Commerce

OP-43

Organization and Performance of World Food Systems: NC-194

OCCASIONAL PAPER SERIES

The work reported herewithin contributes to the objectives of North Central Regional Project NC-194, a joint research project of state agricultural experiment stations and the U.S. Department of Agriculture

AN OVERVIEW OF THE U.S. COMPETITIVENESS DEBATE

*Steve McCorriston

OP-43 OCTOBER 1992

*AGRICULTURAL ECONOMICS UNIT, UNIVERSITY OF EXETER,

I AM GRATEFUL TO PHIL ABBOTT, TOM HERTEL AND WILL MASTERS FOR COMMENTS ON AN EARLIER DRAFT OF THIS PAPER.

An Overview of the U.S. Competitiveness Debate

ABSTRACT

This paper provides an overview of the debate on U.S. competitiveness which has fostered a growing and disparate literature. The overview is not intended as a comprehensive literature review but rather to define what the competitiveness problem is and identify the principal causes of the U.S.'s supposed deteriorating competitiveness. The basic issue is the U.S.'s decline in relative productivity growth. It is argued that low investment due to low savings rates in the U.S. and the growing strength of other countries' R&D sectors are the most convincing explanations of this competitiveness problem. Recognition of the true source of the problem is important for policy: attempts to deal with the problem by using trade policies (particularly against Japan) will not correct the underlying competitive weakness of the U.S. economy.

INTRODUCTION

In recent years, there has been considerable attention paid to the performance of the U.S. economy, which has in large part been motivated by the huge U.S. trade deficit. Many commentators have subsequently raised the question of the competitiveness of the U.S. economy vis-à-vis its major trading partners. While recognizing the deficiencies of the U.S. economy, especially those factors giving rise to a real appreciation of the U.S. dollar in the early 1980s, there has also been considerable criticism directed at the practices of the U.S.'s competitors, particularly Japan and the EC, as a principal source of import penetration in the U.S. and the difficulty in selling U.S. goods abroad. The rise of the dollar and the policies of the U.S.'s major competitors, is seen as being reflected in spiraling trade deficits.

However, the link made between U.S. competitiveness and the trade deficit has been largely misguided. Notwithstanding the size and importance of the trade deficit, it does, *at best,* only serve as a symptom of the underlying competitiveness problem faced by the U.S. Furthermore, "competitiveness" has little to do with the trading policies of other countries per se. Rather, the problem of U.S. competitiveness is largely a result of the productivity slowdown that has been apparent in the U.S. over recent decades. Recognition of the source of the U.S. competitiveness problem is important, particularly with regard to the implications for policy. If, for example, U.S. deteriorating competitiveness is not due to unfair trading practices of other nations, then the aggressive trade policies that have been advocated in political and academic circles are largely unwarranted and can never be a first-best option in dealing with the competitiveness problem. However, if U.S. competitiveness largely reflects productivity performance, then the policy implications are likely to lie much closer to home.

This paper is organized in four sections. Section 1 considers the appropriate definition of competitiveness and considers some indicators of U.S. competitiveness. Section 2 considers the U.S. productivity slowdown both over time and relative to other countries. The potential causes of slow productivity growth are considered in Section 3 and Section 4 concludes.

1. Symptoms of the U.S. Competitiveness Problem

While there has been a profusion of literature, both popular and academic, on the problems facing the U.S. economy, it is difficult to find a useful definition of "competitiveness". This may be due to the fact that many commentators do not regard it necessary to make explicit an appropriate definition, perhaps because it is obvious, or because "competitiveness" means different things to different people. However, given the many potential dimensions of the competitiveness problem, as is apparent from the expanding literature, it is useful to have in mind a clear definition of the term from the start.

Three explicit definitions of "competitiveness" have been found in the literature. Fagerberg (1988) defines it as:

> "The ability of a country to realize central economic policy goals, especially growth in income and employment, without running into balance-of-payments difficulties." (p. 38)

In this vein, another definition of competitiveness is given by Hatsopolous, et al. (1988):

> "The proper test of competitiveness is not simply the ability of a country to balance its trade, but its ability to do so while achieving an acceptable rate of improvement in its standard of living ... we would not regard the United States as competitive unless it is able to maintain a rate of growth in living standards that keeps pace with that in the rest of the world." (p. 299)

From the business-school camp, Scott (1985) defines it as:

> "National competitiveness, refers to a nation's ability to produce, distribute and service goods in the international economy in competition with goods and services produced in other countries, and to do so in a way that earns a rising standard of living." (pp. 14-15)

It appears that when commentators attempt to define competitiveness explicitly, there is some consensus as to what it means. There are perhaps four points worth emphasizing with regard to these definitions. First of all, competitiveness is essentially about economic growth and the well-being of a country's citizens. Second, competitiveness is not specifically about market share issues, the profitability of businesses, returns on investment, etc., but how these aspects of performance relate to economic growth. Third, it is a long-run issue: growth, by definition, is a time-related issue such that the current allocation of resources in the economy will determine future standards of living. As McCulloch (1985) points out:

> "... some policies could increase market share ... but may achieve those results *at the expense of future gains* in production capacity, employment, and national well-being." (p. 143) [emphasis added]

Finally, there is a relative component to the competitiveness issue: a country should maintain a rate of increase in the standard of living at least comparable to other major industrialized countries. It should be remembered that the U.S., in absolute terms, remains the technological leader and that the standard of living in the U.S. is among the highest in the world.

