
What Role for Trade in the “New Paradigm” of Sustainable Long-Run Growth?

Productivity growth is the key variable . . . in the economy's long-run growth performance. . . . [T]echnology, globalization, a balanced budget, and enhanced educational attainment may increase productivity growth . . . in the years to come . . . and nurture smoother growth over time.

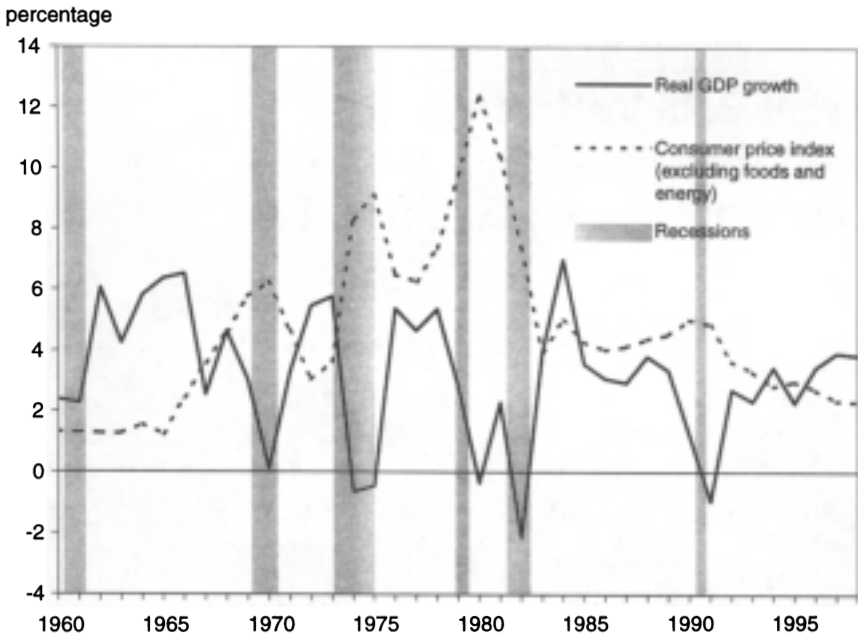
—Laura D'Andrea Tyson, “Just How New Is the ‘New Economy’?”
Business Week (1 June 1998)

The dollar's strength . . . has helped to hold down inflation and has lent support to the theory that America was undergoing an economic miracle . . . [but] virtuous circles can easily turn vicious.

—*Economist* (19 January 1999)

As the economy expanded in the late 1990s, US economic performance outstripped expectations year after year with lower unemployment, faster growth in output, lower price inflation, growing incomes, and soaring wealth. Most observers of the macroeconomy did not believe that this combination could continue for so long. Inevitably, they said, robust growth would lead to higher inflation, as it had in virtually every other economic cycle observed since World War II (figure 5.1). Higher inflation generally precipitates a tightening of the money supply by the Federal Reserve, which slows growth. But with price inflation quiescent, the

Figure 5.1 Growth, inflation, and recessions, 1960-98



Sources: US Department of Commerce, *National Income and Product Account*; Department of Labor, *Consumer Price Index*.

Federal Reserve has not tightened monetary policy since mid-1994—and indeed, it loosened monetary policy in 1998 in reaction to the global financial turmoil and its potential impact on the US economy. Is there a “new paradigm” of macroeconomic activity in which the relationship between too-rapid growth and inflation no longer applies—or has this trade-off been masked by a fortuitous combination of factors? What role does globalization play in either altering the parameters of the old relationship or creating the new paradigm?

The Trade-Off between Inflation and Unemployment

The notion that there is a trade-off between price inflation and the rate of growth of output comes from a 1958 article by the British economist A. W. Phillips, who observed that there was a negative relationship between wage inflation and the unemployment rate in UK data from 1861 to 1957; that is, as unemployment fell, the wage inflation rate tended to rise. Since then a number of new ideas have modified the simple relationship that

Phillips first presented.¹ The more recent theories focus on the supply side of the economy. Events such as the oil price shocks of the 1970s are integrated into the analysis; the impact of labor-market policies such as welfare and unemployment compensation are considered; and understanding of the psychology of wage and price formation and of the role of expectations has been deepened.

