and new ways of organizing the workplace and running a business.

Technology is not the only factor in growth, and in many cases it needs to be embodied in capital. So capital still counts for growth too. It needs to be operated by highly skilled workers, so education counts as well. So innovation and technology are clearly not the only factors, and they can not be fully separated from the other major factors in growth. Nevertheless, conceived broadly, it probably is the single most important factor.

How this happens is a matter of some debate. In the late 19th century, Alfred Marshall articulated the terms of neoclassical economics by emphasizing continuity. Applying calculus to economic matters for the first time, he could explain economic development as a matter of continuous incremental change. By contrast, Joseph Schumpeter, in his 1939 classic work, argued that economies are marked by gradual continuous change for long periods, punctuated by short bursts of explosive activity or discontinuous leaps in technology.

Is the current period better described by Marshall or Schumpeter? Is the semiconductor, computer, and communications revolution improving the productivity of labor and capital in a distinctly new way—creating a long period of rapid non-inflationary growth, the new economy paradigm—or is this, as some believe, a “bubble.com” economy, changing but only marginally and slowly, with a big bubble at the top?

Without embracing the new paradigm view of the economy, this is clearly not a bubble economy. Our economic fundamentals are very, very strong because competition is strong in the United States, and because the economic policies of the current Administration have been sound.

But whatever the precise pattern of economic change in the current era, the global contexts and technology have clearly been key factors. Technological advances affect trade as well as growth. There is no doubt, for example, that the spread of standards created by information technologies promote investment and trade by intensifying the linkages among companies and countries around the world. Technology also affects the patterns of world trade. By importing technology, countries can go from exporting trinkets to exporting computers in one generation. Technology also enables highly advanced countries like ours to become very highly specialized, and to establish new economies of scale. So instead of using comparative advantage to export particular products, countries like ours increasingly produce only certain parts, highly sophisticated parts of a particular product, and then trade it for other components.

So technology has increased the vertical specialization in trade. This is not new. This has happened at various points in economic development for 200 years. At this moment, a country's comparative advantage may turn out to be only in one (or a few) aspects of economic activity—for example, in research and development (R&D), or in the assembly of a product, or in its marketing, or in business management. And falling tariffs—or increasing openness—to foreign direct investment pushes world production and world trade in the same direction. This could be a plus certainly for R&D in this country and for the business management sector.

But always remember, in a global system, the advantage conferred by any technology on a company and its country is short-lived, regardless of the patent or copyright protection applied to a particular application of an idea. The idea itself cannot be owned.

Moreover, since 1980, all the major industrial countries have spent large sums of money generating new ideas for products and processes, and the major countries now have roughly comparable degrees of R&D intensity, that is, ratios of R&D to their GDP.

Differences among countries in this ratio have narrowed to decimal points. In 1996, for example, it was 2.5 percent in the United States, compared to 2.7 percent in Japan, 2.3 percent in Germany and, incidentally, 2.6 percent in Korea. This is not a phenomenon limited to the most advanced economies.

There is also evidence that the diffusion of ideas in technology is narrowing differences in countries' labor productivity, especially between Europe and the United States. Put another way, on balance, the technological achievements of one country or of companies in one country, benefit others. Certainly foreign innovations have benefited us by providing growing foreign markets for our goods and new technological knowledge for our producers. This is a global technological system. And as more sources of potentially relevant knowledge emerge around the globe, American companies have reached out to tap into new research from foreign universities and foreign competitors.

This is clear in the evidence of the increasing use by American firms of international research partnerships, especially in high technology areas. In 1986, there were 400 such partnerships in the three core areas of information technology, biotechnology, and new materials. Over the next decade in information technology and biotechnology alone, U.S. companies formed nearly 3,600 cross-national technology alliances.

One result is that over the last ten years, U.S. firms' investment in overseas R&D increased half again as rapidly as their investment in domestic R&D. Another result is that R&D investment by U.S. companies overseas is now roughly equal to R&D spending in the United States by the affiliates of foreign countries. This is a very permeable system.

This globalization of technology, research, and ideas has clearly been very healthy for the United States. We are the world's leading producer of high technology goods, accounting for one-third of all world production. In the 1990s, we regained world market share in high technology areas where we had lost world market share in the 1980s, and we continue to enjoy a trade surplus in technology products, which is important given that U.S. exports have accounted for a significant share of U.S. growth in the 1990s.

We are also a net exporter of technological know-how. We know that because the royalties and fees from patents received from overseas by U.S. firms are nearly three times the level of those paid by U.S. firms to foreigners.

Since technology is crucial to growth and the global system, the last issue is what government can or should do about it. Now, competition is the single most important driver of all forms of economic innovation. This is true whether the competition is among Japanese oligopolists vying to make the smallest camcorder or small software designers facing off against Microsoft. In the past there has been a lot of evidence, especially in Europe and Japan, of government planning to promote technological development. Our competitive system has clearly served us better. This is not to say that the government has no role to play. Government is crucial in supporting R&D and broad-based education. It is also important in spreading the knowledge of technological advances, and in refereeing the competition itself.

And technology in a global context constantly raises new questions for government. For example, how do we best maintain competition in the face of technological innovations that create industry standards like Windows? We have been in the midst of a major merger and acquisition wave recently, and much of that has to do with buying and selling technology advancements and new technology standards. Sooner or later we will face a related issue, when foreign-owned technologies begin to set global standards—which our industry and consumers will want or have to use. Will we be open to foreign standards, as we expect the world today to accept the standards set by our technology companies?

It matters because openness to new ideas, new technologies, new ways of doing business, and new ways of conducting public life has been our best answer to the challenges posed by the global economy. Openness is one of the basic conditions for technological progress, and it will always be vital to American success.