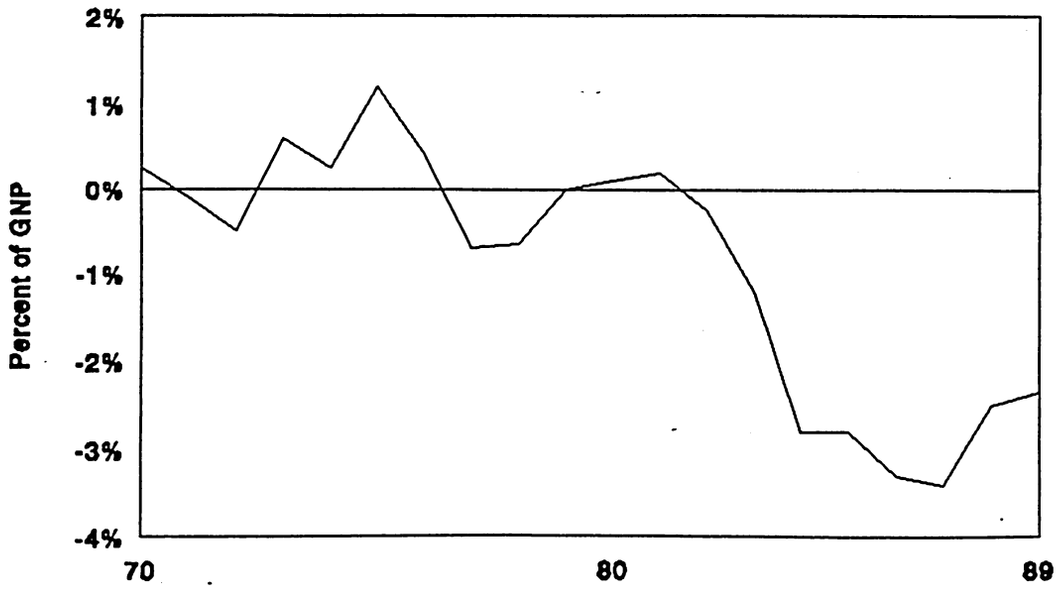
Armed with an appropriate definition of competitiveness, one can turn to indicators of the U.S.'s competitive position. While there may be many potential indicators of competitiveness—particularly at an industry level—three possibilities stand out at the macro

level: (i) the trade balance, (ii) relative wages, and (iii) relative prices. Each of these are briefly dealt with in turn.

(i) Trade Balance

The trade balance is a popular indicator of competitiveness, but its usefulness is highly questionable. The story of the U.S. trade deficit is now a common one. Historically, the U.S. has traditionally run small current account surpluses, with only temporary and rather small deficits. However, as Figure 1 shows, the U.S. faced a sustained trade deficit throughout the 1980s, at one point as high as 3.3 percent of GNP.[1]

Figure 1. U.S. Current Account, 1970-1989.

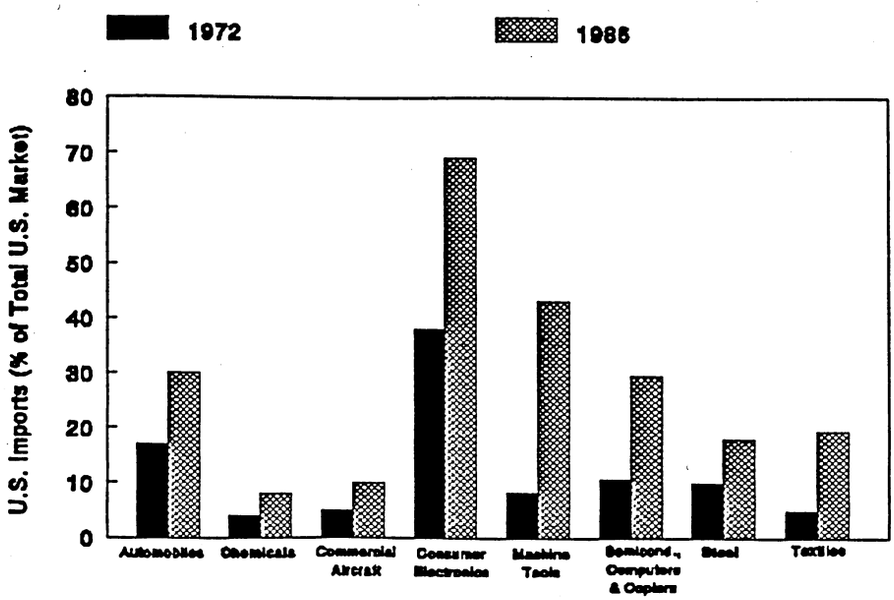


Source: Krugman (1990).

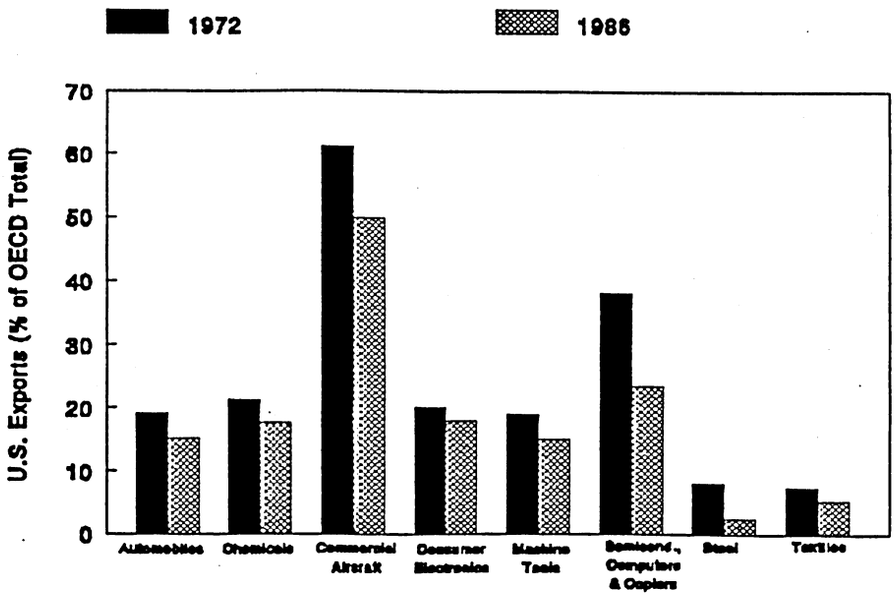
Much of this reflects (obviously) the poor U.S. export performance and the increase in import penetration into the U.S. Figure 2 shows the performance of U.S. exports and imports between 1972 and 1986 in key sectors of U.S. manufacturing. All industries show

Figure 2. U.S. Imports and Exports in Key Manufacturing Industries, 1972-1986.

(a) Imports



(b) Exports



Source: Dertouzos, et al. (1989).

the same trends to a greater or lesser extent: in all cases exports were relatively lower in 1986 than in 1972, while imports were substantially higher; import penetration being particularly high in consumer electronics, machine tools and automobiles.

