Defense Spending and The Economy:

Does the Defense Dollar Make a Difference?

Gordon Adams
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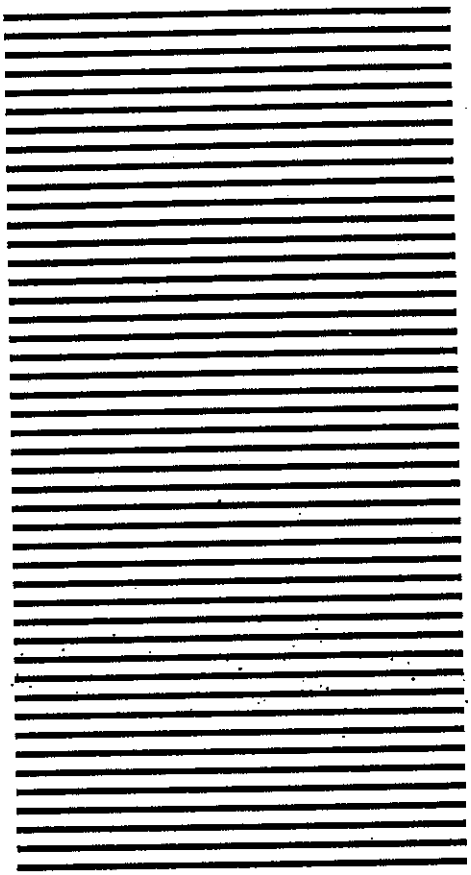

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I. Does The Defense Dollar Make A Difference?

Although the major buildup of the 1980s is slowing, the economic impact of defense spending is a subject of intense debate in the United States. Since 1981, defense spending has doubled. In fiscal year 1980, "national defense" outlays were $134 billion; FY 1986 outlays were twice that amount, $273.4 billion, real growth (after inflation) of more than 51 percent.

By FY 1990, assuming Reagan adminstration budget requests are passed by Congress, national defense outlays could reach $330 billion. U.S. defense spending will have grown 146 percent, including inflation, during the decade of the 1980s.[1] In fact, by fiscal year 1991, national defense outlays in constant dollars may well surpass any previous year, wartime or peacetime, since 1946.[2]

The Defense Department and defense contractors often suggest that defense spending has an important positive impact on the U.S. economy. Secretary of Defense Caspar Weinberger has stated, for example, that cutting $1 billion from the defense budget will reduce U.S. employment by 35,000 jobs.[3] The Defense Department has created a "Defense Economic Impact Modelling System," which projects the opportunities contractors could find in growing defense outlays.

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1. Office of Management and Budget, *Budget of the United States Government: Historical Tables* (Washington, DC: OMB 1987), p. 3.3 (3-4).

2. Defense Budget Project, *The FY 1986 Defense Budget: The Weapons Buildup Continues* (Washington, DC: Defense Budget Project, April 1985).

3. Department of Defense, *FY 1984 Report of the Secretary of Defense* (Washington, DC: Department of Defense, 1983), p. 68.

Contractors have also analyzed the economic impact of weapons programs as part of their lobbying efforts on behalf of such programs.[4]

Some economic analysts, critics of nuclear weapons programs and of high defense budgets, have strongly disagreed with this analysis. Instead, they argue, defense spending spurs inflation by pumping money into the economy without adding to the supply of goods. Moreover, high levels of defense-related research and development, in this view, sap the nation's growth and technological strength by draining funds and personnel away from commercial work that would increase American competiveness in international markets. Finally, they argue that fewer jobs are created by military spending than by almost any other forms of federal spending.

The arguments of these critics seem to have had little impact. The level of U.S. defense spending in constant dollars continues to rise. Communities in which defense plants or military bases are located continue to seek defense contracts and spending. Economists rarely treat defense spending as a central concern in analyses of the workings of the U.S. economy. Most policymakers appear inattentive to what might be the economic risks of continued high rates of defense spending.

The economic experience of the 1980s suggests that both critics and supporters of defense spending may have overstated their cases. Despite high rates of defense spending, the rate of inflation has declined dramatically since 1980. After an initially strong recovery from the recession, accompanied by high rates of defense spending, the economy appears weak and sluggish. Some American technologies are growing rapidly, while other industries fall behind foreign competitors. New jobs are being created rapidly in some fields, while employment in other sectors (especially manufacturing) has lagged or declined. Neither the argument that defense dollars are an economic boon, nor the assertion that they are harmful, seems adequate in explaining these complex and contradictory economic developments.

A careful evaluation of the relationship between defense spending and the economy is overdue. This Defense Budget Project report is such an evaluation, based on the ample body of existing data (see bibliography). Briefly, this review suggests that arguments have been vastly overstated both by the Defense Department and by the critics of defense spending. The impact on the economy of changes in defense spending is affected by the context within which such changes occur. This question of context is crucial in evaluating defense economics issues. By and large, major changes in the U.S. economy appear to be far more strongly influenced by broader events and economic developments -- national and international -- than by variations in the level of defense spending. The central problem of critics and defenders of defense spending alike is that their work attributes too much importance to the defense dollar, using evidence that is too limited in scope.

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4. See, for example, the case of the B-1 bomber campaign conducted by Rockwell International described in Gordon Adams, *The B-1 Bomber: An Analysis of Its Strategic Utility, Cost, Constituency and Economic Impact* (NY: Council on Economic Priorities, 1976).

Beyond this question of context, looking at the U.S. economy as a whole (macroeconomy), existing data and analysis indicate that many of the impacts of defense spending are not significantly different from the impact of other types of federal spending. Defense spending, for example, does not appear to be unusually inflationary. Its impact on price levels (like that of all federal spending) depends very much on how it has been financed and on what other events are taking place in the U.S. economy. The impact of defense spending on overall employment levels does not appear to be substantially different from other forms of federal spending -- especially when measured over time and when public as well as private sector employment is counted.

The impact of defense spending on U.S. economic growth and technology is somewhat more mixed and uneven. Defense spending does not seem to have a major impact on overall rates of investment. There is, at the most, mixed evidence with respect to the impact of defense spending on civilian research and development, with a great deal more research yet to be done. Thus, there may be long-term consequences for U.S. technological development and international competitiveness from investing a large share of public research and development resources in defense-related technologies. These consequences, however, are extremely difficult to isolate and measure, as technological change is influenced by a wide range of economic phenomena.

This review of existing work concludes that a major impact of defense spending may be more at the level of changes in regional and local economies, sectors of production and segments of the labor market (the microeconomy). Although defense is an important share of economic activity in only a few areas of the country, business sectors and parts of the labor market, a decision to increase defense spending, while cutting other forms of federal spending can have an impact on regional economic changes, sectoral growth and labor market shifts.

To the degree that a conscious industrial policy exists at the federal level, defense spending constitutes such an implicit policy, a choice about the direction some developments in the U.S. economy will take. This question of public policy choice is crucial. Spending for defense has one kind of impact while spending for nutrition, transportation, education or health has another. Even here, however, the case must be made carefully. For most regions, sectors or segments of the labor market, defense is one determinant, often a small one, of overall economic change.

The U.S. economy is a large one, not easily driven or undermined by the relatively small share of GNP attributable to defense. Existing research suggests that defense spending is neither the be-all nor the end-all of the U.S. economy, but simply one sector of activity in a wider sea of economic change.

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II. Defense Spending And Inflation

Defense spending is often said to be a source of inflation. Analysts point to historical examples of high levels of defense spending, such as that during World War II, when price controls, rationing, and other restrictive devices were necessary to keep inflation in check, and during the Vietnam War, which began more than a decade of high rates of inflation.[5]

Defense spending is sometimes described as inherently inflationary because it creates income and thus, purchasing power without also adding to the supply of goods and services available for people to purchase.[6] This assertion, however, provides little guidance as to whether military spending is peculiarly a source of inflation. The question of the wider spending and economic context is important. Some government expenditures may have positive long-term effects on productivity and an economy's ability to produce goods and services. At the time they are undertaken, however, virtually all government outlays -- whether for health, public works, police, or defense -- increase purchasing power without expanding the quantity of products for sale on the market.

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5. Earl J. Hamilton, "The Role of War in Modern Inflation," *Journal of Economic History*, 37, No. 1, March 1977: See also, Hugh Mosley, *The Arms Race: Economic and Social Consequences* (Lexington, MA: Lexington Books, 1985), chapter 6.

6. A group of experts reporting to the United Nations stated that "military expenditures are inherently inflationary in that purchasing power and effective demand is created without an offsetting increase in immediately consumable output or in productive capacity to meet future consumption requirements." United Nations Centre for Disarmament, *Economic and Social Consequences of the Arms Race and of Military Expenditures* (New York: United Nations, 1978), p. 41.

The excess demand generated by such spending is the major reason that rising government outlays can stimulate a stagnant economy. To treat such demand as inherently inflationary assumes that the economy is always at or near a point where additional demand can only lead to price increases, rather than to growth in output. In effect, claiming that excess demand is always inflationary is tantamount to assuming the economy is always at or near full employment, which has rarely been the case in the United States.