In fact, there are two distinct relationships between inflation and resource utilization that need to be analyzed—one within the labor market, such as that observed by Phillips, and the other in the general economy between a broad measure of price inflation (such as the consumer price index [CPI] or GDP deflator) and the rate of growth of GDP. Some analysts argue that this distinction is unnecessary—that whenever labor costs rise, prices cannot be far behind. These analysts suggest that a single parameter of labor-market tightness, such as the unemployment rate, is sufficient to pin down the relationship between price inflation and output growth. This parameter is often called the “nonaccelerating inflation rate of unemployment” (NAIRU) or sometimes the “natural rate of unemployment.” Below this rate of unemployment wage costs tend to rise, which often causes price inflation to accelerate.

The rationale for the trade-off between wage increases and the unemployment rate comes from simple supply-and-demand analysis. If more labor is demanded by firms, then its “price”—that is, wages—will rise. The concept of the NAIRU, however, suggests that this relationship is not linear: As unemployment falls further and further, firms find it increasingly difficult to find labor to meet their needs, and hence the compensation they are willing to pay rises at an accelerating rate. That said, the NAIRU is not a fixed and unchanging unemployment rate. Labor-market policies, such as the generosity of unemployment compensation, clearly affect the NAIRU, as does the match between the skills workers have and the skills firms need.² Nevertheless, if the NAIRU changes only slowly over time, and if there is a tight relationship between wage inflation and price inflation, then the NAIRU can help in predicting price inflation in the future.

The 1990s data contain several interrelated puzzles, however, that call into question the assumption that there always is a tight relationship between wage inflation and price inflation. On the one hand, as illustrated in figure 5.2a, the negative relationship between the change in average hourly earnings (wages) and the unemployment rate is still in evidence.

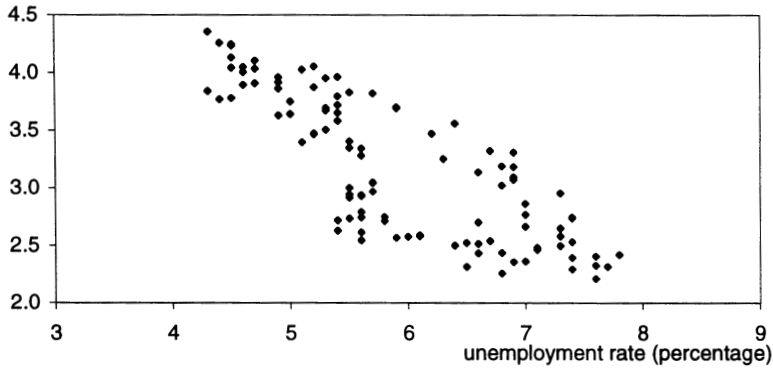
1. For a general discussion of the Phillips curve and new theories of aggregate supply, see any modern macroeconomics textbook (e.g., Mankiw 1997, 346ff.).

2. See chapter 4 for a discussion of how trade may affect the relative wages of workers with different kinds of skills. See OECD (1996) for more discussion of social policy and the NAIRU.

Figure 5.2 Puzzles in 1990s inflation-output relationship

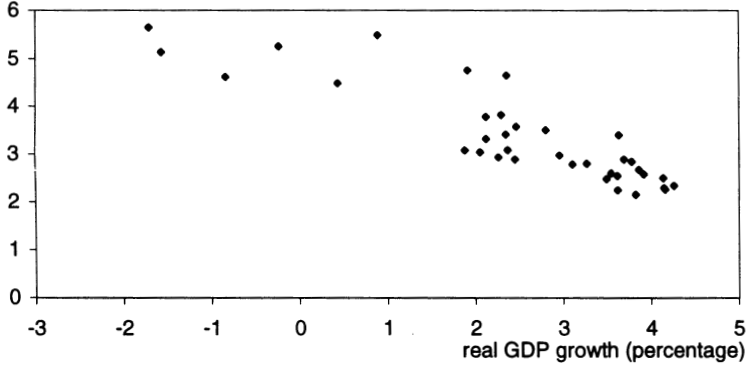
A. Unemployment rate and average hourly earnings

average hourly earnings
(year-over-year, 1990-98, monthly data, percentage)