While Figures 1 and 2 certainly show trends that are consistent with a competitiveness problem, it is highly questionable whether the trade balance is a useful indicator of U.S. competitiveness. It is generally accepted among economists that the trade deficit is a macroeconomic problem. The current account (CA) can be defined as the difference between savings and investment (both private and public) as given by:

$$CA = Sp + Sp_B - Ip - Ip_B$$

where:

Sp is private sector savings,

Sp_B is public sector savings,

Ip is private sector investment, and

Ip_B is public sector investment.

The difference between Sp_B and Ip_B is the public sector deficit (BD), so that:

$$CA = Sp - Ip + BD.$$

With low savings (see below), the growth in the U.S. budget deficit is reflected in a current account deficit. Of course, financial issues have an impact on trade as a result of the real appreciation in the dollar following the inflow of international capital in response to rising U.S. interest rates. Consequently, the trade deficit (while it may catch the pundit's eye) does not tell us very much about underlying competitive weakness or strength of the U.S.

economy. Furthermore, the inappropriateness of the trade deficit as an indicator of competitiveness is underlined by the fact that other indicators suggested competitive weakness throughout the 1970s even though the trade balance typically showed a surplus (see Figure 1). Consequently, a trade surplus is perfectly consistent with a deteriorating competitive position. However, while it has been common to use the trade balance as an indicator of the competitiveness problem, it is not necessarily the best indicator and it is not necessarily a useful one.

(ii) U.S. Wage Levels

One of the most popular and influential measures of competitiveness is growth in relative unit labor costs (Fagerberg, op cit.). Relative unit labor costs reflect costs such that if labor costs were relatively lower for country A vis-à-vis the rest-of-the-world, country A would therefore have a competitive advantage. Consequently, lower relative labor costs should be reflected in rising market shares (which, subsequently, given our definitions, should increase economic growth).

All this appears obvious. There is one basic problem, however: lower relative labor costs do not appear from empirical evidence to lead to rising market shares. This was first noted by Kaldor (1978) and is sometimes referred to as the "Kaldor paradox". Evidence which supports the "Kaldor paradox" is presented in Table 1, below. The data shows relative normalized unit labor costs for the U.S., Japan, and Germany for the period 1966-1985. Market shares for these countries are also shown. All three countries reject the common supposition that lower relative labor costs will lead to higher market shares. The "Kaldor paradox" apparently still holds.

What could explain the "Kaldor paradox"? First, it may be the case that manufacturing costs affect market shares with a lag of a year or more. Evidence to support this possibility can be found in Kravis and Lipsey (1982). Second, the direction of causality may be reversed. Hatsopolous, et al. (op cit.) argue that relative labor costs reflect a competitiveness problem since wages may have to fall in *response* to deteriorating market

Table 1.
Relative Labor Costs and Market Shares: U.S., Japan, and Germany (1966-1985).

	Relative Normalized Labor Costs	Market Share (World)
	Annual Percentage Change	
U.S.	-1.16	-1.72
Japan	2.18	5.04
Germany	1.72	0.62

Source: IMF Price Statistics (1987).

share in order to maintain a degree of competitiveness. This reverse causality would be consistent with the data in Table 1. Finally, consistent with this, other factors may explain changes in market share and competitiveness. Other possible factors are explored later in the paper.

(iii) Relative Prices

A final measure of competitiveness is relative prices. Relative prices, it is argued (Fagerberg, op cit.) will reflect cost and productivity differences between the home country and its major competitors. Clearly, by this reasoning, higher productivity growth and lower costs in the home country should lead to lower domestic prices relative to other countries

and, hence, an increase in market share. Therefore, a high and increasing relative price index will indicate a competitiveness problem for the home economy.

There are many difficulties in deriving such indices, particularly across a range of countries. However, Lipsey, et al. (1991) have undertaken painstaking work in constructing such price indices for a number of countries.[2] However, "Kaldor's paradox" emerges again: changing relative prices do not appear to be consistent with expected changes in market share. The evidence is presented in Table 2. For the U.S., even though the average annual percentage changes in relative prices for U.S. manufacturing goods has been negative, U.S. market share has fallen. Similarly, for Japan, relative prices have increased but market share has risen. Only for Germany are changes in relative prices consistent with expected changes in market share. Clearly, other factors must explain competitiveness.

Table 2.
Relative Prices for Manufacturing Goods and Market Share:
U.S., Japan, and Germany (1966-1985).

	Relative Prices	Market Share
	Annual Percentage Change	
U.S.	-1.66	-1.72
Japan	1.44	5.04
Germany	-0.80	0.62

Source: Lipsey, et al. (1991) and IMF Price Statistics (1987).

In sum, there are problems with conventional measures of competitiveness. The trade balance does not tell us very much and relative cost data, commonly used in competitiveness discussions, is not consistent with *a priori* expectations regarding changes in market shares.

2. The U.S. Productivity Problem

The definitions outlined above suggest that productivity growth is at the heart of the U.S. competitiveness problem; productivity growth is necessary for raising the standard of living. Furthermore, the decline in relative wages in the U.S. is consistent with low productivity growth in the U.S. relative to its main trading partners. This section reviews the evidence of a productivity slowdown in the U.S. over recent decades.

Productivity measures the relationship between outputs and inputs. If output increases by more than the increase in inputs, there has been an increase in productivity. The two most common measures of productivity are Total Factor Productivity (TFP) and labor productivity. TFP measures productivity growth accounting for all factors in the production process while labor productivity obviously refers to productivity growth related to a single factor (labor). Labor productivity is the most common measure when comparing productivity growth across countries.

Table 3 shows estimates of productivity growth in the U.S. using the TFP measure for a range of sectors between 1949 and 1985. Seven of the twelve sectors reported record a fall in TFP growth between 1949 and 1985. The sharpest declines were recorded for mining and construction, with the productivity slowdown being particularly marked in the 1974-85 sub-period. Five sectors show an overall decline in TFP growth over the whole period. Trends in labor productivity for the U.S. are shown in Table 4. Again there is evidence of a productivity slowdown in all three sectors identified with a particular sharp downturn in labor productivity growth in the period 1973-1979. The evidence also suggests that there has been an upturn in labor productivity growth in the 1980s.