In reality, the actual impact of defense or any other federal spending category on rates of inflation is linked to the way such spending is financed. The inflationary potential of government spending can be reduced or offset if outlays are financed by taxation, which can remove purchasing power from the economy in an amount roughly equivalent to the expenditures being undertaken. Different financing mechanisms can lead to different impacts on rates of inflation. Wartime spending, for example, can create inflationary pressures since demand expands rapidly and much private sector production is diverted to the war effort. If taxes are raised and savings stimulated, however, demand can be brought back into balance with available supply. If, instead, higher defense expenditures are financed by deficits, and the Federal Reserve boosts the money supply by stepping up its buying of bonds, the stimulus to demand is magnified, and inflation is a more likely result.[7]

The impact of defense spending on inflation is also linked to the state of the economy as a whole. In the case of the Vietnam War, the increase in U.S. military outlays occurred while the economy was in the midst of a long expansion. The Johnson Administration made an explicit decision to allow the federal deficit to rise, rather than to seek a tax increase to finance Vietnam War outlays. In this instance, higher defense outlays, without compensating action on the revenue side, were a direct cause of higher deficits. A significant increase in inflation followed, as monetary policy was not restrictive enough to offset the fiscal stimulus in a boom economy.[8]

During the Reagan Administration, an increase in defense outlays has been accompanied by large tax cuts and reductions in non-defense government outlays. The result has been large deficits and rapid growth in federal interest payments. However, the high federal deficits of the 1980s have coincided with lower inflation, thus calling into question the claim that a defense buildup, combined with large deficits, is automatically inflationary.[9]

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7. Robert Warren Stevens, *Vain Hopes, Grim Realities: The Economic Consequences of the Vietnam War* (New York: New Viewpoints, 1976), pp. 191-196; Lee D. Olvey, James R. Golden, and Robert C. Kelly, *The Economics of National Security* (Wayne, NJ: Avery Publishing Group Inc., 1984), pp. 98-99.

8. Stevans, *supra* #7, especially chapter 6 and appendix A.

9. The consumer price index went from a 13.5 percent rise in 1980 to 3.6 percent in 1985 to 1.1 per cent rise for 1986. Council of Economic Advisors, *Economic Report of the President* (Washington, DC: U.S. Government Printing Office, 1986), Table B-59, p. 320.

At the time the Reagan buildup began, a number of critics argued that the size and speed of the increase in military outlays, its concentration in a few industries, and the weak condition of the defense industrial base, would lead to an increase in inflation because there would not be enough labor, raw materials, and productive capacity available quickly to satisfy both civilian and military demand. Even the Defense Department was worried about this bottleneck problem. Others suggested, however, that there was sufficient slack in the economy to handle the projected buildup, and that the emergence of inflation would depend on how quickly the rest of the economy expanded and used both available and new productive capacity.[10]

In reality, tight federal monetary policies and the deep recession of 1981-82 broke the inflationary momentum of the late 1970s and generated substantial excess capacity during the subsequent recovery. A rapid increase in U.S. imports of both consumer and capital goods kept capacity utilization rates lower than expected, which allowed defense production to grow quickly without causing inflation. Thus, even a substantial increase in military outlays such as occurred during the defense buildup of the 1980s was not sufficient, by itself, to generate inflation.

There have been some efforts to analyze the relationship between inflation and military spending using statistical methods. The econometric evidence is inconclusive, however. One simulation compared a five-year, 30 percent increase in defense spending (compensated for by an equal dollar decrease in non-defense spending) with both a "no change" alternative and a 30 percent cut in defense outlays (combined with equivalent increases in non-military programs). This simulation showed that the higher level of defense spending was accompanied by lower levels of GNP and employment, and a higher price level.[11] Since the changes in defense spending were fully offset by other spending changes, no deficit financing was involved. This finding implies that defense spending could have an inflationary impact separate from the way in which it is financed.

Studies of actual data, however, have found that defense spending has essentially no effect on inflation. One rank correlation analysis found that a country's rank in the sample with respect to defense spending as a share of output was unrelated to its rank on inflation rates.[12] Another, by Donald Vitaliano concluded that adding defense spending measures to an equation which explains current inflation in terms of unemployment and expectations of future

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10. Robert DeGrasse, Jr., *Military Expansion Economic Decline* (Armonk, NY: M.E. Sharpe, Inc., 1983), pp. 117-126; Lester Thurow, "How to Wreck the Economy," *New York Review of Books*, May 14, 1981; David Gold and Robert DeGrasse, Jr., "Economic Recovery vs. Defense Spending," *New York Times*, February 20, 1981. Congressional Budget Office, *Defense Spending and the Economy* (Washington, DC: U.S. Congress, February 1983).

11. Roger Bezdek, "The 1980 Economic Impact - Regional and Occupational - of Compensated Shifts in Defense Spending," *The Journal of Regional Science*, 15, No. 2 (1975).

12. DeGrasse, *supra* #10, chapter II.

inflation "do[es] not support the hypothesis that defense spending exerts a separate, discernable effect on the inflation rate."[13] Both studies have methodological problems, however. Rank correlation analysis can only relate two variables to each other, whereas the correct relationship may be far more complex.[14] A third study, by Harvey Starr, Francis W. Hoole, Jeffrey A. Hart, and John R. Freeman, using techniques designed to assess whether a statistical relationship exists between two variables, concluded that the tests did not support the existence of a relationship between defense spending and inflation for the United States and the United Kingdom, but did suggest one for France and West Germany.[15]

It might also be argued that the link between defense spending and inflation occurs in a less direct and immediate way. Seymour Melman, Lloyd J. Dumas, and others suggest that military spending's negative impact on manufacturing efficiency reduces the ability of firms to offset growth in costs through increased production, thereby creating a more inflation-prone industrial stucture.[16]

Defense industry contracting and pricing policies suggest that this sector is a likely source of cost-push inflationary pressures. There is little competition within defense industries and significant barriers to both entry of new firms and exit of existing ones. The Pentagon's long-standing insistence on high performance, state-of-the-art equipment, the growth of top-heavy administrative structures in both industry and government, and wasteful defense contracting practices all tend to validate the tendency for costs to grow in the defense sector. According to Melman, "the Pentagon has effectively displaced cost-minimizing with a system of cost- and subsidy-maximizing [within defense production industries]".[17]

Cost-maximizing practices within defense industries appear to have contributed to significant growth in weapons systems costs. However, defense

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13. Donald F. Vitaliano, "Defense Spending and Inflation: An Empirical Analysis," *Quarterly Review of Economics and Business*, 24, No. 1 (1984), p. 25.

14. Vitaliano's results are not easy to interpret. The Phillips Curve equation, which Vitaliano estimates, uses unemployment as a measure of excess aggregate demand; if military spending, which is a component of aggregate demand, is added to the equation, this introduces a redundancy that could distort the estimated coefficients. If two variables in a single equation are measuring the same economic process, at least one of the two coefficients is likely to be incorrectly estimated.

15. Harvey Starr, Francis W. Hoole, Jeffrey A. Hart and John R. Freeman, "The Relationship Between Defense Spending and Inflation," *Journal of Conflict Resolution*, 28, No. 1 (1984).

16. Seymour Melman, *The Permanent War Economy: American Capitalism in Decline* (New York: Simon and Schuster, 1974); Seymour Melman, *Profits Without Production* (New York: Knopf, 1983); Lloyd J. Dumas, *The Overburdened Economy* (Berkeley: University of California Press, 1986).

17. Melman, *Profits Without Production, supra* #16, p. 173; See also, Jacques Gansler, *The Defense Industry* (Boston: MIT Press, 1980); Gordon Adams, *Controlling Weapons Costs: Can the Pentagon Reforms Work?* (NY: Council on Economic Priorities, 1983).

sector price indexes compiled by the Department of Commerce indicate that inflation within defense industries is only slightly higher than inflation in civilian sectors with similar products.[18] Since the total output of military industries is small relative to civilian industries, the differential in inflation rates would have to be significantly greater for inflation in defense industries to exert a major influence on inflation in the entire economy.

One link with inflation may be even more indirect. Some economists point to the large quantity of capital inputs and skilled labor used by the defense sector and thus unavailable to the civilian sector as a source of a decline in production competence that is spreading throughout the entire economy. Melman writes:

> The normal operation of the military economy also depresses productivity in the rest of the American industrial system by preempting trained workers, technicians and engineers. The military firms can attract the skills they require because they are able to outbid other employers with financing guarantees by the federal treasury... By its command of the largest single block of research and development resources in the American economy, the federal military enterprise, whether intentionally or not, exerts a major restraining effect on productivity growth.[19]

A "cost pass-along" model embodying this hypothesis has been tested by B.Y. Hong, who estimated a set of equations to determine prices, wages, and productivity in the U.S. economy using data from 1948 to 1975.[20] Hong's results indicate that an important change occurred in 1965.[21] Previously, he argues, inflation was primarily a function of excess demand, with wage growth being largely offset by advances in labor productivity. Hong's results suggest that productivity gains after 1965 were no longer sufficient to offset wage growth, and inflation in this period can be characterized as a cost-push phenomenon. These results have been used to support the argument that the shift of resources from civilian to military uses has undermined productivity and has led U.S. firms to seek to pass on costs in the form of higher prices, since they are no longer able to control the impact of cost growth with advances in productivity. The shift of resources to the military and resulting loss of productive initiative was cumulative, the argument goes, and became dominant by the mid-1960s.[22]

Hong's econometric work is the only statistical study Melman and Dumas cite in support of the cost pass-along explanation of inflation. However, it does not

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18. Mosely, *supra* #5, pp. 122-129.

19. Melman, *Profits Without Production*, *supra* #16, pp. 177-178.

20. Byung Yoo Hong, *Inflation Under Cost Pass-Along Management* (New York: Praeger, 1979).

21. Hong, *supra* #20; and Dumas, *supra* #16, pp. 229-231.

22. Melman, *Profits Without Production*, *supra* #16, p. 225.

have as much explanatory power as it has been asked to carry. Three problems deserve attention.

First, Hong does not include a variable measuring defense spending in his model and there is nothing in his statistical evidence to link the decline in productivity with defense spending. The link is inferred, but not shown.[23] Given that defense spending is not explicitly part of Hong's model, there is no way to ascertain whether the observed decline in productivity is due to a trade-off between civilian and defense spending or to other causes.

