Articles

Is There a U.S. Productivity Crisis?

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Long-term data on U.S. productivity growth show its enormous contribution to U.S. living standards but do not confirm fears that the country is losing its manufacturing jobs to other countries. Growth in U.S. manufacturing productivity shows no downward trend; the U.S. share of world manufacturing employment is rising and, although the share of U.S. service sector jobs has increased, that in Japan has risen three times as quickly. The threats to U.S. productivity growth are mostly shorter term, for example, the federal deficit that absorbs savings which would otherwise be used to modernize and expand plant and equipment.

A NEAR FLOOD OF WRITINGS TELL THE AMERICAN PUBLIC that the United States teeters on the brink of economic mediocrity, its competitive position about to be lost to Japan, to the other miracle economies of the Far East, and even to the venerable industrial economies of Europe. Declining U.S. productivity growth coupled with the distinctly higher growth rates of its rivals, both of which are very real, are generally cited as the prime reasons for this prospect. The trends are said to portend a future in which the United States suffers chronic and apparently incurable deficits in its trade balance because its manufactured products will be unable to compete with those of foreigners. As a result, the country will either be forced to bear heavy unemployment or to see its labor force driven into service sector jobs at low pay, thus transforming the nation into a "service economy" in which people earn their living by flipping one another's hamburgers and washing up the dishes.

Though there are legitimate grounds for concern about these issues, the facts show that matters are not quite so ominous. The available figures show that, taken as a whole, the economy has pretty well held its own both over the course of a century and even during the period after World War II. During the last two decades U.S. productivity growth and investment in plant and equipment have indeed slowed, but so have those of its industrial rivals (*1*).

Productivity does, indeed, emerge as the key to what we have achieved in the past and what we can hope for the future, but its role is rather different from that in the scenario above—the "deindustrialization thesis." As we will see, productivity growth can provide miracles in the long run and already has yielded improvements in living standards unimaginable at any time in human history before the 19th century. It will determine U.S. living standards for the day after tomorrow, both absolute and relative, and, if all goes well, provide the resources needed to protect the environment, to meet demands for improved education and health care, and to fight poverty. But, in the long run, contrary to what common sense would appear to suggest, the economy's productivity record is not responsible for a country's trade deficit or surplus or its unemployment rate. Even if a nation's productivity record is very poor, its trade deficit will ultimately cure itself—though the cure will indeed be worse than the disease.

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Productivity: What It Is and What It Does

Productivity is a measure of the output that is produced per unit of input. Labor productivity, the measure most commonly used for an economy, an industry, or a firm, may be calculated as the total market value of all goods and services produced, divided by the number of labor hours that went into the production process. Clearly, the greater the economy's productivity level the more goods and services it can provide for each hour of labor, that is, the higher its living standards can be. But, while an efficient and well-educated labor force can obviously contribute to labor productivity, other things also matter. For example, if an economy invests large quantities of resources in its production processes, each worker will have more and better equipment and that, too, will enhance labor productivity. To evaluate the contribution of all the pertinent inputs rather than that of labor alone, one uses the measure called "multifactor productivity," which can be defined as the market value of total output divided by the market value of all pertinent inputs (though measures that are more complex and sophisticated are often used instead).

To recognize what miracles productivity can accomplish we need a bit of history. Until well into the Industrial Revolution growth in the level of productivity was incredibly slow by modern standards. In Europe, at least outside Byzantium, the productivity level probably declined precipitately after the fall of the Roman Empire and then rose at a crawl after the 10th century. It is estimated that at the time of the American Revolution, England had barely reattained the productivity level of Rome in the third century A.D. Even during the first half century of the ensuing Industrial Revolution, it has been calculated that British productivity rose only about 0.3 percent per year, or roughly one-tenth of the average growth rate of productivity in the Third World during the 1970's (*2*). But then, as the wave of innovation spread from textiles and a few other activities to which it had, at first, largely been confined, productivity growth really began to take off.

According to Maddison (*3*), in the 110 years from 1870 to 1979 U.S. output per work-hour increased by an astonishing 1100 percent. This was enough to permit the average number of hours worked per year to fall by some 40 percent while per capita output increased eightfold. To dramatize what such an explosion in living standards means we note that this implies that American per capita income in 1870 was about the same as that in the Philippines or

Table 1. Share of labor force in the services, 1965 to 1980 (*4*).

