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PRODUCTIVITY TRENDS AND DEFENSE IN THE 1980s

by

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National security, we know, involves much more than military force alone. Although analysts have abundantly examined the foreign policy and sociological aspects of military power, they have given scant attention to the relationship between productivity trends, a recent national economic concern, and national security. This article attempts to fill that void, demonstrating the crucial and significant connection between productivity performance and defense capabilities. Last year's increased productivity is encouraging, for if our nation fails to restore historically higher productivity growth patterns, in the future it will confront serious national security problems as political support, funding capabilities, and the defense production base become increasingly fragile. Paradoxically, even if the United States succeeds in recapturing past productivity growth rates, America will face a new set of defense problems—in the manpower arena—directly resulting from the productivity resurgence.

Productivity measures the relationship between inputs and the outputs that they help to create. Increases and decreases are calculated by dividing changes in production over some time period by the associated alterations in inputs, most commonly labor hours. If twice as much labor is producing three times as much corn, efficiency is clearly greater, i.e. labor productivity has increased. (Productivity measurements for capital and land can also be calculated.) Growth in total production may result from one, or both, of

two factors: increased inputs and rising productivity. The production surges entailed in mobilization and wartime production efforts are most visibly associated with greater numbers of inputs. Far less well known, however, is the productivity contribution. The War Production Board, for example, estimated that "the improvement in American labor productivity was responsible for about one third of the total increase in the output of finished goods during 1939-1944."¹ Indeed, over that same period productivity rose an unprecedented 25 percent.²

Growth in output per worker in the United States has historically been substantial, rising at an annual rate of about two percent for the first half of the 20th century and increasing to roughly three percent over the 1950-70 time frame. During the bulk of the postwar period (1948-73), productivity growth accounted for virtually all of the rise in the US standard of living as measured by GNP per capita.³ This favorable productivity performance resulted from a wide variety of factors, including growth in the capital stock, appropriate incentives, improvements in education, favorable governmental policies, and research and development. Experts do not fully agree, of course, concerning the relative contributions of the major factors.⁴

The problem is that by the early 1980s US productivity growth had slowed to a virtual standstill, as shown in the table below. Because of data and methodological difficulties so commonly encountered in the social sciences, there has been some question

concerning the precise magnitude of this slowdown. Nonetheless, there is clear agreement concerning the sharp departure from historic trends. Not only did the United States rest at the bottom of the ladder internationally, it failed to meet its own past patterns (contrast the table's figures with the 1946-66 growth rate of 3.2 percent).⁵ Further, the period from 1973 to 1982 proved even more dismal; as the table portrays, those years evidenced almost no productivity growth whatsoever. Indeed, productivity actually declined in three of the four years, 1978-81,⁶ and by 1982 was barely higher than it was in 1977.⁷

ANNUAL PRODUCTIVITY GROWTH⁸

	1963-73	1973-82
Japan	8.7%	3.0%
Italy	5.4%	1.3%
West Germany	4.6%	2.3%
France	4.6%	2.3%
Great Britain	3.0%	1.4%
United States	1.9%	.2%

Corresponding statistics for other major industrial nations clearly reflect the global nature of the productivity slowdown. Nonetheless, rates of growth overseas generally remained favorable, with none of the major industrial powers performing as anemically as the United States.

These trends raise a significant question with regard to the already difficult issue of financing the Western Alliance. If productivity rates continue to rise substantially overseas, and if American rates return to the stagnancy shown prior to 1983, the willingness of the American taxpayer to bear

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a disproportionate share of the Western defense burden could sharply wane, or worse, disappear. As Lester Thurow has written:

Extend [these] economic trends 20 years into the future Does anyone imagine that the American voter will be willing to pay for the defense of those wealthier than he? Sooner or later, someone will point out that it is much cheaper to defend North America than it is to defend U.S. allies abroad Obviously, a new set of alliances and foreign policies will emerge in a world where America is economically weak.⁹

We must revitalize productivity because it will serve as the major source of increase of total output during the current decade. Further, without sustained economic expansion, programmed growth in defense spending cannot take place unless major cuts in nondefense outlays or in the standard of living occur. The driving force for this needed expansion will be productivity advance.

The following table shows that American real GNP growth rates declined steadily and substantially through the 1970s and early 1980s.

US ANNUAL GROWTH RATES¹⁰

	1961-69	1970-73	1974-82
Real GNP	4.4%	3.6%	1.9%
Number of employees	1.9%	2.2%	1.8%
Output per employee	2.5%	1.4%	0.1%
Share of GNP growth due to employment growth	43%	61%	95%

The bottom row of the table is most relevant for the purposes of this article. During the high-growth period of 1961-69, productivity gains were substantial, with only 43 percent of real GNP advance accounted for by increased employment. Over the 1970-73 period, with declining productivity gains, increased employment provided 61 percent of GNP growth. By the 1974-82 period, virtually all of the advance in real GNP was accounted for by employment growth.