More important, given that defense spending is not explicitly part of Hong's model, there is no way to ascertain whether the observed decline in productivity is due to a trade-off between civilian and military spending, or to other causes. There have been numerous studies assessing the reasons for the productivity slowdown in the United States, but there is no consensus among researchers. The cost pass-along model certainly merits attention, but the hypothesized link between military spending and productivity needs explicitly to be tested and compared with alternative explanations of the productivity slowdown.

Second, the causes of inflation have been studied extensively in recent years and Hong's results need to be compared with other work. The most widely used model of inflation is the augmented Phillips Curve, where inflation is assumed to be a function of changes in unemployment, along with variables measuring changes in economic structure, including productivity, and to expectations of future inflation.[24] Lower unemployment is assumed to result from increases in aggregate demand, and unemployment is taken as a "demand pressure" variable. In the 1950s and 1960s, simple Phillips Curve models yielded strong negative correlations between inflation and unemployment. In the late 1960s and in the 1970s, however, the inflation-unemployment connection appeared to be very weak, and in some instances yielded a positive correlation. A similar result in Hong's post-1965 equations is interpreted as support for the shift from a cost-minimizing to a cost pass-along mode of production.[25] But when inflationary expectations and other "shift" variables were added to Phillips Curve equations, statistical measures of the trade-off returned, suggesting that the problem was a model that did not include the appropriate variables. Hong's model contains a variable designed to measure inflationary expectations, but recent work suggests that more sophisticated formulations are needed. Thus, it is not possible to accept Hong's equation as providing evidence that the Phillips Curve trade-off collapsed after 1965. Without that result, the entire hypothesis of a shift in cost behavior in the mid-1960s is called into question.

Phillips Curve formulations, whether estimated by themselves or as components of larger models, are designed to estimate short-term determinants of inflation. Some researchers claim that the augmented Phillips Curve has been

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23. Hong, *supra* #20, pp. 147-151.

24. Rudiger Dornbusch and Stanley Fischer, *Macroeconomics* (New York: McGraw-Hill, Inc. 1978), 2nd ed., pp. 429-44.

25. Dumas *supra* #16, pp. 229-231.

stable in the United States over longer periods of time. Robert J. Gordon, for example, claims his research shows "the U.S. Phillips Curve . . . to be one of the most stable empirical macroeconomic relationships of the postwar period."[26] While not all analysts would agree with this claim, it does give the cost pass-along model an impressive target to overcome.

A third problem with the cost pass-along model is that Hong's work has not been replicated or tested against data outside of his own sample. New econometric research is usually followed by other researchers testing similar models, with variations in data, variables, or testing methods. Also, a model is usually tested against a new environment. Modifications in the Phillips Curve equations were called for when the simple equations could not adequately explain the inflation of the 1970s. In the case of Hong's equations, the decline in the rate of inflation after 1981 would be likely to present just such a new environment, and it would be an important test to see how this model stands up against this change. In the absence of such extended research, it is difficult to accept just this one study as sufficient evidence for such a radical reinterpretation of the postwar inflation experience in the United States.

Although a number of economists have argued that defense spending is a cause of inflation in the United States, existing empirical work has failed to find a strong or systematic link. Episodes where defense spending increases appear to lead to inflation are instead examples of excess aggregate demand generated by the unwillingness or inability of governments to raise taxes in the context of an expanding economy. When the economy is contracting, as at the beginning of the current defense build-up, expanding defense outlays are not necessarily inflationary. Therefore it does not appear possible to argue that defense spending is a specific source of inflation.

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26. Robert J. Gordon, "Supply Shocks and Monetary Policy Revisited," *American Economic Review*, 74, No. 2, May 1984, p. 42.

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III. Defense Spending, Technology, Productivity and Economic Growth

As concerns about the competitiveness of the U.S. economy rise, it is frequently argued that defense spending has a negative impact on U.S. productivity and economic growth. While it is widely accepted that an increase in defense spending can stimulate the economy by adding to aggregate demand, some analysts suggest that the defense sector consumes resources that would otherwise be employed in expanding productive capacity or increasing the productivity of labor.

From this point of view, countries which invest smaller amounts of their resources in defense, such as Japan and the Federal Republic of Germany, perform better according to various measures of economic performance. This difference in performance, it is argued, stems from the fact that resources are spent on defense at the expense of investment in new civilian sector plant and equipment. At the same time, defense research and development (R&D) is said to provide little civilian sector spin-off for commercial technology, while it consumes hard-to-replace technical resources, weakening innovation and productivity. In turn, this trend leads to slower rates of growth and imbalances in foreign trade. Overall, the negative impact of defense spending on productivity is seen as outweighing its stimulative effect on demand.

This "depletion" theory contains an implied theory of economic growth, according to which investments in plant and equipment and spending on R&D are prime determinants of the growth in productive capacity and the productivity of labor. This growth, according to the theory, in time, leads to an increase in the rate of growth of GNP and enhanced international competitiveness for the U.S. economy. An increase in defense spending -- or in some studies simply the existence of such spending -- is said to subtract from the economy's available supply of investment and R&D resources, which eventually leads to poorer performance. Proponents of this theory argue that an increase in defense sector employment of scientists, engineers, and other technically trained people is particularly damaging, since these people are difficult to replace and play a

critical role in commercial research and development. In addition, it is argued, the depletion process makes it harder for civilian sector firms to achieve cost-minimizing productivity gains. Instead, firms frequently resort to passing cost increases along in the form of higher prices.[27]

Statistical Studies: What the Data Might Show

There have been numerous statistical studies that could shed light on the empirical relationships between defense spending and investment, productivity and economic growth. Most studies have found negative relationships between defense outlays and some or all of these key variables, and have led investigators to conclude that high defense spending is a cause of low levels of growth and capital formation. The results, and the conclusions that seem to follow, however, are subject to significant qualifications on both methodological and interpretive grounds.

Studies using rank correlation analysis have concluded that countries with higher shares of output devoted to defense tend to have lower shares of output devoted to investment and lower rates of economic growth.[28] However, a general problem with rank correlation analysis is that it can only compare two variables at a time, while the true relationships may be far more complex and involve a number of explanatory variables. The technique is useful in suggesting relationships that can be explored in greater detail, but it is not sufficient by itself to justify conclusions about defense spending and economic performance.[29]

Simulation studies have used input-output and econometric models to project the economic impact of alternative future scenarios for defense spending. A number of such studies have concluded that when defense spending is higher, measured either as a share of output or in terms of its rate of growth, investment and GNP are lower. For example, Bezdek found that a projected 30 percent, five year growth in military spending financed by an equal growth in tax

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27. Prominent examples of these arguments are in Melman, *Profits Without Production*, *supra* #16; Dumas, *supra* #16; Dan Smith and Ron P. Smith, *The Economics of Militarism* (London: Pluto Press, 1983), Chapter 4; DeGrasse, *supra* #10; Mary Kaldor, *The Baroque Arsenal* (New York: Hill and Wang, 1981); Thurow, *supra* #10.

28. DeGrasse, *supra* #10, chapter II, appendix B; See also Albert Szymanski, "Military Spending and Economic Stagnation," *American Journal of Sociology*, 79, July 1973, pp. 1-14.

29. Ron Smith used a correlation matrix, which reports correlations among pairs of variables in a data set, as a guide in formulating more sophisticated tests. Ron P. Smith, "Military Expenditure and Capitalism," *Cambridge Journal of Economics*, 1, No. 1, March 1977, pp. 71-72. DeGrasse recognizes the limits of rank correlation analysis and presents additional information supporting the argument that military spending undermines growth and international competitiveness. However, he was not successful in an attempt to formulate other statistical tests. DeGrasse, *supra* #10.

revenues resulted in lower investment, employment, and GNP than either a "no change" scenario or a 30 percent cut in military spending accompanied by an equal cut in tax revenue. Wassily Leontief and Faye Duchin, using a worldwide input-output model, found that per capita output grew the fastest under a scenario where defense spending was projected to decline.[30]

Simulations studies assume, however, that the structure of the economy embodied in the model is also sufficient to describe the economy at a future date. Simulations must make assumptions about key economic variables, such as the growth of the labor force, changes in the money supply, tax rates, etc. Leontief and Duchin, who have developed input-output models that can incorporate some of these changes, were still required to assume that a change in defense spending was accompanied by offsetting changes in aggregate demand. In reality, changes in key variables can depart significantly from the assumptions, while alterations in economic structure can occur in direct response to the event being analyzed. For example, the oil price rises of the 1970s led to increased investment in energy efficient materials and production methods, which changed the relationship among energy, labor, and other inputs. As a result, the increase in oil prices had a less severe impact on the economy than had been expected.[31] In general, the economy's response to major events tends to be less severe than predicted by a model, due to such compensating changes.[32]

Econometric models have yielded negative regression coefficients when defense spending is related to investment, implying that an increase in defense spending is associated with a drop in investment, and vice versa. Using data from fourteen OECD countries, Ron P. Smith tested an equation where the investment to GNP ratio was explained by unemployment, the GNP growth rate, the defense share of GNP, and other variables. Smith interpreted his results as showing a one-to-one tradeoff between defense spending and investment, whereby

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30. Bezdek, *supra* #11; Wassily Leontief and Faye Duchin, *Military Spending: Facts and Figures, Worldwide Implications and Future Outlook* (New York: Oxford University Press, 1983). When military spending was projected to double as a share of output, except for the United States and Soviet Union where the level, not the share, was projected to double, per capita output throughout most of the world, including the industrialized countries, was projected to fall. See also, Congressional Budget Office (CBO), *supra* #10, for another recent example of a simulation study of military spending.

31. See, for example, William D. Nordhaus, "Oil and Economic Performance in Industrial Countries," *Brookings Papers on Economic Activity*, 2 (1980); Dermot Gately, "A Ten-Year Retrospective: OPEC and the World Oil Market," *Journal of Economic Literature*, 22, No. 3, September 1984.