Country	1980 (%)	1965–80 (% increase)	Country	1980 (%)	1965–80 (% increase)
Spain	46	43.8	Netherlands	63	26.0
Italy	48	41.2	Denmark	61	24.5
Austria	50	38.9	West Germany	50	19.0
Sweden	62	34.8	United Kingdom	59	18.0
Switzerland	55	34.1	Australia	61	17.3
Japan	55	31.0	Ireland	48	17.1
France	56	30.2	Canada	65	14.0
Finland	53	29.3	United States	66	10.0
Norway	62	29.2	New Zealand	56	9.8
Belgium	61	27.1			

Egypt today. It means that our ancestors spent well over 90 percent of their incomes on food, clothing, and shelter, that vacations were virtually unknown, that the typical meal consisted of a "one-pot stew," shared by the entire family, and that home heating was so primitive that ink wells routinely froze in winter. Productivity has also exploded in agriculture. As late as the 17th century, when some 90 percent of the European work force was engaged in agriculture, outputs were still so small that regular famines, with widespread death by starvation, continued to be common. Today, the highly agricultural United States employs only 3 percent of its labor force in the production of its farm outputs, usually providing a considerable overabundance. These few representative observations tell us, first, that today's productivity growth rates cannot be taken for granted. Rather, they represent what may be a freak phenomenon unduplicated in earlier history. Second, they indicate that those growth rates have brought us prosperity previously undreamed of. If productivity growth slows materially, the improvements in our economic status must also level off. Productivity does, indeed, matter.

Those Industrialized Service Economies

What has been shown so far is that the role of productivity growth may, in critical respects, be undervalued in popular discussions. But there are other things that are incorrectly attributed to it. The "service economy" or "deindustrialization" thesis is a clear example. The story, oversimplified, asserts that slow productivity growth in manufacturing sharply decreases the sale of U.S. industrial products abroad. Consequently, our workers are driven out of manufacturing and forced to turn to service-sector jobs as others steal our industrial markets away.

The data, at first glance, seem to confirm this. Between 1965 and 1980 the share of the U.S. labor force engaged in industry fell about 11 percent, whereas that in the services rose 10 percent, just as the deindustrialization thesis asserts. But, as shown in Table 1 (*4*), the story breaks down when we seek to identify the countries that have supposedly stolen our industrial markets. The table, which reports statistics provided by the Organization for Economic Cooperation and Development (OECD), the organization of the world's leading industrial free-market economies, shows that every such country other than New Zealand has increased the share of its labor force in the services by a greater percentage than ours. If America's 10 percent rise in share of employment in the services represents a move toward a "service economy," what are we to make of the 19 percent rise in Germany, the 30 percent increase in France, and the 31 percent increase in Japan? Which country is it that has been permitted to become an industrial economy by the increase in the share of U.S. employment devoted to the services? Or are all industrial nations becoming service economies and, if so, why?

It turns out that there is a straightforward answer in which productivity does play a key role, but it is very different from the deindustrialization parable. The simple explanation is that throughout the industrial world, as any knowledgeable observer would expect, productivity in manufacturing has grown considerably faster than it has in a large group of services. For example, productivity in automobile manufacturing has grown far faster than that of selling real estate. This means that, though manufacturing outputs have grown, less and less of each nation's labor force has been needed to produce them. That is, with fewer labor hours needed to produce each unit of industrial product (each car), a relatively declining number of jobs has been provided in that economic sector. Moreover, after correction for inflation in the prices of services and manufactures, it turns out that the ratio of the outputs of the manufacturing and service sectors of the industrial economies has remained roughly unchanged over the years while the unemployment rate has shown no long-term upward trend. With manufacturing taking a declining share of the labor force and unemployment not rising, those workers displaced from manufacturing or the new workers entering the labor force who could not be absorbed by that sector have had to move elsewhere. The services with slow productivity growth have provided the necessary jobs.