Despite the apparent recovery in productivity growth in the 1980s, observers of U.S. productivity performance should not be complacent. As shown in Table 5, despite the recovery of labor productivity growth in the U.S. in the 1980s, U.S. performance has been considerably below that of other industrial countries.

Table 3.
Estimates of Total Factor Productivity:
Average Annual Rates of Growth (in percent) in the U.S., by Sectors and Periods.

	Periods		
Sector	1949-1966	1967-1973	1974-1985
Total Private Industry	1.3	0.4	0.1
Agriculture, Forestry, &	-1.8	0.1	1.4
Fisheries	0.5	1.9	-4.3
Mining	1.7	-5.1	-1.1
Construction	2.0	1.8	1.4
Manufacturing	1.0	1.6	0.1
Transportation	2.7	3.0	2.3
Communication	3.7	2.4	1.2
Utilities	0.8	0.8	-0.5
Wholesale Trade	0.6	-0.0	-0.4
Retail Trade	-0.3	-0.9	-0.6
Finance, Insurance, etc.	-0.6	-0.2	0.1
Services			

Source: Griliches (1988).

Table 4. Labor Productivity Growth in the U.S., 1948-1986.

	Output Per Hour of Labor			
Sector	1948-1965	1965-1973	1973-1979	1979-1986
Business Sector	3.25	2.14	0.61	1.40
Nonfarm Business	2.70	1.83	0.48	1.16
Sector	2.92	2.48	1.37	3.42
Manufacturing Sector				

Source: Baily and Chakrabarti (1988).

Table 5 shows comparative labor productivity performance among the U.S.'s major competitors. There are two points that are apparent from the table. First, all industrial countries recorded a productivity slowdown in the 1970s, though the U.S. recorded the lowest growth for all five countries considered. Second, although there has been some recovery in U.S. labor productivity growth in the 1980s, U.S. performance still lags behind that of other countries with the exception of Germany. Thus, the productivity problem facing the U.S. is not just that it has performed poorly in productivity terms in the 1970s but that it has also performed poorly relative to other industrial countries over the post-war period.

Table 5.
Labor Productivity in Five Industrialized Countries, 1950-1986 (Average Percentage Change).

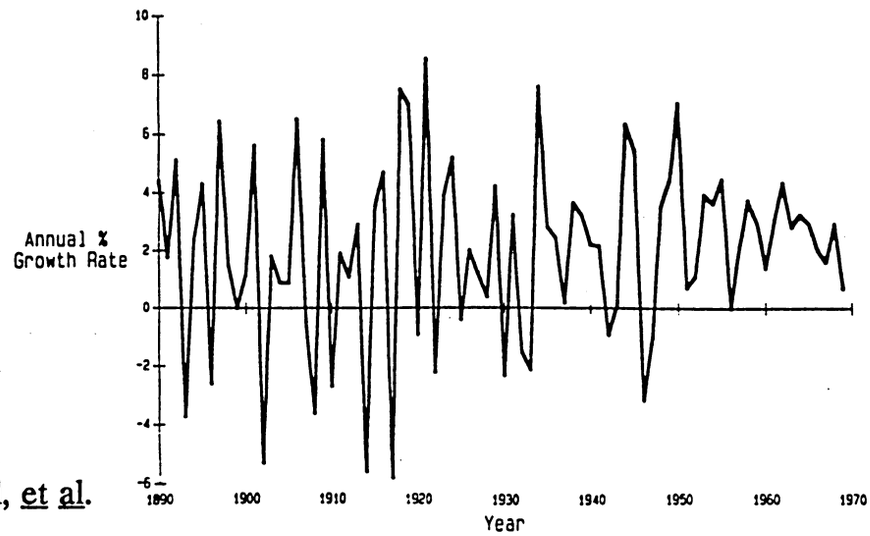
Period	France	Germany	Japan	Britain	United States
		Growth of GDP per hour worked			
1950-73	5.01	5.83	7.41	3.15	2.44
1973-79	3.83	3.91	3.40	2.18	0.80
1979-84	3.24	1.88	3.06	2.95	1.09
		Growth of manufacturing output per hour			
1950-73	5.63	6.31	9.48	3.25	2.62
1973-79	4.90	4.22	5.39	1.15	1.37
1979-86	3.50	2.78	5.46	4.28	3.10

Source: Baily and Chakrabarti (1988).

Though data sources differ, as does the extent of the measured slowdown between various studies, the data presented above provide much of the evidence that has been used

in the literature in identifying the productivity and hence competitiveness problem facing the U.S. However, two qualifications can be made with regard to the evidence. First, Baumol, et al. (1989) have argued that the productivity problem facing the U.S. has been overstated. Their principal point is that when one looks at the long-run evidence, it is not clear whether recent U.S. productivity performance is any different from the historical norm. This point can be succinctly stated with reference to Figure 3. If one looks at U.S. productivity growth between 1890 and 1970, it is evident that no distinct trend is discernible. Thus, the fairly recent slowdown (i.e., 1970 onwards) is not really any different from U.S. productivity performance in the earlier part of the century. Nevertheless, Baumol, et al. admit that, while the U.S. economy is not in crisis, there is cause for concern.

Figure 3. U.S. Annual Growth Rate, Total Factor Productivity, 1884-1969.

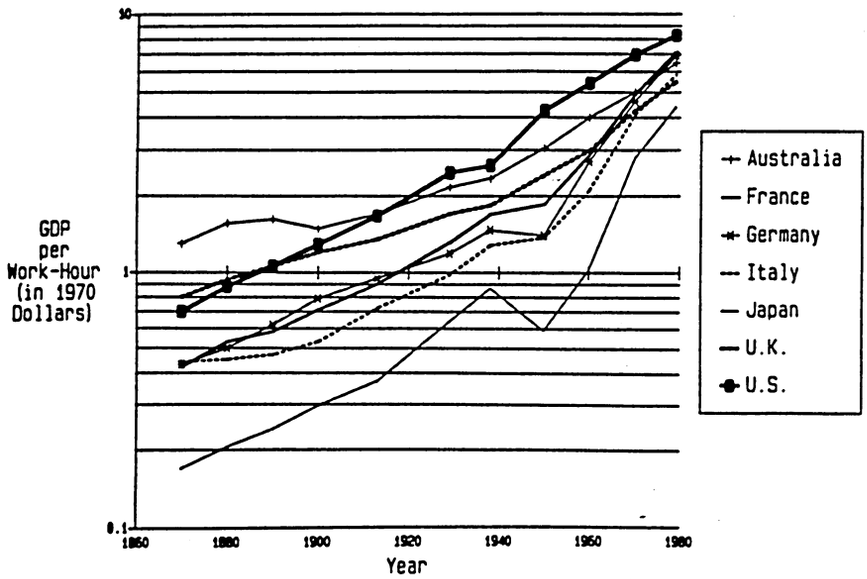


Source: Baumol, et al.