32. One important research task would be a close, retrospective analysis of how the economy actually responded to substantial changes in defense spending.

every increase in the defense share of GNP was accompanied by an equal decrease in the investment share.[33]

Smith combined the data from all 14 countries in his estimates. However, when one combines data from a number of countries into a single estimate, the resulting coefficients are averages and, therefore, not necessarily meaningful for any single country. Smith did estimate equations for each country separately. For the United States, Smith's equation yielded a coefficient for defense spending that was negative, implying a tradeoff between defense spending and investment. However, the tradeoff coefficient for the U.S. alone was far smaller in value than the coefficient estimated from the combined data. Thus, the one-to-one tradeoff did not exist for the U.S. data. When examined separately, only four of the 14 countries (United States, Italy, Japan and Switzerland) had statistically significant negative coefficients, a prerequisite for arguing the presence of a tradeoff between defense spending and investment. Nine countries had coefficients that were not statistically distinguishable from zero. The remaining country, Australia, had a positive coefficient, which would imply that military spending stimulates investment.[34]

The variety of results obtained from individual country equations casts doubt about Smith's conclusion that such a tradeoff exists. Smith stated that time series analysis of individual countries is subject to a variety of influences, both short-term in nature and specific to each spending and investment. It is not clear how important such influences might be. The choice between using pooled data or focusing on individual countries may depend on the question being explored. Smith is concerned with examining the relationships that these countries have in common. But if one is concerned with a single country, the specific and short-term influences that appear in time series data are part of what needs to be analyzed.

Statistical Studies: Questions of Interpretation

In addition to statistical problems, there are also problems with the interpretation of the results of some of this research. Interpreting the direction of causality between defense spending on the one hand and investment and economic growth on the other can be a problem, especially when the business cycle is taken into account. Critics interpret a negative relationship as showing that growth in defense spending causes a decline, or slower growth, in investment and output. Other researchers argue, however, that defense outlays have been used by the U.S. government as a counter-cyclical device. In this case, a negative relationship could be consistent with a causal mechanism running from

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33. Smith found that the coefficient of the defense spending variable was not statistically different from minus one. Ron P. Smith, "Military Expenditures and Investment in OECD Countries," *Journal of Comparative Economics*, 4, No. 1 (1980). Smith "Military Expenditure and Capitalism," *supra* #29; See also Smith and Smith, *supra* #27, pp. 87-88, for further discussion of the one-to-one tradeoff.

34. Smith, "Military Expenditure and Investment in OECD Countries," *supra* #33, p. 30.

lower output and investment to increases in defense spending. Analysis of the timing of defense spending in relation to investment and changes in GNP would be an important component of any future work in this area.[35]

A study by Kenneth Boulding suggests that changes in defense spending may have little impact on investment.[36] Boulding looked at the elements of GNP for the United States for two years -- 1929 and 1969 -- each of which was the peak of a long business cycle boom. Thus, both years represent conditions as close to full employment as the economy could reasonably get. Differences in the investment share are not likely to be due to the business cycle, since the two years are at similar points in the cycle. Between the two years, defense spending as a share of GNP increased dramatically. However, there was no fall-off in the investment share; instead, the private consumption share of GNP fell. In addition, the level of GNP was substantially higher in 1969 than it had been in 1929. This data suggests that a larger defense burden could be consistent with substantial economic growth, and does not necessarily result in a decline in investment.

Boulding looked at data from two years that are separated by four decades. More important, extensive economic changes occurred between the two years: a major depression, a world war and a period of strong postwar expansion. The changes that Boulding's data are measuring are long term in nature. By contrast, econometric studies of annual data are essentially measuring the correlations among year-to-year changes in investment, defense spending, GNP and other variables. The absence of a tradeoff between defense spending and investment in Boulding's data, covering the long gap between 1929 and 1969, might still be consistent with a tradeoff seen in annual data covering the postwar years.

In addition, multiple regression analysis provides estimates of the impact of defense spending on investment, once the impact of other variables is taken into account. It is possible that a tradeoff could occur, and be measured econometrically, even if both defense spending and investment were to grow, or, as in the case of Boulding's data, the defense share of GNP were to rise while the investment share stayed constant. Such a result could imply that investment would have been even higher if defense spending had been lower. Thus,

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35. The most complete econometric presentation of the argument that military spending is used counter-cyclically is Larry J. Griffin, Michael Wallace, and Joel A. Devine, "The Political Economy of Military Spending: Evidence from the United States," *Cambridge Journal of Economics*, 6, No.1 (1982); See also James Cypher, "The Basic Economics of Rearming America," *Monthly Review*, November 1981.

36. Kenneth Boulding, "The Impact of the Defense Industry on the Structure of the American Economy," in *The Economic Consequences of Reduced Military Spending*, ed. Bernard Udis, (Lexington, MA: Lexington Books, 1973). See also, Michael Edelstein, "What Price Cold War? Military Expenditures, the Accumulation of Physical Capital, and Economic Growth: the United States, 1890-1980," (unpublished, December 1986), for conclusions similar to Boulding's.

Boulding's results do not prove the absence of a tradeoff, but they do raise doubts about how large such a tradeoff might be.[37]

Another problem of interpretation arises from the contention by advocates of the depletion theory that the negative economic impacts of defense spending and military R&D are cumulative. The empirical results already discussed suggest that the impact of defense spending should be symmetrical: any trade-off should apply equally to increases and decreases in defense spending. In other words, if a high military burden is associated with low investment rates and a poor overall economic performance, then a low burden should be linked to good economic performance. Similarly, a shift from a high to a low military burden, or a decline in the growth of military spending relative to the growth of GNP, should be associated with improved performance.

Given this symmetry in the empirical results, the actual pattern of defense spending in the United States raises some interpretative problems. Defense spending has fluctuated substantially in the postwar period. Measured in real terms, and as a percentage of both GNP and of government purchases of goods and services, military spending dropped after World War II, rose to its postwar peak during the Korean War, and then fell during most of the next two decades. Spending grew sharply during the Vietnam buildup, then dropped after 1969. While the Vietnam-era spending growth was concentrated in personnel, munitions, construction, and supplies, the current buildup has been concentrated in the investment accounts. These fluctuations, and especially the long term decline in real outlays for procurement, from the mid-1950s to the mid-1970s, raise an important question: If the depletion theory is correct, why didn't this two-decade long decline result in substantially improved U.S. economic performance?

One explanation offered by Dumas is that looking solely at aggregate data, such as changes in defense spending as a share of GNP, is insufficient, since such spending has a disproportionate impact on such key variables as R&D, capital

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37. The growth in defense spending after World War II may have been financed largely out of an increase in personal income taxes, which would help explain the decline in the consumption share of GNP cited by Boulding. Consumption growth is largely determined by growth in disposable income, which would be lessened by increases in income tax rates. Changes in the distribution of the tax burden, and an increase in the relative importance of deficit financing, could lead to changes in the tradeoff between defense spending and investment. An analysis of changes in shares of GNP, however, should not stop with private sector totals but should also analyze changes in social consumption and social investment, as embodied in growing public outlays for education, health, public works, and other items. Smith's work does define investment and consumption to include the relevant government spending categories. He interprets the tradeoff between defense spending and investment in terms of political struggles by income earners to maintain their share of total consumption both private and social. To the extent these struggles are successful, the consumption share would be constant and the investment share would fluctuate opposite to the defense share. Smith, "Military Expenditure and Capitalism," *supra* #29.

investment, and employment of technical labor.[38] However, defense R&D declined in real terms from the mid-1960s to the mid-1970s without any apparent gains for the economy as a whole. It is possible, of course, that the decline in defense investment outlays did have a positive impact on the economy, but was overwhelmed by other powerful negative economic influences, such as excessive monetary expansion, or the rise in oil prices. If that is the case, it would cast doubt on the implication in the depletion argument that defense spending is the key variable in explaining economic decline.

Melman especially emphasizes the cumulative nature of the depletion process, and, with Dumas, cites Hong's econometric work concluding that the cumulative impact of depletion surfaced in the mid-1960s and was a cause of the "stagflation" of the 1970s.[39] If the depletion hypothesis implies a cumulative impact, then the presence or absence of a short-term tradeoff may not be relevant. Tests need to be formulated that can measure the cumulative impact of high levels of defense outlays. Moreover, since the key element in the depletion hypothesis is the impact of military R&D on civilian R&D, tests also need to examine more specific possible tradeoffs involving civilian and military R&D.[40]

Possible Tradeoff Mechanisms

The statistical studies done to date on the relationship between defense spending and economic growth focus on relationships among items of data at the aggregate level. In evaluating such data, however, one needs to examine the variety of possible mechanisms through which the tradeoff between defense spending and non-defense economic performance might occur.

Government Spending

The government spending process is one obvious mechanism. An increase in defense outlays might be accompanied by a reduction in civilian government outlays, which could have a negative impact on economic growth and capital formation. Research on U.S. public sector spending, however, indicates that defense and civilian government outlays in the United States tend to move

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38. Dumas, *supra* #16, especially pp. 207-227. However, Dumas, along with most critics, does not hesitate to cite aggregate data, such as the share of GNP devoted to the military, in support of the depletion hypothesis for the United States, and in explaining why the postwar economic performance of Germany and Japan has been generally superior to that of the United States and the United Kingdom.

39. Dumas, *supra* #16, pp. 229-231; Melman *supra* #16, p. 225; Hong, *supra* #20. See also, Melman, *The Permanent War Economy*, *supra* #16. Hong's study, however, did not test for a link between defense spending and productivity change; see p. 10 above.