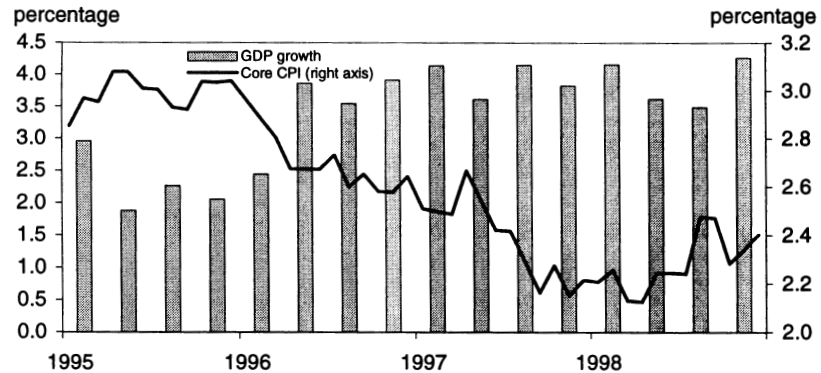


B. Real GDP growth and Inflation

core CPI (year-over-year, 1990-98, quarterly data, percentages)



C. Inflation and GDP growth



Source: Bureau of Labor Statistics, US Department of Labor
<<http://stats.bls.gov:80/datahome.htm>>.

But the rise in labor costs in the past several years has not been passed through to increase price inflation. Hence when the Phillips curve is respecified to the more general relationship between the price inflation rate and the rate of growth of output, as shown in figure 5.2b, the negative relationship is not so clearly and cleanly observed. Indeed, as figure 5.2c illustrates, price inflation has generally fallen even as GDP growth has remained strong (and unemployment low) over the past several years.

What factors, then, might be loosening the link between wages and prices, and between prices and output growth? Are those factors temporary or permanent? What role do international factors in particular play?

New Investment and the Inflation-Output Trade-Off

Just as strong employment growth tends to push up wage inflation, high rates of utilization of industrial capacity tend to push up price inflation. However, investment in the United States has been particularly robust during this expansion. While the narrowing of the federal budget deficit has been important in releasing funds for productive investment, so too has the additional finance provided by foreign savings (see chapter 2, especially figure 2.5).

The additional physical capital provided by investment has meant that the additional labor employed in recent years has had sufficient plant and equipment to produce effectively. Without the additional capital, capacity utilization might have risen into an inflationary zone. In fact, new research (Corrado and Matthey 1997) suggests that the nonaccelerating inflation rate of capacity utilization (NAIRCU) is just as important a concept for understanding the dynamics of the relationship between price inflation and output growth as the NAIRU concept is for labor, the other major input to the production process.³

Moreover, a key component of the investment surge in the last half of the 1990s has been in computers and other information technology equipment (Sichel 1999). Real net investment in computers and peripheral equipment rose more than 40 percent per year between 1996 and 1998, and the real net capital stock rose 37 percent. As of 1998, computers accounted for more than 40 percent of the total nominal nonresidential stock of investment. Such remarkable growth was powered by prices calculated to be falling at an average rate of nearly 30 percent per year. As discussed

3. Some analysts have held in recent years that too much investment in plant and equipment has been undertaken around the world. To be sure, when economies in much of the world are growing at rates well below what they are capable of, it will appear that there is too much capacity. Paul Krugman (1997) effectively points out the mistaken thinking underlying the "global glut."

in chapter 3, one reason that prices have been falling so fast is the globalization of production of computers and related equipment.

International Forces and the Inflation-Output Trade-Off

Other international factors have contributed to falling inflation rates in recent years. The dollar has appreciated, contributing to downward pressures on input costs as well as on final goods prices. Commodity prices have weakened, in particular on account of the slow growth in other parts of the world. Finally, the growing market clout of imports has increased competition in the domestic marketplace, further keeping prices in check. And the drive to expand into markets abroad has made exporters acutely conscious of pricing. Some of these international forces should be temporary, and others may be more lasting.

First, the trade-weighted exchange value of the dollar appreciated some 25 percent from mid-1995 through mid-1999. To varying extents and with varying delays, firms pass exchange rate changes through to their prices,⁴ and thus the appreciation of the dollar tended to reduce import prices (figure 5.3).

In addition, commodity prices have been falling, particularly as growth has slowed abroad but also because technological change has increased the efficiency of, and lowered the cost of, extraction and production (World Bank 1999). On the export side, sales abroad have had to contend not only with an appreciating dollar but also with sluggish activity in other economies. Export prices declined particularly sharply in 1997 and 1998 until the dollar began to depreciate late in the year.