The second qualification relates to U.S. performance vis-à-vis other countries. Again, Baumol, et al. object to the interpretation in much of the literature; they argue that the U.S.'s relatively weaker performance is due to other countries catching-up on U.S. productivity leadership. Thus, since the U.S. has historically been the technological leader, other countries have incorporated U.S. technology into their own practices. Therefore,

convergence in productivity levels is both to be expected and desirable. Evidence of such convergence is shown in Figure 4; growth in labor productivity for seven countries between 1860 and 1980. There is evidence of convergence in productivity growth rates, particularly by Japan and Germany in the post-war period, though the U.S. retains its leadership in absolute productivity levels. Quantitative evidence from Helliwell and Chung (1991) also confirms the convergence process although this conclusion has been disputed by deLong (1987) who argues that support for convergence arises only because of sample selection bias.

Figure 4. Labor Productivity (GDP/Work Hours), Seven Leading Industrial Countries, 1870-1979.



Source: Baumol, et al. (1989).

Despite Baumol, et al's qualifications in interpreting the data, most commentators agree that there has been a considerable slowdown in productivity growth in the U.S. since the 1970s, particularly when compared with other countries. It is this fairly recent productivity slowdown which is at the heart of the competitiveness problem faced by the U.S. However,

while there is broad agreement that there has been a productivity problem in recent years, there is less consensus on what caused it. The potential causes are discussed in the following section.

3. Causes of the Productivity Slowdown

The reasons cited in the literature for the productivity slowdown are seemingly endless. They include: too little investment; cut-back in R&D activity; poor management practices; trade union activity; slow innovation; the energy crisis; the composition of output; the composition of the labor force; inadequate educational system; government regulations regarding pollution; obsolescent capital stock; and so on. Given the variety of causes to select from, we shall focus here on the most popular (and perhaps most convincing) of the reasons purporting to explain the U.S.'s competitiveness problem.

Some respected commentators have argued that the 1970s energy crisis is the principal cause of the productivity slowdown. Among those advocating this view are Griliches (1988) and Jorgensen (1988). There are perhaps two reasons why Griliches and Jorgensen focus on the energy crisis: (i) the productivity slowdown affected all sectors and all countries, and (ii) the timing for the productivity slowdown is consistent with the productivity slump.

The energy crisis factor is indeed a difficult one to dismiss. If one refers back to Tables 4 and 5, one indeed finds that the sharpest slowdown in productivity growth occurred in the wake of the energy crisis. Further, it did appear to affect all countries simultaneously. However, there are several reason to dispute the energy crisis factor. First, the productivity slowdown in other countries was not as sharp as in the U.S., and recovery was quicker,

despite the fact that other countries are more dependent on imported energy than the U.S. Japan, in particular, stands out in this regard. Second, energy as a proportion of costs is deemed to be fairly low; Denison (1979) argues that the value of energy used in the nonresidential business sector is less than 4 percent of the total value of the factor inputs in the entire economy. Further, though one would expect high energy prices to lead to input substitution, the observed variations in energy-output ratios were very small between 1973 and 1979 despite the high energy prices (see Baumol and McLennan, p. 42). Hence, energy prices, despite the convenience of timing, perhaps do not provide a full explanation of the productivity slowdown.

Research and development is an obvious factor to receive attention in the slowdown story. Much of this has to do with earlier work by Solow (1957) who, when pioneering growth-accounting techniques, suggested that about half of measured growth was explained by unobservable factors. This became known as the "Solow-residual" and was identified with technological change. Clearly, since technological change is seen to be so important in growth accounting models, it seems an obvious source in explaining productivity slowdown in the U.S.[3]

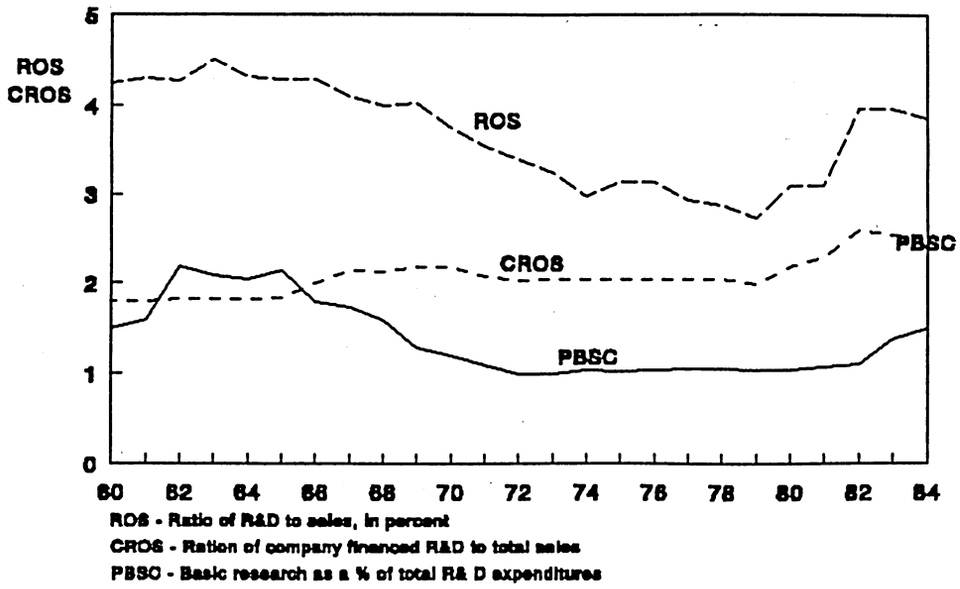
There are two means by which there could be an R&D slowdown: first, the U.S. may have reached the "technological frontier" and, second, entrepreneurs may not find it profitable to increase R&D activity. The first point is hard to justify. There is no apparent evidence in the age of electronics and computers that scientists have reached the technological frontier although, admittedly, it may be difficult to prove that the rate of new discoveries is not slowing down. Nordhaus (1982), however, favors the technological

boundary explanation. The second point relates to the wedge between private and social returns to R&D activity. Private and social returns to R&D investment can arise due to the failure of the private investor to appropriate all the gains from investment. This can occur, for example, due to spillovers when competitive firms can reverse engineer a product or when key personnel leave the innovating company. There have been some estimates made of the difference between private and social returns. Mansfield (1986) estimates that the social return to R&D is 56 percent while the private rate is around 25 percent. Other studies have found a similar, and sometimes higher, magnitude of divergence (Baily and Chakrabarti, 1986). Clearly, the extent of spillovers may limit the extent to which entrepreneurs invest in R&D.