A hypothetical example makes the point clear. If, over a period of time when productivity in automobile manufacturing doubled, automobile sales rose only 50 percent, there must have been a 25 percent reduction in the number of workers employed in that industry. But, if at the same time productivity in the real estate industry stayed still, while sales volume rose 50 percent, this industry must need 50 percent more workers than before, and so it will have been put into a position to absorb some of the workers released by the automobile industry. Thus, with both industries expanding their outputs in exactly the same proportion, some labor must shift out of the auto industry with its high productivity growth and some must shift into real estate with its stagnant productivity. This is the true sense in which all the industrial nations are becoming service economies. The share of their outputs constituted by manufactures has generally not fallen, but the share of employment in the service sector has risen universally.

The United States is not alone here, and its service employment record is not attributable to lack of competitiveness of its manufactures. On the contrary, between 1962 and 1984, years for which data are available, the U.S. share of the total industrial employment of the world's 24 most industrialized economies actually increased about 20 percent. That is hardly a picture of faltering competitiveness in our manufacturing sector.

Productivity Growth in U.S. Manufacturing

It is true that there has been a slowdown in American productivity growth, particularly after about 1965. But this, too, is a universal phenomenon in the industrial world, probably attributable in good part to the exhaustion of the opportunities for spectacular productivity gains that had accumulated during the Great Depression and World War II. As a result, productivity growth in every industrial economy for which figures are readily available declined during the 1970's, with the percentage drop for Japan almost identical with that of the United States.

More than that. At least in the United States, except for relatively brief periods, the decline has occurred in sectors of the economy other than manufacturing (notably in mining, construction, and a variety of services). As is shown in Fig. 1, which covers the entire

period after World War II, the growth rate of productivity in U.S. manufacturing has had sharp rises and declines, but its trend over the period as a whole has actually been slightly upward (*5*).

Is Productivity in Other Countries Growing Faster Than Ours?

Still, it is true that productivity in almost every major industrial country has recently been growing faster than that of the United States. Since 1880, except in wartime, the United States has been outperformed by at least five countries in every period. In the period after World War II, the number of countries whose labor productivity growth rate was greater than ours has probably been on the order of 15 or 20. Those facts are, with good reason, disquieting. But, even here, there is a significant sense in which, even in terms of relative productivity growth, U.S. performance has been and continues to be creditable. To see why this is so, we must digress briefly to consider some international technological relationships and their implications for the relative productivity performance of the industrial free-market economies.

Technology transfer, which throughout history has enabled the world to benefit from advances in knowledge originating in any particular nation, has become a way of life in the industrialized economies. Japan learns from us and we learn from Japan. Obviously, France, Italy, West Germany, and many others all act similarly. The result has been a remarkable convergence in productivity levels (Fig. 2) (*3*, table C10) and per capita gross national product (GNP) in those countries. The range of labor productivity levels among the 16 leading industrial economies studied by Maddison (*3*) is estimated to have fallen from 8 to 1 in 1870, to 2 to 1 in 1979—that is, the range of their productivity levels is now 75 percent narrower than it was 110 years earlier.

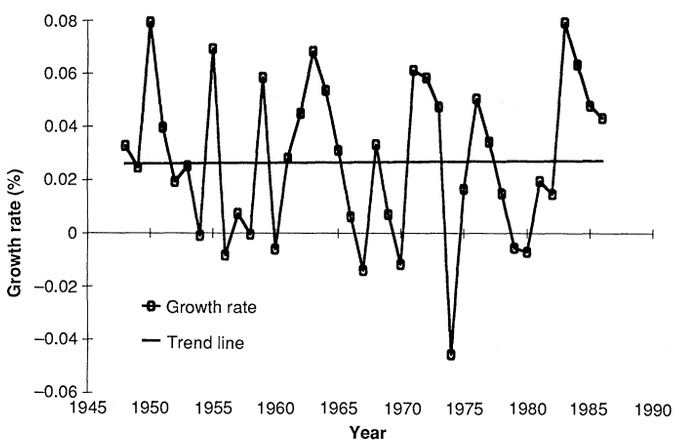

Fig. 1. U.S. manufacturing productivity growth rate, 1947–1986 (*5*).