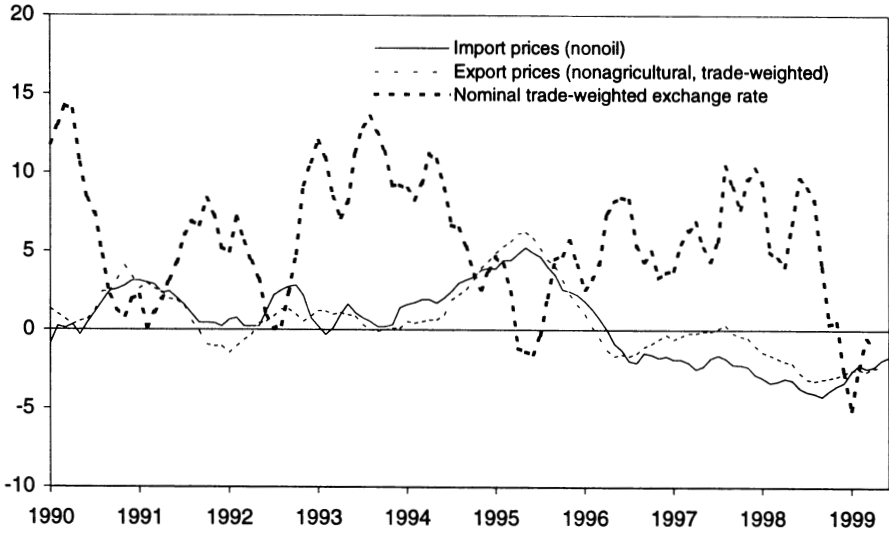
The falling import prices and falling commodity prices have slowed the rate of price inflation. Different measures of price inflation have slowed to differing degrees with the different behavior directly related to international trade exposure and competition. Inflation has come down the most in those sectors with the greatest exposure to international competition. For example, producers of manufactured goods face competition from imports that account for about 30 percent of their domestic market, and 25 percent of their sales are destined for foreign markets. With such fierce competition at home and for markets abroad, it is not surprising that producer prices rose only very slowly over the past few years. (The depreciation of the dollar in the second half of 1998 lessened some of the compet-

4. For an example and further discussion of the relationship between the exchange value of the dollar and the competitiveness of US products, see chapter 7 (esp. table 7.1). On average, about 60 percent of an exchange rate change is passed through to a change in import prices; about one-half of the total amount occurs in the contemporaneous quarter and the rest over the subsequent three quarters.

Figure 5.3 International influences and price inflation

A. Dollar exchange rate, import and export prices

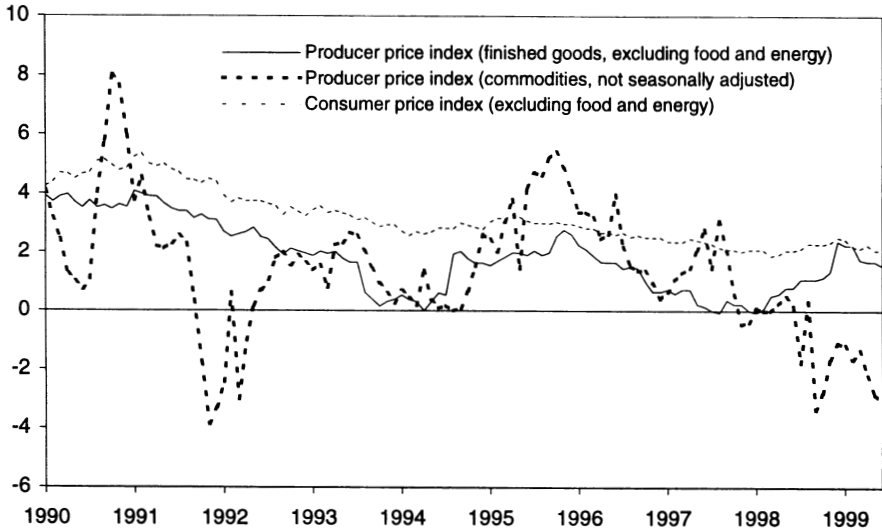
percentage change from previous year



Sources: Bureau of Labor Statistics, *Export and Import Prices*; IMF, *International Financial Statistics*.