But the days of increasing output through the application of increased resources, the style of the 1970s, are now passed. The surge of young people and married women who entered the labor force in the past decade has dramatically abated.

The number of high school graduates declines each year, and apparently we are nearing the bottom of the pool of available housewives willing and able to undertake outside employment. Accordingly, increasing output simply by increasing inputs is not applicable to the 1980s and will not provide the production thrust of earlier years.

Capital goods, of course, are in theory readily augmentable if we choose to create them. However, with relatively low savings rates, continuing high interest rates, an uncertain business environment already characterized by two recessions, and the fear of resurgent inflation, it is uncertain that a significant upswing in capital goods production will indeed soon take place. And even if it does, the changed composition of our capital needs reduces the punch of this previously potent stimulus. Growing capital consumption due to new energy, environmental, and technical conditions, coupled with an aging capital stock and new competitive requirements, suggests that the proportion of gross investment necessary to replace depreciated or obsolete capital is growing. For any given increase in gross investment, then, there are likely to be smaller associated increases in the real GNP.

This line of reasoning does not imply that capital formation has become unimportant. To the contrary, growth in the capital stock remains essential for two chief purposes. First, such expansion assists productivity growth by equipping our workers with better tools and factories. Second, the capital stock is a resource that society can augment through appropriate policy and ordinary market processes. Because we have too long delayed retooling our industrial plant and equipment, our economy and productive capacity have suffered. This is most evident in the defense industrial base, where "sixty percent of equipment now used to produce military hardware is more than 20 years old, a proportion far in excess of the average for all U.S. industry."¹¹ Accordingly, significant capital formation in the 1980s, in both the defense and the civilian sectors, is crucial. Indeed, a 1981 study concluded that "had the

U.S. rate of capital accumulation matched Japan's, it would have approximated that country's impressive 4% real economic growth rate."¹²

Yet, a clear conflict becomes immediately evident. Increasing investment within a stagnant economic pie can come only at the expense of consumption or government programs. And while government cutbacks are in process, the necessary increases in defense are likely to outweigh probable nondefense reductions. Accordingly, the government slice is unlikely to shrink, while investment claims must rise if we are to revitalize our industrial base. Only consumption is left. Without a growing economic pie, the consumption slice must decline. This scenario is grim, for one can rightly question the likely tenacity of defense commitment and resolve of the American people and its leadership in the face of falling standards of living. Again, a sustained turnabout in productivity trends appears absolutely necessary if programmed defense increases are to be politically sustainable.

In the face of higher labor, capital, and material costs, productivity boosts are necessary in order to keep unit costs from rising. If productivity fails to keep pace, or worse, falls, this serves as a meaningful contributor to unit cost growth. It must be recognized that the defense industrial base, while having a number of unique characteristics, is very much a part of the total industrial structure. The Joint Congressional Committee on Defense Production has used the following definition:

The defense industrial base . . . comprises not only those industries which are considered primarily or potentially military in nature, but also processing, refining and other basic industries; the manufacturers and suppliers of components, subassemblies, and spare parts; R and D laboratories; industrial plant equipment which is or could be available for defense production; and the management resources and skilled labor pool required to operate these facilities.¹³

The base, in short, is an integral part of the US economy and usually suffers from the same maladies and disorders that afflict the general economy. Accordingly, aging equipment, inflationary distortions, debilitating labor and management practices, quality deterioration, and related problems affect the entire network of Defense Department suppliers. If, for example, the American steel industry has productivity problems, the associated cost increases will reduce buying power in defense procurement. It seems clear that the fields of transportation (particularly rail and automotive), machine tool manufacturing, metal processing, mining, and a host of other vital industries have suffered seriously. The construction industry, for example, has been one of our worst performers, but it is extremely important in mobilizations.¹⁴ During the last decade productivity not only failed to increase, but experienced real declines—in 1980, measured construction productivity was only 79 percent of the 1965 figure.