While there is some logic for addressing R&D as causing the U.S. productivity slowdown, it is not a convincing explanation. The reason for this is simply that there has not been a recorded significant slowdown in R&D expenditure in recent years. R&D expenditure in the U.S. between 1960 and 1984 is shown in Figure 5. The evidence suggests that, although the ratio of R&D to sales did decline in the 1970s, this was not true of other measures of R&D activity. Further, Griliches argues that since the declining trend was weak, and since it takes some time for R&D to be incorporated in industrial practices, the R&D story is another "nonexplanation" of the productivity slowdown.

However, as discussed above, to a considerable extent, competitiveness is a relative issue and it may be the case that the U.S.'s problems arise because other countries have devoted greater effort to R&D. Figure 6 shows spending on R&D as a percentage of GNP in the main industrialized countries. The U.S. has, over the period, remained near the top of the

Figure 5. R&D Expenditures in U.S. Industry, 1960-1984.



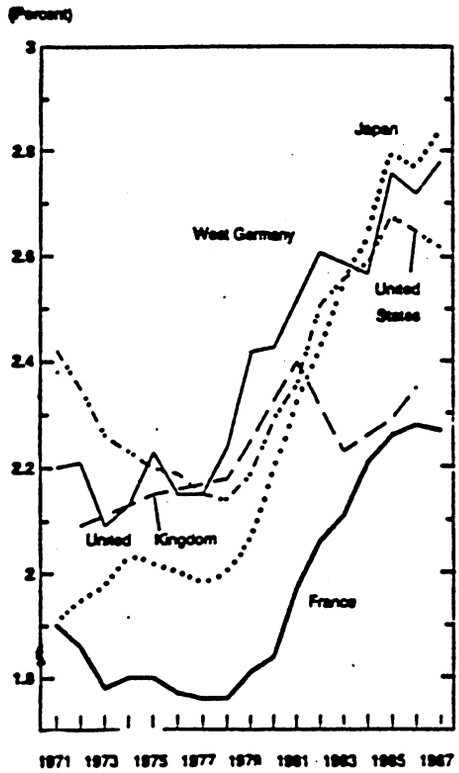
Source: Griliches (1988).

R&D spending league though Japan and Germany have spent more on R&D as a percentage of GNP in the 1980s with Germany outspending the U.S. since the late 1970s. However, what is also of interest from the figures are the large changes in resources (as a percentage of GNP) devoted to R&D in Germany and Japan.

Perhaps even more revealing is the nature of R&D activities on which resources are spent. One of the main recipients of R&D expenditure in the U.S. has been the defense sector, which leaves a smaller amount for commercial R&D. In contrast, most, if not all, R&D expenditure in Germany and Japan is on commercial activities, which is highlighted in Figure 7.

While R&D expenditure in the U.S. may not show a (significant) deteriorating trend,

Figure 6. R&D Expenditures as a Percentage of GNP, by Country.

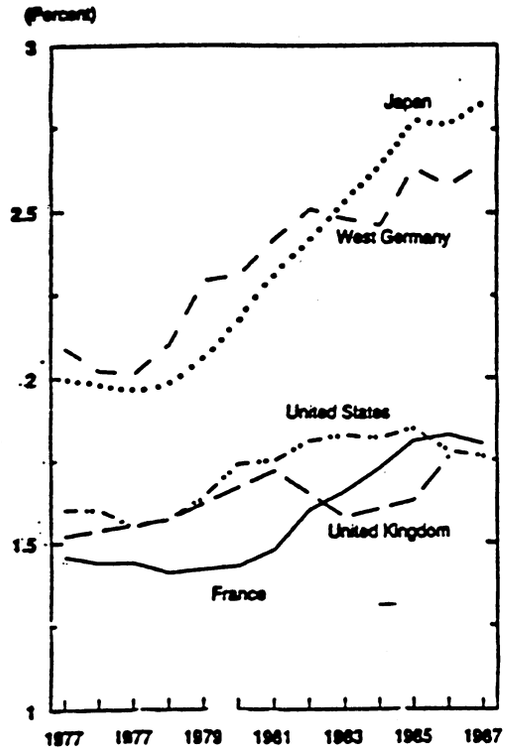


Source: National Science Foundation, 1989.

it may nevertheless be the case that the results of R&D expenditure may not have been adopted by U.S. industry no matter the overall level of R&D activity. This is the case argued by Baily and Chakrabarti who suggest that slow innovation (i.e., the rate of adoption of new technologies) has been the principal cause of the productivity problem in the U.S. Through a series of case studies, they argue that U.S. industry has consistently failed to take advantage of new technologies that were readily available. Hence, the fault lies not with inadequate R&D, but with inadequate innovative activity to take advantage of available technological improvements.

This takes us to the third and perhaps most convincing reason for the productivity

Figure 7. Nondefense R&D as a Percentage of GNP, by Selected Countries (1977-1987).



Source: National Science Foundation, 1989.

slowdown in the U.S.: low investment. Investment here can be interpreted broadly to include not only capital but also capital-embodied technical change. The role of capital investment in explaining the U.S. productivity problem is underlined by important recent evidence from Jorgensen (1990) which suggests a greater role for capital accumulation in productivity growth than had previously been thought. Table 6 shows Jorgensen's evidence on the role of different factors in explaining U.S. productivity growth since 1947. This shows that capital accumulation accounted for 47 percent of growth of productivity between 1947 and 1985, with a smaller role for exogenous technical change than had previously been assumed.