B. Inflation rates

percentage change from previous year



Sources: Bureau of Labor Statistics, *Consumer Price Index and Producer Price Index*; IMF, *International Financial Statistics*.

itive pressure, and the PPI for finished goods, excluding food and energy, tipped back up in late 1998—see figure 5.3.)

For consumers as well, international competition has been a key force dampening price inflation. About 50 percent of consumer goods (excluding automobiles) are imported, so this component of consumer price inflation has been trending downward. In addition, the dampening force of international prices and competition matter even for the broadest measure of consumer price inflation, in which domestic services account for 60 percent. Wages, which are particularly important in the labor-intensive service-sector industries, are rising less quickly than they otherwise would because of the slowed rate of consumer price inflation. Thus international factors are integral to the “virtuous” circle of lower inflation (Mann 1996).

All told, the declines in import prices might have cut about 1.8 percentage points off CPI inflation since 1996, more than accounting for the decline in inflation. At some point the rest of the world will return to a more normal growth path, releasing some of the downward pressure on import prices and offering some upward price flexibility both to producers of domestic-competing goods and to exporters. In addition, pressure on the dollar to depreciate will likely intensify (see chapter 10). From the point of view of the long-term trade-off between inflation and output, how much of the benefits of international competition is likely to remain, and how much is fleeting and dependent on changes in exchange rates and business cycles here and abroad?

Globalization and Trend Productivity Growth

There are two ways an economy can increase output. One of these is to use more resources, such as labor and capital. Once these resources are fully employed, however, further noninflationary increases in output must come from improvements in the utilization of resources. Such improvements often are measured as increases in *trend* productivity growth. A higher rate of productivity growth should increase the maximum growth rate that an economy can achieve without accelerating the rate of inflation. In addition, higher productivity growth implies that firms can afford to raise wages, maintain prices, and yet avoid too hard a hit on their profit rate. Thus an increase in the trend rate of productivity growth would help resolve the constellation of puzzling data observed in the late 1990s.

But has trend productivity growth increased? It is difficult to measure productivity growth, and even more difficult to determine whether *trend* productivity growth has changed. It is well known that productivity varies over the business cycle. For example, as demand for their goods rises, firms initially work their existing resources harder (e.g., with overtime or speeded-up production runs) to produce more output. Productivity (output divided by inputs) increases, but firms cannot forever work

their employees and machines harder to generate more output; they must ultimately work them more efficiently and effectively. It is this second type of productivity gain, measured by changes in *trend* productivity growth, that generates increased sustainable growth in GDP.

Whether trend productivity growth over the 1990s has increased remains controversial. However, there is no question that productivity growth has been more rapid for the manufacturing sector of the economy (figure 5.4). For the broader aggregate, the nonfarm business sector, a higher average productivity growth apparently has been maintained for the latter half of the 1990s; this may be due only to the manufacturing component or it may suggest a new, higher trend for the whole economy.⁵

In any case, the manufacturing sector is more exposed than the service sector to international competition; this suggests a key relationship between international competition and faster productivity growth. Within the manufacturing sector, there is substantial variation in both productivity growth and exposure to international trade and competition. This variation in productivity growth across industries can be used as a laboratory of sorts for investigating whether international forces may be an important ingredient in raising productivity growth.

There are two channels through which trade can affect trend productivity growth: changes in volume of output and changes in competition. The first is quite familiar from the work of many macroeconomists on aggregate productivity data. Productivity tends to be “procyclical,” rising and falling as demand and output rise and fall. In the global environment, increased demand for exports should raise overall output and increase productivity. On the other hand, unless domestic demand stays strong, an increase in imports would tend to reduce productivity growth as imports substitute for domestic consumption and reduce domestic output.