There are really two sides to the productivity problem, the rate of output per unit of input and the quality of output. Whereas the former has received the bulk of public attention, it is only recently that the significance of the qualitative dimension has been recognized. An anemic productivity performance becomes evident either through reduced rates of production increase or through manifest deterioration in quality of items produced. As successive public surveys have demonstrated, American consumers have detected meaningful degradation of product integrity.¹⁵ The rising tide of imports is at least in part a testimony to the disillusionment with American-made products. And the turn to imports is not limited to consumers. In a recent survey of 508 American manufacturers, it was found that some 63 percent use some foreign-made machinery in their domestic operations. While price was a consideration, the chief motivation was the belief that "equipment made abroad is higher in quality."¹⁶

Real levels of Defense Department procurement are clearly lower due to quality deterioration. The economic cost of quality

failures can only be estimated, but it is undoubtedly staggering. At the first Bottom Line Conference in May 1982, for example, Senator John Warner maintained that roughly \$13.5 billion was being used to correct defects or retool poorly manufactured defense inventories. And General Robert Marsh reported that a survey of 21 Air Force contractors indicated the processing of over 370,000 material review actions each year. In June 1983 then-Deputy Secretary of Defense Paul Thayer suggested that quality failures were costing the Department of Defense perhaps as much as \$28 billion. Later that month, Rear Admiral Frank C. Collins noted that the price of some weapon systems could be reduced by 50 percent if contractors produced the end item properly the first time.¹⁷

Increased rejection rates and quality degradation have also limited readiness and mobilization capabilities. The pattern of increasing lead times which characterizes a broad spectrum of defense procurement is at least in part a function of American productivity difficulties. Additionally, the derivative problem of reduced economic flexibility limits the ease and speed of conversion from peacetime to wartime production. In short, the productivity/quality nexus has not only contributed to unit cost growth, but to a reduced readiness and mobilization posture as well.

Last, American productivity performance relative to that of our overseas competitors has surely been one of the important contributors to our inability to compete successfully, the net result being the closing of large numbers of US plants.¹⁸ The production base has been shrinking or moving overseas. This seriously complicates a mobilization scenario and introduces increased dependency and vulnerability to the national security posture.

Currently, substantial efforts are being undertaken to upgrade productive performance. A few examples of success suggest the enormous potential that exists:¹⁹

- A quality circle at Tinker Air Force Base, Oklahoma, developed a better nickel-plating procedure and reduced the parts reject rate from 50 percent to three percent.

- A job enrichment intervention at Kelly Air Force Base, Texas, reduced the J79 engine transition duct repair time from 19 days to eight.

- A value engineering proposal resulted in a C-141 modification to permit fuel to be pumped back to the tanker after inflight refueling practice, saving \$16 million per year in fuel costs.

Efforts to upgrade civilian performance in the Department of Defense also have been rather successful. Secretary Weinberger's 1984 *Annual Report to the Congress* notes that productivity "has been increasing at a rate of 2.1% annually since 1972."²⁰ This has provided for effective use of manpower, increased efficiency, and the release of resources for priority tasks.

The productivity problem, then, is an extremely serious one, but one that can be addressed with good effect. The crucial point to be made is that both military procurement and mobilization capabilities are seriously degraded by the kind of productivity performance that characterized the general economy in the last decade.

Clearly, a sustained revitalization of productivity trends is absolutely essential, both for the economy itself and for national security. Fortunately, there are sound reasons for expecting such a sustained turnabout. A sample would include the following:²¹

- A "seasoning" and maturing of the relatively inexperienced workers (mostly young people and married women) who surged into the labor force in the 1970s.

- Improved worker attitudes and concerns.

- "Leaner" business managements, more conscious of productivity.

- An increased rate of consumer savings due to policy inducements (Individual Retirement Accounts, etc.) and increased awareness of future needs and uncertainties.

- Less onerous government regulation and heightened competition.

- More rapid capital formation due to policy inducements and a greater awareness of the vital nature of such investment.

(Unfortunately, the recession-induced low levels of capacity utilization, among other things, have served as a major stumbling block to the realization of this essential ingredient.)

- A new national awareness of the qualitative dimension of output and international competitiveness.

The most recent data clearly support this optimism. Productivity has enjoyed five consecutive quarters of growth, with 1983 witnessing nothing less than spectacular gains. Do these indicators portend a sustained favorable trend? According to John Kendrick, a distinguished expert, the answer is yes. Indeed, "productivity could rise 2.7 percent annually in the 1980s."²²

Ironically, however, a sustained productivity uptrend could be a double-edged sword in the manpower arena. Operating with an all-volunteer force, the Department of Defense must compete in the marketplace for human resources. Wages must have some comparability, as the history of the all-volunteer force has demonstrated, to levels of compensation in the general economy. In short, increased numbers are primarily attracted by higher military wages (although other factors, such as high levels of unemployment and greater recruiting efforts, also have an influence). Herein lies the problem.