40. Frank Lichtenberg, using data from business firms, found a tradeoff between R&D spending financed by the firm itself, and R&D spending financed by the federal government. "The Relationship Between Federal Contract R&D and Company R&D," *American Economic Review*, 74, No. 2, May 1984.

together, rather than in opposite directions, suggesting that there is no systematic "guns-butter" tradeoff. One study, examining data on U.S. government spending on defense, health and education between 1941 and 1975 found no tradeoff pattern. This study concluded that the experience of the Reagan Administration, where growth in military outlays has been accompanied by cuts in many non-military budget categories, is an exception to the general pattern.[41] Another study found no statistically significant tradeoff between defense and welfare expenditures, except during wartime periods.[42]

One issue that has not been investigated is whether there is a tradeoff between outlays for defense investment and those civilian government outlays that might contribute to capital formation: public works, non-military R&D, and some outlays for transportation, education, worker health and safety, among others.[43]

Taxation

Defense outlays could also be financed through higher taxes.[44] The impact of such financing on capital formation and productivity, however, is not clear. Boulding's analysis, described above, attributed the apparent tradeoff between defense and consumption spending to the more extensive use of taxes on income after World War II. This implies that a heavier tax burden on corporate profits, dividends, or other investment income would have reduced investment outlays and capital formation. However, there is no evidence linking defense spending to any particular form of financing and it is not clear that the growth of income taxation is due to rising defense spending *per se*.

Indeed, the rapid growth of the payroll tax has reflected rising insurance obligations, while much of the growth of income tax revenues occurred while the share of defense spending in government spending was actually falling. This

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41. Bruce Russett, "Defense Expenditures and National Well-Being," *American Political Science Review*, 76, No. 4, December 1982.

42. William K. Domke, Richard C. Eichenberg and Catherine M. Kelleher, "The Illusion of Choice: Defense and Welfare in Advanced Industrial Democracies 1948-1978," *American Political Science Review*, 77, No. 1, March 1983.

43. Russett, *supra* #36, tested for tradeoffs between defense outlays and spending on health and education, with the latter seen as social investment. He found no systematic tradeoff. Smith, *Military Expenditure and Capitalism*, *supra* #29, defined investment to include both private and public outlays, but did not test for a tradeoff between military and public investment outlays.

44. Using tax revenues to fund defense outlays, as opposed to using deficit financing, would tend to reduce the impact of any increase in defense outlays on aggregate demand, since tax increases remove purchasing power from the economy. Similarly, a defense buildup would also be less inflationary if financed from taxes than if it were financed by deficits.

implies that the rising personal tax burden was being used to finance, to a large extent, growing non-military outlays.[45]

Deficit Financing and "Crowding Out"

Defense spending might reduce investment if defense outlays were financed through government borrowing, which could make it harder for private sector borrowers to obtain needed funds. At the beginning of the current buildup, it was widely argued that higher defense outlays, combined with tax cuts, would result in large federal budget deficits. In turn, funding these deficits through borrowing would absorb a large portion of the economy's savings, raising interest rates, and "crowding out" many other borrowers, including businesses seeking funds for new investments.[46] Such crowding out did not occur in the 1980s, largely because an influx of financing from abroad significantly supplemented domestic savings.

Because of the foreign capital inflow, a second version of the deficit financing/crowding out scenario was formulated, in which high deficits pushed up interest rates, creating a gap between U.S. rates and lower rates abroad. This interest rate differential, it is argued, induced foreigners to buy dollars in order to lend and to purchase equities and other assets on U.S. markets, pushing up the value of the dollar, reducing prices of goods imported into the United States, and raising prices of U.S. exports. The result was a widening trade deficit and lower output in U.S. exporting and import-competing industries.[47] In both versions of the crowding out story, some important U.S. activity -- business investment or exports -- is reduced, and domestic economic growth is lower.

There are a number of problems with both versions of crowding out. It is extremely difficult to isolate any expenditure as being financed by deficits, rather than by taxes. Deficits are a residual item, resulting from numerous changes in both expenditures and revenues. The increase in deficits during the Vietnam War and again in the early years of the Reagan Administration are instances where the link between defense spending and budget deficits seems clear. However, during the 1950s, when defense outlays were a far higher share of government spending, budget deficits occurred far less frequently and were much smaller in size.

During the 1970s, when deficits were more common and began to increase in size, defense outlays were at their lowest point since before the Korean War,

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45. There are theories which project that defense spending, welfare spending, and income taxes will grow together, not because one causes the other, but because all three are responses to the same set of problems. See James O'Connor, *The Fiscal Crisis of the State* (New York: St. Martin's Press, 1973).

46. Gold and DeGrasse, *supra* #10; Thurow, *supra* #10.

47. Franco Modigliani, "And Why the Deficit Must Be Slashed," *New York Times*, November 5, 1985; Martin Feldstein, "U.S. Budget Deficits and the European Economies: Resolving the Political Economy Puzzle," *American Economic Review*, 76, No. 2, May 1986, pp. 342-346.

measured as a percentage of government outlays. During the 1980s, moreover, tax cuts and slower economic growth than anticipated have also made significant contributions to the record high deficits.

Statistical studies have found no consistent relationship between government deficits and interest rates. One analysis of four wartime periods (the Civil War, World War I, World War II, and the Korean War) found that deficits were associated with a lowering of interest rates, the opposite of what one would expect from the crowding out theory.[48] The most likely explanation of this result was that other factors in the broader economic context, such as monetary policy, the inflow of foreign funds, or the more effective mobilization of savings during wartime, were the most important determinants of interest rates during these periods.

The events of the 1980s still need to be explained. The period of high real interest rates and a rising dollar began while deficits were smaller, and resulted initially from the anti-inflationary tight money policies adopted by the Federal Reserve in 1979.[49] Both interest rates and the dollar have fallen substantially since 1985, although the deficit remains unusually high. Moreover, the inflow of foreign funds has, through the end of 1986, remained large, despite the fall in the dollar (which imposes capital losses on holders of dollar-denominated assets) and the narrowing of the interest rate differential that had favored the United States.

These developments suggest that the outflow of financial capital from Germany, Japan, and the United Kingdom, as well as the increase in capital flight from Latin America, may have less to do with the U.S. budget deficits than had previously been thought, and more to do with economic conditions within those nations. Thus, both versions of the crowding out story leave out important variables and are not as consistent with the data as they might be.[50]

Resource Competition in the Market

Beyond the public sector mechanisms, the market could be a significant channel through which defense spending affects civilian economic growth. Defense firms and their subcontractors might obtain resources by paying higher prices and offering higher wages than firms producing for civilian markets.

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48. Paul Evans, "Do Large Deficits Produce High Interest Rates?" *American Economic Review*, 75, No. 1, March 1985, pp. 68-87. A Congressional Budget Office review of empirical studies concluded there was no systematic link between budget deficits and interest rates. Congressional Budget Office, *The Economic and Budget Outlook: Fiscal Years 1988-1992, Part I* (Washington, DC: U.S. Congress, January 1987), pp. 97-102.

49. Gerald Epstein, "The Triple Debt Crisis," *World Policy Journal*, 2, No. 4, Fall 1985.

50. It is also possible that the deficit, when appropriately measured to adjust for inflation and changes in the market value of bonds, has had a smaller impact on the economy than previously thought. See Robert Eisner, *How Real is the Federal Deficit?* (NY: The Free Press, 1986).

Moreover, military sector firms might be aided in this process by the Defense Department's practice of making "progress payments" before any product is delivered and acquiescing in cost overruns due to poor management and higher than anticipated wage and materials costs.

During the Vietnam War, the demands of the defense industry appear to have resulted in shortages of personnel, machinery and raw materials for civilian industries. During the 1980s, however, such shortages appear to be minimal. The primary difference between the two situations is that the Vietnam buildup occurred when the economy was reaching a business cycle peak, while the beginning of the current buildup coincided with the onset of a deep recession. The wider economic context, in other words, had a significant impact on the existence of a market tradeoff.

Beyond the specifics of a given defense buildup, however, there have been no analyses of general patterns of resource tradeoffs in the market.[51] Such patterns could be difficult to isolate. The resource requirements of defense production change and needs differ depending upon whether a buildup occurs during wartime or is designed to modernize weaponry in peacetime. Resource availability, moreover, will depend on the state of the economy -- for example the existence of substantial spare capacity (as in 1981-82) or little room for expansion (as in 1966-68) -- as well as on the degree to which resources can be obtained from overseas. Thus, as with other aspects of the defense economics debate, the degree to which defense spending might crowd out investment in the private market is determined by a broad range of factors. Hence, hypotheses about potential tradeoffs between defense and civilian resources need to be more thoroughly explored in the context of actual situations.

Tradeoffs in Specific Industries

Case studies of specific industries have also been used to support the hypothesis that defense spending undermines productivity, hence U.S. economic growth and competitiveness. Semiconductors and machine tools are specifically cited as two examples. In these sectors, it is argued, once dominant U.S. firms are said to have gradually lost technological and market leadership because military performance requirements and cost structures are unsuited to commercial competition and distort the development of the industry as a whole. Non-military industries, including automobiles and steel, have also been cited as examples of competitive decline resulting from depletion and loss of "productive competence".[52]

In the case of semiconductors, however, demand from defense sector users was actually an important early stimulant to the development of the industry. Defense demand expanded the initial market, stimulated research, and allowed firms to develop economies of scale. As a result, costs fell rapidly. More recently, the industry has lost technological initiative and market position to

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51. See Chapter IV on employment tradeoffs.

52. Melman, *Profits Without Production*, *supra* #16; Kaldor, *supra* #27; DeGrasse, *supra* #10.

Japanese firms and the distorting effects of military technology, especially the emphasis on high performance without regard to cost controls, have been cited as the cause.[53]

However, other factors may also be of considerable importance. In Japan, semiconductor manufacturers are bound in a series of alliances with product manufacturers, financial institutions, and government agencies. Japanese firms have tended toward a long-term view emphasizing investment in research and development in production technology. The firms are supported by government assistance for R&D and by financial institutions that are willing to advance funds on the basis of long-term prospects for market growth.