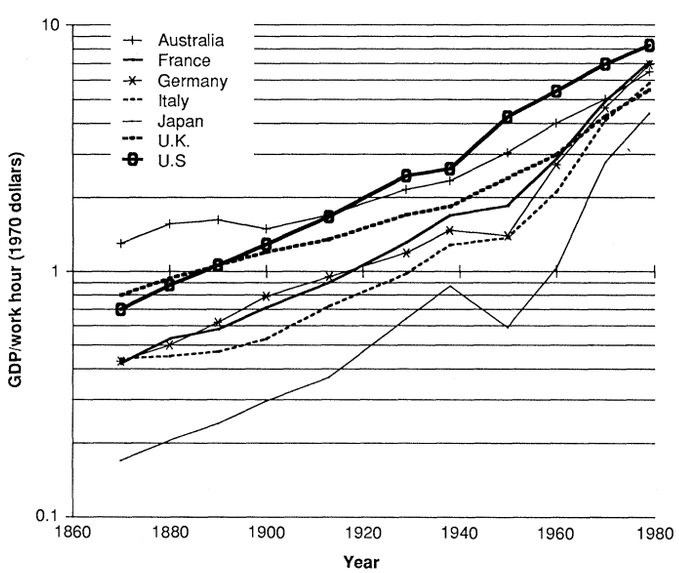

Fig. 2. Labor productivity (gross domestic product per work-hour) for seven leading industrial countries, 1870–1979 (*3*, table C10).

The relevance of this point for an evaluation of U.S. performance is that, for convergence to be possible, the countries that were furthest ahead must necessarily grow more slowly than those that were initially behind. Otherwise, the gap between them could never narrow. Moreover, this difference in growth rates required for convergence is automatically made possible by the fact that the countries that are behind have more to learn from those that are ahead than the other way around. It should be noted, then, that this convergence process does not necessarily mean that technology transfer has sped up with the passage of time. All it requires is some late-starting economies whose skilled labor force and active entrepreneurs enable them gradually to adopt the techniques of the economic leaders (*6*). Thus, until the differences are reduced to minor proportions, we should expect the low-productivity countries to exhibit the fastest productivity growth.

That is precisely what has been happening for over a century among the world's most industrialized countries, though, regrettably, the process has not yet trickled down to the poorer nations. We find a remarkably close inverse correlation between the initial level of productivity of any of the top economies and its subsequent growth rate both since 1870 and since World War II. Countries like Japan, Sweden, and Norway, which were among the poorest of these economies initially, have consistently been those whose labor productivity rose most rapidly. Not only the United States, but also Australia, Canada, the United Kingdom, Belgium, and Holland, all of which started out with relatively high productivity levels, have been those whose growth has been slowest. Thus, although U.S. productivity growth has indisputably been relatively low, that may not constitute a poor performance but, rather, a normal manifestation of a widely encompassing and basically beneficent process of convergence of the poorer industrial nations to the high standard of productivity attainment set by this country.

There is even a bit more that can be said here. Although none of Maddison's 16 countries deviated from this pattern in which countries whose productivity was initially low grew faster than those that were initially ahead, in a number of countries like Switzerland, the United Kingdom, and Australia productivity has grown more slowly than the convergence process seems to account for. In contrast, some other countries have outperformed that standard, among them West Germany, France, the Netherlands, as well as the United States. Indeed, the United States may have beaten that standard by a comfortable 15 to 20 percent margin. That is, for the other countries to have caught up to us at the same rate as they have been doing to still other countries previously ahead of them, productivity in the United States would have had to have grown some 15 to 20 percent more slowly than it did in fact.

What all of this means in common sense terms is that in a world with increasingly shared technology, management, and marketing approaches, the United States, as economic leader, must expect others to narrow the gap between their productivity levels and its own, and that requires, by definition, that the others must display faster productivity growth. But none of the others, not even Japan, has so far surpassed us in overall productivity level, and there is no

evidence indicating, except in some particular industries, that they are about to.

Productivity Performance, Trade Deficits, and Unemployment

We come, finally, to the widespread impression that this country's relative productivity lag condemns it to chronic trade deficits and unemployment. Slow productivity growth, the argument goes, makes our exports relatively expensive and prevents them from competing. But both economic analysis and the historical evidence reject this conclusion. There really is no a priori reason to believe that the level of unemployment at any point in time should be related to the intertemporal growth of productivity. The historical evidence is straightforward. England, through her long period of productivity lag and relative economic decline, produced a record with a generally declining trend in unemployment and a rising trend in the balance of trade (7). The same sort of long-term evidence puts to rest the opposite fear—that rapidly rising productivity cuts down the demand for labor and is a cause of serious unemployment. The case of Germany with its protractedly superior productivity-growth record shows that this need not be so, since its long-term unemployment trend has also been downward.