Table 6. Contributions to U.S. Productivity Growth, 1947-1985.

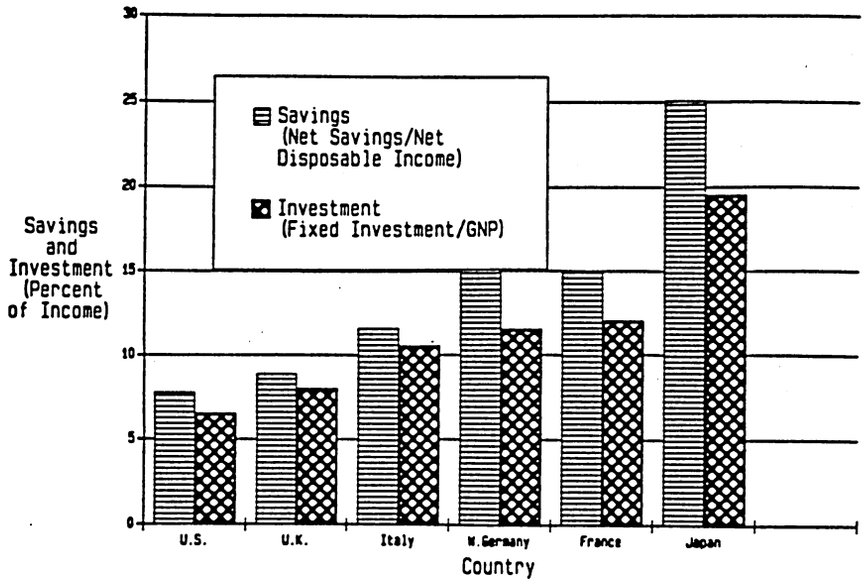
Contributions to Productivity Growth	1947-1985 Average Annual Rate	1947-1985 Percentage of Total	1979-1985 Average Annual Rate	1979-1985 Percentage of Total
Growth Rate	2.10	100	1.05	100
Labor-Labor	0.39	19	0.29	28
Capital-Capital	0.58	28	0.31	30
Capital-Labor	0.41	19	0.14	13
R&D	0.25	12	0.25	24
Residual	0.46	22	0.06	6

Source: Jorgensen (1990).

Is there evidence that investment in the U.S. is lower than its competitors? The answer is yes, particularly if one compares investment expenditure in the U.S. with Japan. Figure 8 shows investment in fixed capital investment (excluding residential construction) in the major industrial countries between 1970 and 1980. Taking the period as a whole, U.S. investment was lower than all its major competitors. However, more startling are the very high rates of investment in Japan which were almost three times the investment rate of the U.S. Such investment rates will lead to lower productivity growth in the U.S., particularly if capital is deemed to embody technical change.

Clearly the low rates of investment in the U.S. require an explanation as do the high rates of investment in Japan. The principal reason for such divergences in investment rates has its source in the relative costs of capital between countries. There are many difficulties in comparing the costs of capital between countries, particularly when private firms raise

Figure 8. Savings and Investment Rates, Six Industrialized Countries, 1970-1980.



Source: Baumol, et al. (1989).

finance—to varying degrees—from equity or debt, the cost of capital depending on the source of finance. Further difficulties arise due to differences in tax laws between countries; also, depreciation has to be accounted for.[4]

Nevertheless, there have been some recent studies on the cost of capital, particularly in Japan and the U.S. Evidence from a study by Ando and Auerbach (1987) is shown in Table 7. What they find is that the cost of capital in Japan is consistently lower than that in the U.S., with capital being on average twice as expensive in the U.S. However, the average figure masks some wide divergences in particular years with capital being sometimes 5 to 6 times more expensive in the U.S. relative to that in Japan.

The relatively high cost of capital in the U.S. not only leads to lower investment but also to short-termism, a further reason cited for the productivity slowdown. Hatsopolous, et al. argue, perhaps against conventional wisdom, that short-termism is a rational reaction by management to the high cost of capital since it forces them to look for highly profitable but short-term opportunities rather than investing in projects with a long-term payback. Thus, the recent wave of takeover activity in the 1980s has involved the takeover of firms that were deemed to be investing too much rather than too little, *given* the cost of capital in the U.S.

What explains the high cost of capital in the U.S. and, likewise, the relatively lower cost of capital in Japan? The answer is to be found mainly in different savings rates between the two countries, although high public sector demand and capital market imperfections are also contributing factors. The U.S. has a comparatively low savings ratio (which, of course, links to the trade balance problem mentioned earlier) while Japan has a high savings ratio (though this has not always been so). Evidence on comparative savings and investment rates across various industrial countries is shown in Figure 8. There are two main points to be gleaned from Figure 8. First, relative to all major competitors, the U.S. has the lowest savings ratio while Japan has the highest. Japanese savings rates are more than three times that of the U.S. Second, high savings rates are associated with high investment rates; Japan, again, recording investment around three times higher than that of the U.S.

Though there are perhaps many other reasons for the productivity slowdown in the U.S., the U.S. record on investment seems to stand as the most convincing explanation. Further,

Table 7. Costs of Capital in U.S. and Japan.

	Returns to Capital After Tax	
Year	U.S.	Japan
1967	.053	.037
1968	.042	.050
1969	.037	.048
1970	.037	.040
1971	.040	.044
1972	.040	.037
1973	.042	.007
1974	.049	.031
1975	.057	.007
1976	.062	.008
1977	.060	.012
1978	.073	.013
1979	.090	.021
1980	.080	.030
1981	.061	.038
1982	.052	.034
1983	.066	.038
1984	.062	NA
Average	.056	.025

Source: Ando and Auerbach (1987).

the increasing importance of R&D in competitor countries (specifically Japan and Germany) also contributes to the U.S.'s relative decline. However, all said, the true explanation of the U.S.'s productivity slowdown and hence its weakening competitiveness probably does not lie in one sole cause. The productivity slowdown is probably due to a combination of a large number of factors.