In the United States, there has been little government assistance to the civilian side of the semiconductor industry, which clearly has hurt U.S. firms relative to the Japanese. Moreover, in the more decentralized U.S. structure, firms have been hit harder by business cycle fluctuations and by changes in demand for products. During recessions and slumps in demand for key products, U.S. firms have cut back on research in order to reduce costs and preserve profitability. The result has been a "stop-go" investment cycle that has hampered long-term technological progress.[54] The relative importance of these factors versus the role of defense demand and contracting practices on the industry needs a more thorough assessment than it has had.

If the depletion theory explains the decline of American manufacturing at a more general level, however, its role should be evident in the evolution of major industries with little direct involvement in defense, such as automobiles, chemicals and textiles. The success of Japanese auto firms is based to a significant extent on their use of flexible production technologies reinforced by innovations in electronics. These technologies have allowed Japanese firms to maintain low production costs and to produce cars with a high degree of reliability. U.S. firms, on the other hand, have focussed on marketing. The U.S. industry built a reputation for production competence based on the Ford model of auto production, but also due to the large internal market, which allowed the most successful firms to achieve significant economies of scale and underprice many competitors. Since the 1930s, however, U.S. auto production has become increasingly dominated by the marketing approach pioneered by Alfred P. Sloan of General Motors, who

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53. Michael Borrus, James E. Millstein, and John Zysman, "Trade and Development in the Semiconductor Industry: Japanese Challenge and American Response," in *American Industry in International Competition*, eds. John Zysman and Laura Tyson (Ithaca, Cornell University Press, 1983); Leslie Brueckner, "Assessing the Commercial Impact of the VHSIC (Very High Speed Integrated Circuit) Program," *Berkeley Roundtable on the International Economy* (Berkeley: University of California, 1984).

54. Robert Reich, "Japan in the Chips," *New York Review of Books*, November 19, 1981.

introduced into the industry annual model changes, the proliferation of models, and other marketing techniques.[55]

Starting in the 1950s, when worldwide tariff barriers began to fall, European and Japanese automobile producers have achieved economies of scale by exploiting export markets. U.S. firms responded to the new competition by reemphasizing marketing and later by seeking government support through protectionist measures. The failure of U.S. firms to meet the challenges of new production technologies has, over time, cost them significantly in terms of market share.

Were these failures to meet competition due to a decline in production competence which in turn, grew out of a shortage of resources or skilled personnel for civilian research and development? This explanation does not seem particularly strong. For one thing, the auto industry was immensely profitable, paid high salaries and produced a popular product. It is unlikely that U.S. auto companies would be consistently outbid for engineering talent by defense firms.

David Halberstam, in his recent comparative history of Ford and Nissan, suggests that the Japanese auto industry was able to attract the best available engineering talent, due to the absence of an aerospace industry. In the United States, by contrast, the best engineers were hired to work on defense-related projects. However, the image of the top auto manufacturers being unable to compete for engineers does not square with other aspects of their behavior. Halberstam also describes how Ford competed for managerial talent:

> The Ford Motor Company was rich, and in those days it could offer earlier success and larger salaries than other companies. It also placed a high priority on recruiting; in the fifties it was getting the cream of the nation's business-school graduates.[56]

The basic theme of Halberstam's book is that U.S. and Japanese auto firms established different priorities, with the former emphasizing financial management and the latter seeking to exploit segments of the market the Americans were ignoring, using cost-minimizing innovations. Indeed, many Japanese innovations had roots in ideas that had been ignored or de-emphasized in Detroit, as American companies felt secure in their market dominance. If the top management of Ford and the other U.S. companies had wanted to, there is no reason they could not have successfully competed for the best engineers.

Second, the basic strategy and structure of the U.S. auto industry were in place well before the growth of a permanent defense sector. The response of

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55. Alan Altshuler et al, *The Future of the Automobile* (Cambridge, MA: The MIT Press, 1984); John M. Blair, *Economic Concentration: Structure, Behavior and Public Policy* (New York: Harcourt Brace Jovanovich, Inc. 1972), especially pp. 334-338, 474-479, 502-507; ed. Alfred D. Chandler, Jr., *Giant Enterprise: Ford, General Motors and The Automobile Industry* (New York: Harcourt, Brace & World, Inc., 1964).

56. David Halberstam, *The Reckoning*, (New York: William Morrow and Company, 1986), p. 214.

U.S. firms to foreign competition -- first to ignore it, then to fight it through marketing, and finally to petition the government for help -- is exactly what would be expected from a mature, oligopolistic industry that considered itself largely immune from competitive pressures. It is not clear that the depletion theory adds anything of significance to the explanation of the postwar behavior of the U.S. auto industry.

A recent study of innovation and productivity in chemicals and textiles show striking differences between these industries and raises further problems for the depletion theory.[57] The study analyzed the relationship of innovation to productivity changes in the two industries, using interviews with industry specialists and a detailed survey of technical literature. In chemicals, innovation slowed down in the mid-1960s, and productivity growth was significantly lower in the 1970s than it had been earlier in the postwar period. About half of the drop in productivity was attributed to under-utilization of capacity, the result of lower than anticipated growth in demand. The study did not investigate why innovation slowed, and there is no attempt to raise the issue of whether the growth in military R&D adversely affected the chemical industry.

For textiles, however, the story was different. Innovation did not tail off, and the drop in productivity in the 1970s was small. One explanation for the differences between the two industries might be found in their respective structures. Chemicals is an oligopolistic industry with a high degree of capital intensity. New capacity is expensive and must be built in advance of demand growth. Thus, innovation and demand would be important determinants of productivity growth. Textiles is structured more competitively. Textile machinery is a separate industry, also structured competitively. Firms in both textile-related industries can adjust capacity relatively quickly, and there is constant pressure to innovate since innovation is a prime mechanism for controlling costs and achieving profitability. One implication of the evidence for textiles, an industry that has suffered from import competition, is that its problems may not stem from a shortfall in innovation. This conclusion, if it were to hold up, is not consistent with the depletion theory.

Spin-Off from Defense Technologies

Even if it were true that defense spending drew investment and R&D resources away from the civilian sector, making it more difficult for the economy to achieve high rates of growth in productivity and GNP, there might be mechanisms through which benefits flow back to the civilian sector from defense research and production. The "spin-off" of new products and new technologies from the military has been described as an important economic stimulant in the past and is frequently cited as a justification for current defense programs. There are a number of examples of such spin-off. Weapons production appears to have been a source of significant technological innovation in the United States during the nineteenth century and immediately after World War II, and at various times in the United Kingdom. Moreover, such technologies as aircraft, aircraft

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57. Martin Neil Baily and Alek K. Chakrabarti, "Innovation and Productivity in U.S. Industry," *Brookings Papers on Economic Activity*, 2 (1985).

engines, microcircuits, computers, fiber optics, lasers and composite materials can all be tied in some way to defense spending.[58]

There has been virtually no systematic analysis, however, of the importance of the spin-off effect. The products and technologies attributed to defense spending might have occurred in the absence of such programs and at a different cost and speed. The extra benefits of such technologies relative to the extra cost of conducting such research through the military are thus unclear.

Dumas argues that spin-off cannot be very effective, since it would be obviously more efficient to subsidize civilian research directly.[59] However, spin-off may be important under certain conditions. Kaldor has argued that historically "military technology is rarely in phase with civilian developments over the long term, since it is very advanced, stimulating new civilian technology" in some periods, but "decadent, dragging the economy backwards" at other times.[60] It would be an important research task to analyze the conditions under which military technology can act as a stimulant, and the conditions under which it is decadent.

The Ability of the U.S. Economy to Compete

The argument about the relationship between defense spending and economic performance has become more acute in recent years because of the apparent inability of U.S. manufacturing to compete in international markets, especially markets for manufactured goods and high technology products. Advocates of the depletion theory of defense spending increasingly focus on the U.S. trade gap and the more successful recent performance of such economies as those of Japan and West Germany, linking these changes in the world economy directly to the impact of defense spending on the U.S. economy. Defense production, they argue,

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58. Clive Trebilcock, "'Spin-off' in British Economic History: Armaments and Industry, 1760-1914," *Economic History Review*, 22, No. 3, December 1969; Nathan Rosenberg, "Technological Change in the Machine Tool Industry, 1840-1910," *Perspectives on Technology* (Cambridge, MA: Cambridge University Press, 1976); Gansler, *supra* #17, p. 21.

59. Dumas *supra* #16, pp. 213-217. Dumas also argues that if spin-off were an important phenomena, the high levels of defense spending and R&D in the postwar period would have improved U. S. economic performance; instead, productivity and economic growth rates have declined. It is possible, however, that negative factors were simply too large, and that even a strong, positive spin-off effect could not compensate.

60. Kaldor, *supra* #27, p. 4. Kaldor also cites Britain at the end of the nineteenth century and the U.S. after World War II to argue that defense technology is dominated by "elaborate custom-built product improvements that are typical of industries on the decline instead of the simpler mass-market process improvements which tend to characterize industries in their prime." Kaldor, p. 5.

removes resources disproportionately from exporting industries, directly weakening their ability to compete on international markets.[61]

Here the question of the broader economic context is of crucial importance. The apparently declining competitiveness of U.S. manufacturing needs to be examined in the broad framework of recent economic developments, including major changes in currency exchange rates (which can change trading advantages greatly), the debt crisis of developing countries (which would reduce U.S. export markets), a stronger U.S. business cycle expansion relative to Europe and Japan (which would increase U.S. imports) and changes in the domestic economic and fiscal policies of such major countries as West Germany and Japan (which have stimulated exports to the U.S.). All of these developments would contribute to a large U.S. trade deficit, and would reduce the competitiveness of U.S. exports, even if the United States had spent significantly less on defense.