With the relevant population base (17-to-21-year-old males) declining during most of this decade, it is clear that in "order to maintain current numbers of accessions . . . enlistment rates will have to rise."²³ A 1980 study estimates that the maintenance of this level will require a 17.44 percent increase in military pay relative to civilian rates of pay.²⁴ Demographics thus mandate that military pay rise roughly that amount relative to the alternate options available to potential volunteers. This alone points to significantly greater outlays for military manpower. If, however, the renewed productivity vigor is indeed sustained, real civilian wages will increase (since market wages tend to reflect productivity). The Department of Defense then, must be able to raise relative military pay against a base of civilian wages that itself is likely to be increasing rapidly.²⁵ The

budgetary implications are almost mind-boggling and are likely to test the true resolve of Congress and the American people with regard to staffing manpower needs with volunteers. Additionally, concerning resource allocations within the armed forces themselves, it is likely that growing manpower costs will force a more rapid substitution of capital for human inputs. This will present management challenges as well as add to growing capital demands in the general economy.

In conclusion, the productivity problem is inextricably linked to national security and the free-world defense posture. Lower productivity has contributed to increased defense procurement costs, reduced surge and mobilization capabilities, and, if it reemerges, could erode the nation's capacity and willingness to fund defense. The economic weakness that the productivity problem both reveals and induces has diminished US credibility within our alliances and with potential adversaries. Finally, to the extent that the productivity trend of the past decade and a half is reversed (as it *must* be), there will be fuller employment and rising real civilian wages, both of which will increase the manpower drain on the Department of Defense budget.

NOTES

1. Alan S. Milward, *War, Economy and Society, 1939-1945* (Berkeley: Univ. of California Press, 1977), p. 230.
2. *Ibid.*
3. John W. Kendrick, "Productivity Trends and Prospects," in Joint Economic Committee, *U.S. Economic Growth from 1976 to 1986: Prospects, Problems, and Patterns* (Washington: GPO, 1 October 1976), p. 3.
4. Edward Dennison, (*Accounting for United States Economic Growth, 1929-1969*) and John W. Kendrick (*Postwar Productivity Trends in the United States, 1948-1969*) both attribute some 20 percent of productivity growth to capital, while other experts (L. R. Cristensen, D. Cummings,

and D. W. Jorgenson, *An International Comparison of Growth in Productivity, 1947-1973*) hold that capital's contribution exceeds 40 percent. The latter investigators ascribe 14 percent of postwar productivity advance to labor quality improvements, midway between Kendrick's 10 percent figure and Dennison's 18 percent estimate.

5. Kendrick, "Productivity Trends and Prospects," p. 1.
6. *Economic Report of the President, 1982* (Washington: GPO, February 1982), p. 204.
7. Peter Clark, "Inflation and the Productivity Decline," *American Economic Review*, 72 (May 1982), 149.
8. Table shows annual growth in real Gross Domestic Product per employed worker, using US Department of Labor figures of 10 November 1983.
9. Lester Thurow, "The Moral Equivalent of Defeat," *Foreign Policy* (Spring 1981), p. 114.
10. *Barclays Review* (November 1983), p. 83.
11. Paul Seabury, "Industrial Policy and National Defense," *Washington Times*, 28 June 1983, p. 3C.
12. New York Stock Exchange, *U.S. Economic Performance in a Global Perspective* (New York: February 1981), pp. 6-7.
13. *Civil Preparedness Review Part One: Emergency Preparedness and Industrial Mobilization. Report by the Joint Committee on Defense Production* (Washington: GPO, 1977), p. 55.
14. See Edward G. Rapp, *Construction Support for Mobilization* (Washington: National Defense University Press, 1980).
15. Molly Sinclair, "Consumer Unhappiness Growing," *The Washington Post*, 17 February 1983, p. A21.
16. "Conference Board says 63% of U.S. Firms Use Foreign-Made Gear," *The Wall Street Journal*, 22 February 1983, p. 10.
17. "Less Bang for the Buck," *Hartford Courant*, 28 June 1983.
18. See New York Stock Exchange, *U.S. Economic Performance*, pp. 36-40.
19. Jack P. Bujalski, "Readiness and Productivity: Friends or Foes," *Air University Review*, 33 (September-October 1982), 48.
20. Caspar W. Weinberger, *Annual Report to the Congress, 1984* (Washington: GPO, 1983), p. 107.
21. Alfred L. Malabre, Jr., "Productivity Edges Higher Despite Recession . . .," *The Wall Street Journal*, 20 August 1982, p. 40.
22. Quoted in Robert J. Samuelson, "Inflation an Unwanted Stepchild," *The Washington Post*, 13 December 1983, p. D1.
23. Robert F. McNown, Bernard Udis, and Colin Ash, "Economic Analysis of the All-Volunteer Force," *Armed Forces and Society*, 7 (Fall 1980), 128.
24. *Ibid.*, p. 129.
25. Add to this the likelihood of reduced unemployment in a more vigorous economy.