At least some of the reasons why lagging productivity, contrary to common sense, need not lead to perpetual unemployment and trade deficits triggered by lack of competitiveness are straightforward. A U.S. trade deficit reduces the demand for dollars by foreigners, and the result is that the value of the dollar must fall relative to the yen, the mark, and so on. But a fall in the exchange rate of the dollar is one way of reducing the price of U.S. goods to foreigners, and of increasing the price of foreign goods to Americans. When these pressures force the exchange rate of the dollar to fall sufficiently, the demand for U.S. exports, including the export of ownership of U.S. factories and other capital items, will be raised and U.S. import demand will be cut sufficiently to bring the trade deficit to an end. U.S. products will then once again be competitive, and no unemployment need result from trouble in the export industries.

This all sounds a bit too easy, and is undoubtedly all the more suspect because the story has not even mentioned productivity performance, but the fact is that the scenario just described is neither easy nor pleasant. Its heavy costs are merely hidden. When a country's productivity lags, its products do initially lose competitiveness, and the consequent fall in the exchange value of its money amounts to a thinly disguised cut in the real wages of its labor force—a fall in the prices that the products of its labor can command. That is how the competitiveness of the productivity-laggard economy is restored. Rather than succeeding by exporting the products of an efficient economy, it is able to compete only as the supplier of cheap labor. Without necessarily suffering unemployment or chronic trade deficits, it does indeed pay for its poor productivity in the form of retardation of its standard of living. And that is where productivity growth really does matter.

Shorter Run Developments

The bulk of the evidence presented so far spans exceedingly long periods. Its moderately comforting message is open to the objection that worries about the fate of the U.S. economy derive from the experiences of a brief period. It is true that the last two decades have included a sharp slowdown in U.S. productivity growth, perhaps on the order of 65 percent. This has been accompanied by a marked decline in U.S. savings rates, and real wages have virtually stopped growing altogether. These are all disquieting developments. In particular, the decline in savings would have threatened to deprive the labor force of expanded and improved plant and equipment, which is a prime contributor to increased labor productivity. The lack of growth in real wages, in turn, may well be attributable, at least in part, to the fall in productivity growth.

Still, even here there is another side to most of these developments. As we have seen, while overall U.S. productivity growth has indeed slowed during the period, that has not been true of productivity in manufacturing—the arena that has been the focus of particular concern. Moreover, the industrial rival economies of the United States have also experienced marked slowing of their overall productivity growth. Even the low U.S. savings rate may not be as extreme as it appears. A study by two careful analysts has corrected the savings-investment statistics for such distorting influences as the fact that plant and equipment are cheaper to produce in the United States than in other countries, so that a dollar of savings here buys more plant and equipment than it does abroad, and they found that these and other appropriate corrections wiped out the bulk of the shortfall in U.S. investment rates below those of other countries (*8*).

Still, the shorter run developments are not reassuring, nor is their attribution to a series of unfortunate temporary events such as the Vietnam War, the fuel crises of the 1970's, and the huge federal budget deficit of the 1980's. That deficit alone probably bears much of the responsibility for the shortfall of investment by Americans that left much of the task of construction of plant and equipment to foreign sources of funds, with the price in U.S. income levels to be paid in the future. By acting as a huge drain on investable funds, the federal deficit absorbed most of what Americans were willing to save, leaving little left over for investment in the private sector of the economy. It is, incidentally, probably in good part responsible for our huge trade deficit, for by attracting funds from abroad it led foreigners to demand dollars with which to make their investments in the United States. This raised the exchange value of the dollar, making U.S. goods more expensive for foreigners to buy and foreign goods cheaper to Americans than they would have been otherwise. Yet, although the budget deficit will take years to eliminate, there is no reason to believe that it will constitute a permanent problem, permanently impeding saving and productivity growth.

In sum, we neglect such shorter term developments, perhaps most particularly the stagnant real wages, at our peril. But they do not mean that the United States has entered a course that portends a dismal long-term future.