Depletion theory argues, however, that there is a critical link between defense spending and the slow growth in U.S. productivity in recent years, which has a direct effect on U.S. competitiveness. As already noted above, it is difficult to connect productivity problems in specific industries with increases in or the basic nature of defense spending.

More generally, the link between defense spending and overall slow growth in U.S. productivity is not clear. Analysts have searched extensively for the broad sources of productivity growth and decline in the United States since 1965 without coming to simple conclusions or even to a consensus. Edward Dennison, for example, suggests that increases in knowledge explain a large part of long-term U.S. economic growth, but he finds that the productivity slowdown after 1965 was not related to a slowdown in R&D or a shortage of capital.[62]

To Dennison, the slowdown in U.S. productivity remains somewhat mysterious. He does argue that the post-1965 slowdown occurred in two stages. The first, from 1966 to 1973, he attributes largely to cyclical phenomena, while the second, deeper decline, remains unexplained.[63] Dale Jorgenson, however, attributes the sharp decline in productivity after 1973 to the rise in oil prices.[64]

Zvi Griliches finds lower R&D spending to be an important source of productivity decline, but also points out that data on R&D are poor, making it

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61. For one example see, Kurt Rothschild, "Military Expenditure, Exports and Growth," *Kyklos*, 26, No. 4 (1973).

62. Edward F. Dennison, *Trends in American Economic Growth, 1929-1982* (Washington, DC: The Brookings Institution, 1985).

63. Edward F. Dennison, "The Contribution of Capital to Economic Growth," *American Economic Review*, 70, No. 2, May 1980. Depletion theory treats the post-1965 period as a single entity.

64. "The Answer is Energy," Interview with Dale W. Jorgenson, *Challenge*, November/December 1980.

difficult to apply standard statistical techniques to the analysis.[65] In a study explicitly comparing productivity performance in a sample of U.S. and Japanese manufacturing firms, Griliches and Jacques Mairresse found that the two sets of companies spent about the same on R&D and investment, when measured as a percent of sales. But Japanese firms did not add significantly to their labor forces during the 1970s, while U.S. firms did. This gave Japanese firms a larger increase in ratios of capital to labor and accounts for the greater increase in labor productivity in Japanese as compared with U.S. manufacturing companies.[66]

The lack of consensus among researchers on the source of productivity growth and decline in the United States is a clear indication that further empirical work is needed. Most analysts of productivity do not consider the effects of defense spending, while very few analysts of defense spending relate their work to existing research on productivity.

Productivity problems, however, are not the only structural changes taking place in the international economic context which could affect the U.S. competitive position. The multinationalization of manufacturing, for example, has proceeded significantly further for U.S. industry than for the Japanese, raising important questions about depletion theory.[67] If the process of depletion resulting from defense spending has weakened U.S. management, then why are U.S.-managed multinational corporations effective competitors outside of the United States? If depletion reduces productivity and competitiveness within the U.S. economy, then why are Japanese-managed firms successful in both the United States and United Kingdom?

Over time, moreover, multinationalization by Japanese firms may change the terms of competition. As Japanese firms increase their direct investment in the United States and Europe, sales by these affiliates will begin to grow faster than Japanese exports, which is likely to reduce the Japanese trade surplus.[68]

Ultimately, the declining U.S. position in international markets has taken place in the context of important changes in the global economy since the end of the World War II. These changes go far beyond the question of defense spending. The U.S. dominance of the world economy was significantly advanced by two world wars and the massive depression of the 1930s, which damaged the economies

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65. Zvi Griliches, "Productivity, R&D, and Basic Research at the Firm Level," *American Economic Review*, 76, No. 1, March 1986, pp. 141-154.

66. Zvi Griliches and Jacques Mairresse, "R&D and Productivity Growth: Comparing Japanese and U.S. Manufacturing Firms," *Working Paper No. 1778*, National Bureau of Economic Research, December 1985.

67. Kenichi Ohmae, *Triad Power: The Coming Shape of Global Competition* (New York: The Free Press, 1985), p. 53.

68. To give one recent example, Japanese automobile manufacturers have been building factories in the United States, and are beginning to plan for exporting some of the output from their U.S. factories back to Japan. "A Hot American Car May Hit Japan: The Honda," *Business Week*, January 26, 1987.

of other industrialized nations far more than that of the United States. The large U.S. trade surpluses of the 1950s and 1960s were to some extent a product of uneven economic development between the United States and other nations and could not reasonably have been expected to continue forever.

Moreover, conscious U.S. policy decisions aided the rebuilding of the economies of Europe and Japan, encouraged the creation of the European Common Market, and promoted investment and trade, hastening the end of U.S. dominance. In addition, the United States could not remain dominant in the economies of the Third World forever. Developing countries such as Brazil, South Korea, Singapore, Hong Kong and Taiwan have been increasing their exports to the United States and have become major competitors for some U.S. industries. Many of these changes in the world economy were inevitable, independent of U.S. levels of defense spending.

One specific comparison, however, seeks consistently to link defense spending to international economic performance: that between the United States and Japan. Japan, as noted above, is the extreme case in statistical comparisons of economic data. It is a common piece of folk wisdom that Japan's superior economic performance since World War II is due to its low level of defense spending and defense R&D, while nations with higher military burdens, such as the United States and United Kingdom, have been unable to find a formula for sustained economic growth.[69]

Although superficially compelling, this argument rather dramatically avoids the major role played by other economic developments in distinguishing between the paths of economic growth followed by the United States and Japan and places far too much weight on the single factor of defense spending. In reality, Japan's rapid economic growth is linked to a number of social and economic circumstances and government policies over the past 40 years: large numbers of relatively low wage workers ready to move into industrial and commercial activities in the 1950s and 1960s; close relationships among financial, marketing, and industrial enterprises which provide firms with a cushion against recessions and permit them to concentrate on long-term objectives; a production strategy emphasizing product quality and the continual updating of process technology which helps Japanese firms penetrate Western markets with high quality products; and government policies that stimulate savings, reinforce technological dynamism, subsidize exports and protect Japanese firms from import competition.[70]

It remains unknown whether such policies and circumstances would have stimulated the economy if Japanese defense spending had been larger. For example, would the Japanese have financed higher defense outlays by reducing

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69. Some statistical analyses argue that countries that devote a small proportion of their output to defense spending tend to have higher savings and investment ratios, higher productivity growth, and higher GNP growth than countries with higher ratios of military spending to GNP. DeGrasse, *supra* #10.

70. See, for example, Bennett Ramberg, "The Japan Problem," *Foreign Affairs*, 65, No. 2, Winter 1986/87; Chalmers Johnson, *MITI and the Japanese Miracle: The Growth of Industrial Policy, 1925-1975* (Stanford, CA: Stanford University Press, 1982); Harry T. Oshima, "Reinterpreting Japan's Postwar Growth," *Economic Development and Cultural Change*, 31, No. 1, October 1982.

consumption, or, rather, by reducing investment? Would a larger Japanese defense industry have had cost control problems? Would the government have been able to insulate the civilian economy from such inefficiencies?

The case for continued Japanese economic success, moreover, can be overstated. Japanese firms have not been successful in penetrating international aerospace markets, for example. Japanese performance in basic metals industries are often cited as an example of their superiority relative to U.S. firms, yet in recent years Japanese firms have been forced to curtail capacity in steel and other metals production, due to successful competition from South Korea, among other developing countries. Similarly, Japanese producers have began to feel the impact of increased competition in low cost automobiles from South Korea. The substantial rise in the value of the yen relative to the dollar since 1985 has caused significant disruption in Japanese industry and suggests that perhaps some of the intra-firm or intra-industry differences emphasized by industrial policy and depletion advocates may not be as important as previously thought.[71]

Finally, as the previous discussion has already suggested, while the United States has had problems with capital formation and economic growth, it is not clear how much these can be attributed to defense spending, independent of other economic changes. Economic growth rates in the United States have been highest when defense spending has been high or rising, as in the mid-1950s, mid-to-late 1960s, and 1982-1986. The period of economic stagflation in the 1970s coincided with a decline in U.S. defense spending.

Comparisons with European countries also suffer from overreliance on just one cause. Great Britain is often cited as a country with high defense spending and a deteriorating industrial base, while West Germany has a strong economy with a smaller defense sector. Britain's economic difficulties can be linked to many other factors, however, most prominently economic policies that, for almost a century, favored financial over industrial interests, including a long-standing tendency to maintain a high value for the pound.[72]

Moreover, the West German economy is not a one-dimensional success story. The economic miracle of the 1950s and 1960s gave way to stagflation in the 1970s and 1980s, including a stubbornly high level of structural unemployment in the Federal Republic. For the postwar period as a whole, West Germany's economic performance is no better than that of France, a country with a greater involvement in defense R&D.[73] In recent years, business and political leaders throughout the European Community have expressed concern about the need to

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71. Susan Chira, "Japanese Steel's Darkest Days," *New York Times*, August 3, 1986; Leslie Helm, "The 'Four Tigers' are Pouncing on Japan's Markets," *Business Week*, March 24, 1986.

72. John Eatwell, *Whatever Happened to Britain?* (London: British Broadcasting Corporation and George Duckworth and Co., 1982).