4.) Conclusion

This paper has reviewed some of the main aspects of the U.S.'s competitiveness problem. The important point is that the trade deficit is not the root of the competitiveness problem for the U.S. but rather that it is the slowdown in productivity growth. While there have been many studies on the productivity slowdown in recent years—and as many reasons that purport to explain it—the most convincing explanation for the productivity slowdown is low investment, broadly defined. Further, the increasing success of competitor countries' high-technology sectors also contributes to the U.S.'s relative decline.

Despite the apparent weaknesses in the U.S. economy, a basic question remains. What is really at stake in the competitiveness debate? We have seen that the U.S. suffers from a productivity problem, both relatively and absolutely. Yet traditional trade theory tells us that governments should not be particularly concerned (barring adjustment costs) since what is important is comparative, not absolute, advantage. Thus, the U.S. is not like a business (contrary to the way some people think about the competitiveness problem) since, unlike a business, the U.S. cannot go bankrupt. If competitiveness is a concern, therefore, it must have something to do with an ideal mix of industries and that some industries are more important than others. As McCulloch points out:

> "Many concerns about competitiveness are actually concerns about changes in the composition of output relative to some unspecified ideal." (p. 242)

Recognition of what competitiveness is and what has caused the competitive weakness of the U.S. economy is important for identifying the appropriate policy response. However, given our explicit definitions of competitiveness and the principal sources of concern, the question remains whether traditional trade theory can shed light on appropriate policy

choices. As far as traditional theory is concerned, competitiveness is largely a non-issue; however, this is unlikely to appease businessmen, politicians, and the public alike.

FOOTNOTES

1. Krugman (1990) argues that concern over the trade deficit has been largely overstated since it accounts for only a small proportion of U.S. GNP.

2. In constructing these indices, Lipsey, et al. (1991) exclude the agricultural and food sectors, presumably because the extent of government intervention in these sectors would render such price indices meaningless.

3. More recent growth-accounting exercises have lowered the magnitude of the "Solow-residual" (Grossman and Helpman, 1991).

4. It has been suggested that the market price of capital equipment is cheaper in the U.S. than in Japan. However, even accounting for this, Japanese investment is still considerably higher than that in the U.S. or in other countries. See Baumol, et al. (1989) for a discussion.

REFERENCES

Ando, A. and A.J. Auerbach (1987). "The Cost of Capital in the U.S. and Japan: A Comparison," NBER Working Paper No. 26.

Baily, M.N. and A.K. Chakrabarti (1988). Innovation and the Productivity Crisis. Washington, DC: Brookings.

Baumol, W.J., S.A.B. Blackman, and E.N. Wolff (1989). Productivity and American Leadership. Cambridge, MA: MIT Press.

Baumol, W.J. and K. McLennan (eds.), (1985). Productivity Growth and U.S. Competitiveness. Oxford: Oxford University Press.

deLong, B. (1987). "Have Productivity Levels Converged? Productivity Growth, Convergence, and Welfare in the Very Long Run," NBER Working Paper No. 2419.

Denison, E.F. (1979). "Explanations of Declining Productivity Growth," Survey of Current Business 59, No. 8, Part 2.

Dertouzos, M.L., R.K. Lester, and R.M. Solow (1989). Made in America: Regaining the Competitive Edge. Cambridge, MA: MIT Press.

Fagerberg, J. (1988). "International Competitiveness," Economic Journal, Vol. 98, 355-74.

Griliches, Z. (1988). "Productivity Puzzles and R&D: Another Nonexplanation," Journal of Economic Perspectives, Vol. 2, No. 4, 9-23.

Grossman, G. and E. Helpman (1991). Innovation and Growth in the Global Economy. Cambridge, MA: MIT.

Hatsopolous, G.N., P.R. Krugman, and L.H. Summers (1988). "U.S. Competitiveness: Beyond the Trade Deficit," Science July, 299-307.

Helliwell, J.F. and A. Chung (1991). "Macroeconomic Convergence: International Transmission of Growth and Technical Progress," in P. Hooper and J.D. Richardson (eds.), International Economic Transactions: Issues in Measurement and Empirical Research. Chicago: NBER.

Jorgensen, D. (1988). "Productivity and Post-War U.S. Economic Growth," Journal of Economic Perspectives, Vol. 2, No. 4, 23-43.

Jorgensen, D. (1990). "Comments," Brookings Papers on Economic Activity.

Kaldor, N. (1978). "The Effect of Devaluations on Trade in Manufactures," in Further Essays in Applied Economics. London: Duckworth.

Kravis, I.B. and R.E. Lipsey (1982). "Prices and Market Shares in the International Machinery Trade," Review of Economics and Statistics Vol. 64, No. 1, 110-16.

Krugman, P.R. (1990). The Age of Diminished Expectations. Cambridge, MA: MIT.

Lipsey, R.E., L. Molinari, and I.B. Kravis (1991). "Measures of Prices and Price Competitiveness in International Trade in Manufactured Goods," in P. Hooper and J.D. Richardson (eds.), International Economic Transactions: Issues in Measurement and Empirical Research. Chicago: NBER.

Mansfield, E. (1986). "Microeconomics of Technological Innovation," in R. Landau and N. Rosenberg (eds.), The Positive Sum Game: Harnessing Technology for Economic Growth. Washington, DC: National Academic Press.

McCulloch, R. (1985). "Trade Deficits and International Competitiveness," California Management Review, Vol. 27, 140-57.

National Science Foundation (1987). Science and Engineering Indicators - 1987. Washington, D.C.

Nordhaus, W.D. (1982). "Economic Policy in the Face of Declining Productivity Growth," European Economic Review, Vol. 18, 131-57.

Scott, B.R. (1985). "U.S. Competitiveness: Concepts, Performance, and Implications," in B.R. Scott and G.C. Lodge (eds.), U.S. Competitiveness in the World Economy. Boston, MA: Harvard Business School Press.

Solow, R .M. (1957). "Technical Change and the Aggregate Production Function," Review of Economics and Statistics 30, 312-320.

This material is based in part on work supported by the U.S. Department of Agriculture, Cooperative State Research Service, under Agreement No. 89-34210-04238 and successor(s).

Additional information on NC-194 and a complete list of project publications can be obtained from:

Executive Director, NC-194
Department of Agricultural Economics
The Ohio State University
2120 Fyffe Road
Columbus, Ohio 43210-1099
(614)292-2194