Toward the Design of Policy

Although we have found no reason for panic in the U.S. productivity record, that record also provides no assurance that our future is immune from all dangers. Historically, a succession of countries have fallen from economic leadership, showing that no nation is secure from being overtaken and displaced by others. This immediately suggests the importance of studying the means the country can employ to improve its productivity performance.

There is a standard list of influences that contribute to a nation's labor productivity. It includes that country's flow of inventions and innovations, the rate at which it learns to benefit from the flow of technology contributed by other economies, the rapidity with which it increases the capital stock per worker (including the plant and equipment at that worker's disposal), the skill and training of the country's labor force, and the incentives provided for the productive activities of entrepreneurs. It is clear that each of these five prime influences merits the attention of those concerned with productivity

policy. The means to stimulate and facilitate basic research as well as applied R&D have been widely discussed in considerable detail, and a reexamination of the issues would present no surprises. The same is true of the policy measures that can encourage saving and productive investment (*9*). The encouragement of entrepreneurship is a complex and controversial issue that cannot usefully be discussed briefly.

Comments here will, therefore, be confined to two of the five policy avenues—technology transfer and the education of the labor force—merely to illustrate the fact that there is room to go somewhat beyond the standard observations in the design of productivity policy.

There is increasing agreement that an economy's ability to benefit from technology transfer can play a major role in determining the degree of its success in the productivity arena (*10*). Some countries, such as Japan and the Soviet Union, have set up specialized government agencies whose mission is to gather information on productivity-enhancing developments in other countries, to disseminate that information domestically, and to encourage domestic use of such novel technology. In the United States, however, the transfer of technology from other countries is left largely to chance. It is surely worth considering, then, whether a more systematic approach, perhaps under the direction of an agency assigned such responsibility, might not yield substantial dividends. The free market does, of course, already provide incentives for private transfer activities, but it is widely agreed by students of the subject that its workings in the creation and dissemination of knowledge may be less effective than in other arenas. One of the prime reasons is the fact that the entity that lays out the funds often turns out not to be the one that derives most of the benefits—the "free-rider" problem; and there are other reasons as well.

A second arena that can usefully be singled out is the education of the labor force, which is also widely recognized as a significant source of contribution to labor productivity. But here there is indeed a specter that haunts our prospects, and that is the poor educational attainments of minority groups, particularly blacks, Hispanics, and native Americans, in the United States. The evidence indicates that for the foreseeable future these groups will constitute a growing share of the nation's labor force, reaching about one half of the entrants by the end of the century; yet the education obtained by these groups continues to be consistently and substantially inferior to that of the population as a whole. It is easy to provide shocking statistics showing the shortfall in the number of years of education they complete and in their performance in academic subjects (though, of course, there are noteworthy and outstanding exceptions). But perhaps even more shocking is the apparent absence of tested plans to do anything about it, and the rarity of anything resembling designed and controlled experiments to determine what ameliorative methods really promise to make a difference and offer means that can be employed on a large scale to improve the educational performance of the millions of people at risk. Note that the issue being raised here is not a matter of justice or equality of opportunity, though those are clearly also at stake. Rather, the point here is that failure to do something effective about the education of minority groups can become a major impediment to the nation's productivity performance tomorrow and so may constitute a costly "saving" to those who resist provision of the requisite resources. For, although productivity growth does not require all of the economy's labor force to be highly educated, such spotty evidence as is available suggests strongly that poor education of a large share of the labor force can be a major impediment.

Concluding Remarks

The basic conclusion from our discussion is that there are genuine grounds for concern about the future of the U.S. economy. But there is as yet no valid portent of a long-term crisis, and little substance to the deindustrialization thesis. Along with the other industrial economies, we suffered what appears to have been a transient productivity setback in the wake of the energy crisis of the 1970's. In the last 2 years we have experienced a sharp fall in the exchange value of the dollar, probably attributable in good part to the budget deficit of the U.S. government. But it is only in the long run that productivity growth matters substantially, and here research has provided no clearcut evidence of deterioration in our performance.

I have presented only a small sample of the evidence for this conclusion. It seems clear from what has been shown, however, that productivity is one arena in which there is time for us to avoid acting in haste. Instead, we have the time and the opportunity to make sure that we are not behaving in a way that will change us into a feared exporter of cheap U.S. labor, rather than the proud purveyor of the products of U.S. efficiency and ingenuity.

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