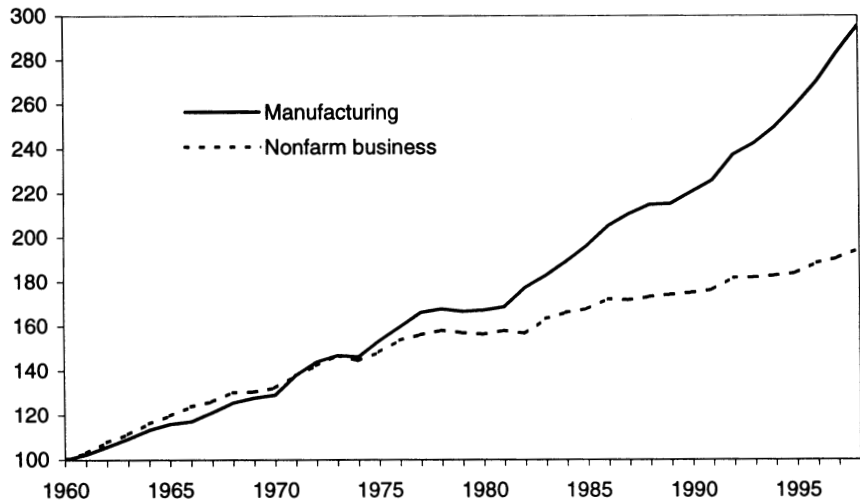
The second channel, competition, has to do with the relative share of imports in domestic consumption and of exports in production. Research shows that information conveyed to firms from trade competition is different from that conveyed through competition with other domestic firms and can stimulate a change in trend productivity growth. For example, imported goods can be reverse engineered, during which firms learn about new production techniques. In addition, if among import-competing firms some are more efficient and cost-effective producers, these firms will survive import competition longer than other firms. Thus the least productive firms exit, leaving the more productive firms to raise the overall average. On the export side, firms that export a higher fraction of their product could have a more flexible and efficient production technology, which increases their ability to meet foreign designs and demand; reverse engi-

5. Corrado and Slifman (1996) examine productivity and output data for a broad set of manufacturing and service-sector data and also discuss issues of measurement. See also Gordon (1999) for another view of productivity growth and the “new paradigm.”

Figure 5.4 Labor productivity growth and trends

A. Labor productivity, 1960-98

1960 = 100



Source: Bureau of Labor Statistics, *Major Sector Productivity and Costs Index*.

B. Nonfarm business productivity growth trend, 1947-98

1960 = 100

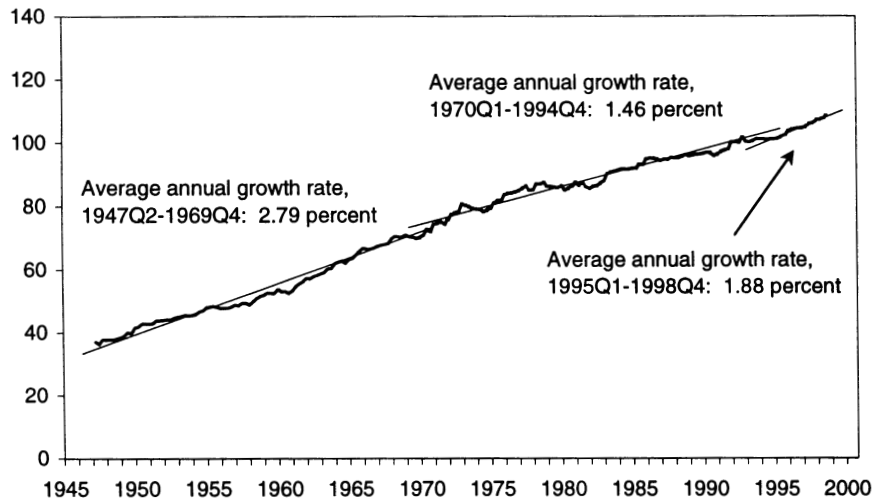


Table 5.1 Trade and productivity growth (regression coefficients, sample of 21 industries)

Effect on trend productivity growth^a	
Volume effect^b	
Domestic shipments	0.55
Imports	-0.13
Exports	0.34
Competition effect^b	
Imports	0.6
Exports	-0.55 (not significant)

a. Vector of change in trend productivity growth is measured as

$\text{mean}[\text{total factor productivity}]_{1995-87} - \text{mean}[\text{total factor productivity}]_{1978-86}$.

b. Change in average of sample variable between first and second half of sample period: (1995-87) – (1978-86).

Source: Mann (1998).

neering is important for exporters as well. Moreover, much evidence suggests that firms that export are more productive than firms that do not (Richardson and Rindal 1995, 1996).

Systematic analysis of a cross-section of manufacturing industries reveals that importing and exporting raise trend productivity growth but with different weights on the two channels (table 5.1). Before considering the effect of international factors, however, it is clear that the domestic market remains very important for manufacturers' productivity growth. The volume effect on productivity growth coming from changes in domestic shipments to domestic customers is greater than the volume effect coming from increased imports or increased exports. This is not surprising since on balance US manufacturers still have very large domestic markets.

Consider now the volume and competition effects of international trade. On the import side, the volume effect has the expected relationship: rising volume of imports apparently reduces the domestic volume produced, with negative consequences for productivity growth. But this volume effect is countered by a much stronger positive effect on trend productivity growth coming from the competition effect. When imports begin to take over the domestic market, and when domestic firms must fight for market share, trend productivity growth increases. On the other hand, on the export side, expanding sales abroad (the volume effect) appear to have the more important role in affecting productivity. Simply raising the share of exports in the production run (the competition effect) does not appear to raise productivity further (Mann 1998).

Globalization also may affect productivity growth through its synergy with spending on research and development (Baygan and Mann 1999).

R&D and trade can work together to raise productivity growth in two ways. First, R&D innovations in one country can “spill over” into another via trade flows, as in the case of reverse engineering. The firms in the recipient country adopt innovations and learn best practice, which increases productivity growth. In another model of the R&D and trade relationship, the forces of international competition encourage firms within a country to undertake R&D spending so as to improve the efficiency of resource usage within that country. Research that aggregates industries into different groups on the basis of the degree of technological sophistication suggests that R&D spending does raise productivity growth, but only when trade encourages and diffuses the fullest uptake of globally available technological innovations by all firms within an industry.

In sum, research indicates that globalization changes the way in which resources are used in the US economy. Moreover, the globalization of computer production contributes to a greater integration of computers and information technology into the capital stock that is available to the economy at large, not just to that portion of the economy exposed to international forces. Consequently, productivity gains occur not only because of the direct forces of the international marketplace through competition and demand but also because of the indirect benefits that accrue to purely domestic producers in their use of products that are made cheaper and better by globalization. These forces of international trade appear to have produced permanent changes in the way the US economy works, allowing GDP growth to remain above 3.5 percent with inflation below 2 percent for more than three years.

Conclusion

Summary

- Over the last half of the 1990s, US growth has been particularly robust while inflation has fallen. During every other postwar expansion there has been a positive relationship between output growth and inflation—robust growth has generally led to increased price inflation. While the positive relationship has not been eliminated, it has been both masked and fundamentally changed by globalization.
- International forces, some temporary and others more enduring, have helped to alter the relationship. First, the appreciation of the dollar has kept down import prices. In addition, slow global growth has kept commodity prices low. Finally, slack demand in overseas markets has put downward pressure on export prices. At some point, these temporary factors will reverse. The dollar will depreciate, import prices will no longer dampen domestic inflation, and export prices could rise.

Global growth will resume, boosting commodity prices, foreign costs and prices, and domestic prices.

- However, stiffer international competition, both on the import and on the export side, have made producers acutely aware of pricing, have enhanced productivity growth, and may have made R&D spending even more beneficial. Moreover, foreign savings have helped to finance new investment in plant and equipment in the United States, which allows US firms to hire more labor without running into capacity constraints. And, finally, the benefits of globalized production of computers are filtering through to enhance resource utilization in all industries and services. Even when the temporary factors recede, these permanent benefits of globalization for long-term sustainable growth will remain.

Policy Discussion

- From the standpoint of economic analysis, the policy implications are becoming familiar. International forces are allowing the current robust expansion to continue and are enhancing the long-term ability of the United States to grow without generating inflation. Restricting trade would have a negative effect on both the short-run and the long-run performance of the economy.
- Moreover, there are important synergies between open trade, global investment, and the effectiveness of R&D spending. The ability of firms to decompose the production and service processes and to invest and trade worldwide is key to generating productivity gains and lower inflation. Efforts to keep R&D at home or to prevent industry from investing abroad will obviate the very benefits such policies were thought to confer on selected industries or groups of workers.
- These insights have not been wholly understood by the population at large or embraced by many of their elected representatives. As noted in the previous chapter, adjustment by firms and workers to economic dynamics is not without cost. In addition to creating policies that facilitate adjustment, it is important that we describe and quantify the benefits of globalization. Lower inflation rates benefit all people, especially those who consume a large fraction of their income. Faster productivity growth is the foundation for higher wages and allows monetary policy makers to keep interest rates low for longer periods without being concerned about inflation. Increasing the size of the economic pie through productivity growth offers higher levels of economic well-being to everyone; policies of education, training, and flexibility ensure that everyone can take advantage of those opportunities.