73. Between 1960 and 1985, West Germany had lower average rates of unemployment and inflation, while France had higher average annual growth in investment and output. Organization for Economic Cooperation and Development, *Historical Studies, 1960-1983* (Paris: OECD, 1983); OECD, *Main Economic Indicators* (Paris: OECD, 1986).

formulate appropriate policies to catch up with the two countries they see as the world's technological leaders: Japan and the United States.[74]

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Many critics of defense spending in the United States focus the weight of their argument on a presumed negative relationship between defense outlays and private sector research and development, and on the consequent decline in U.S. innovation, productivity and international competitiveness. While some statistical evidence supports elements of this position, it cannot be said that the argument has been empirically verified. Existing statistical studies have severe methodological limitations and problems of interpretation. It is not clear that defense spending actually deprives an economy of the resources for investment or for research and development, nor is it proven that high levels of defense spending create a cumulatively negative impact on economic growth.

It is also unclear how defense spending actually has an impact on productivity and economic growth. There is little evidence of a tradeoff in public spending, although some research on public sector investment spending remains to be done. The case for defense spending crowding out private investment through the taxation or federal borrowing processes is a weak one, although the high deficits of the 1980s may yield important new evidence. Specific industry case studies show defense spending to be one among a number of sources of competitiveness problems in some instances, and to have little or no impact in others. The literature on spin-offs from defense to non-defense technologies is mixed and unsystematic.

Finally, it is not clear that defense spending is the source of the overall U.S. competitiveness problem. Literature on productivity, which is described as the central issue, does not attribute major responsibility to defense spending and more work needs to be done in this area. With respect to competition in international markets, moreover, a far wider array of changes in the economic context can explain the rise of Japan and Germany and the decline of the United States and United Kingdom. Defense spending may be a significant variable, but the case has not been made.

There remains significant scope for empirical research in this complex arena of technology, productivity, investment, economic growth and international competitiveness, with a number of issues remaining to be resolved.[75]

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74. Even Japanese firms continue to look to the United States for new technology. Bernard Wysocki, Jr., "Japanese Start Buying U.S. Firms Stressing Latest in High Tech," *Wall Street Journal*, August 8, 1986.

75. The Defense Budget Project is preparing a second study focusing specifically on research bearing on this set of issues.

IV. Defense Spending And Employment

Economy-Wide Employment Impacts

Since World War II, when military service and wartime production absorbed a large body of unemployed people the link between defense spending and employment has been an important part of the public debate over defense economics.

From the viewpoint of the Defense Department, while jobs are not a primary reason to support a certain level of defense spending, they are an economic reality of which the Congress and the public are often reminded. Defense Secretary Caspar Weinberger has argued that military spending is labor intensive and that "by cutting defense spending, you create substantial unemployment."[76] For defense contractors, the loss of jobs around defense cutbacks (such as

76. See Weinberger testimony before the House Appropriations Committee, Subcommittee on Defense Appropriations, *Hearings on Department of Defense Appropriations for FY 1984*, Part 1 (Washington, DC: Government Printing Office, 1983), p. 440. Weinberger also argues that 35,000 jobs depend on each $1 billion of defense procurement spending. *Ibid*, and Caspar Weinberger, *Annual Report to the Congress*, Fiscal Year 1984 (Washington, DC: Department of Defense, 1983), p.68. In a 1980 defense economics symposium sponsored by the Defense Department, Pentagon economist David Blond noted that an average annual increase of 10 percent in defense spending might lead to a decline in the rate of unemployment ranging between 0.6 and 2.4 percent, according to the projections of various econometric models presented at the symposium. Blond also contended that such an "accelerated defense program would provide more jobs in the private economy, thus reducing unemployment." See Office of the Secretary of Defense, *Symposium on the Impact of Higher Levels of Defense Expenditures on the United States Economy in the 1980's*, October 26-29, 1980, Arlington, VA (Washington, DC: Office of the Secretary of Defense, 1980), cover letter by David Blond, p. 2 and Table I.

occurred after the Vietnam War) and the hiring which accompanies new contracts can be cited as evidence that defense dollars are beneficial for employment.[77]

Some critics of defense spending contend that the defense dollar is actually harmful to employment, creating fewer jobs than virtually any other form of federal spending.[78] A shift of funds from the defense budget to other federal programs or cutting taxes would create a larger number of jobs. Some researchers go so far as to assert that large defense outlays actually cost the economy jobs.[79]

Defense spending clearly creates a large number of jobs, directly and indirectly.[80] Economic models provide a variety of estimates of the actual number, ranging from 25,000 jobs per $1 billion of spending estimated by a 1983 Congressional Budget Office study to the 35,000 per $1 billion cited in Defense Department testimony.[81] These numbers alone, however, say little about the relative employment impact of defense spending. Employment in defense must be

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77. See, for example, the lobbying campaigns by Rockwell International for the B-1 bomber and Grumman for the F-14 in the 1970s, which made ample use of the jobs argument. Gordon Adams, *The Politics of Defense Contracting: The Iron Triangle* (New Brunswick, NJ: Transaction Press, 1982), Chapter 13.

78. See David Gold et al., *Misguided Expenditure: An Analysis of the Proposed MX Missile System* (New York: Council on Economic Priorities, 1981), especially Table 5, p. 157; Bezdek, *supra* #11; Chase Econometric Associates, *Economic Impact of the B-1 Program on the U.S. Economy* (Bala Cynwyd, Pa.: Chase Econometrics, 1975); Carolyn Kay Brancato and Linda LeGrande, "Impact on Employment of Defense versus Non-Defense Government Spending", *Congressional Research Service Issue Brief MB82246* (Washington, DC: Library of Congress, 1984). As one group has put it, for example: "Military spending creates fewer jobs per billion dollars spent than any other category of government spending except the space program....The bulk of military spending goes to hardware, not to creating jobs." Minnesota Clergy and Laity Concerned, *Jobs and Peace: Military Spending and Its Impact on Minnesota's Economy* (Minneapolis: CALC, 1982), p. 11.

79. An Employment Research Associates report argues, for example, that "contrary to long held and popular belief, military spending is not good for the economy. It does not create employment -- it generates unemployment...every time the military budget went up $l billion, l0,000 jobs disappeared in the United States." See Marion Anderson, *The Empty Pork Barrel: Unemployment and the Pentagon Budget* (East Lansing, MI: Employment Research Associates, 1982), p. 1.

80. Direct jobs are those employed directly by federal funds of contracts; indirect jobs are those that result from purchases of inputs for production.

81. Weinberger, *supra* #76 and CBO, *Defense Spending and the Economy*, *supra* #10. Assistant Secretary of Defense Lawrence Korb provided data in 1982 showing defense generated employment per $1 billion ranging from 28,500 to 63,400 jobs, depending on the model being used. Lawrence Korb, *Memorandum* (Washington, DC: Department of Defense, 1982).

compared to the creation of jobs through other forms of federal or private spending in order to gauge the relative impact of defense outlays on employment in the economy.[82]

Although there is a considerable body of work making such comparisons, it does not permit easy conclusions. Depending on the study, one could conclude that defense spending is a very poor generator of employment, only marginally different from, or virtually the same as other federal spending programs or fiscal policy decisions. Data generated by the U.S. Bureau of Labor Statistics, for example, seem to show an enormous difference between the number of jobs generated by federal spending on health or education and those generated by defense purchases. These comparisons, however, are not particularly meaningful, since they count only the direct and indirect jobs created by different spending programs, not those induced in the economy as a result of spending wage dollars.[83] As a result, these data are more a measure of wage differences in various segments of the labor market than an index of the real job creation potential of different types of federal spending.[84]

Other studies, using input/output models of the U.S. economy that examine the employment requirements generated by a given amount of final demand for military and civilian products, show similar, although far less dramatic, differences. Comparing spending on a specific type of defense program (e.g., demand for MX missiles) with a list of selected non-defense alternatives, some input/output studies suggest that most alternative types of spending appear to create more jobs in the economy than defense.[85]

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82. One weakness of the analyses presented at the 1980 Defense Department symposium was the absence of any comparison to alternative types of federal spending. See Department of Defense, Symposium on the Impact of Defense Expenditures, *supra* #78.

83. Tom Riddell, "The Employment Effects of Military Spending," paper presented at the Meetings of the Allied Social Science Associations, December, 1984, p. 19. The BLS data (and most other comparisons of this kind) do not distinguish between full-time (characteristic of the defense industry) and part-time (characteristic of service sector work) jobs. Riddell, p. 11.

84. Brancato and LeGrande note that average hourly wages in defense-intensive manufacturing industries in 1983 ran nearly $2.80 higher than average hourly wages in all manufacturing industries. Brancato and LeGrande, *supra* #78, p. 4.

85. See, for example, Gold, *Misguided Expenditure*, *supra* #78, p. 157, indicating that the MX missile program would create 53,000 jobs per $1 billion dollars of federal expenditure, while such alternative expenditures as mass transit, housing and railroad construction would create 77,000, 68,000, and 54,000 jobs, respectively. As Riddell has pointed out, one needs to be careful using input/output tables. While they show the employment requirements of certain types of final demand, they do not calculate actual employment which would result from such spending. Riddell, *supra* #83, p. 17.

On the other hand, a 1983 analysis by the Congressional Budget Office (which combined an input\output model of production with an econometric analysis of demand) concluded that the number of jobs generated by $10 billion of defense spending is not noticeably different from the number created by spending $10 billion in other federal programs. Using a model developed by Data Resources International, Inc., the CBO concluded:

> [A]dditional spending on defense and on nondefense purchases of goods and services appear to have roughly equal expansionary effects on employment in the short run. Econometric model simulations suggest that an additional $10 billion in defense spending in the current fiscal year could create up to 250,000 additional jobs; the same $10 billion spent on nondefense purchases in the public and private sector could also create almost 250,000 jobs.[86]

Assumptions in Employment Studies

As with most such statistical studies, the differences in outcome derive, in part, from differences in the assumptions made in each study. One can, to some degree, predetermine the outcome by the kind of information included in or excluded from the model and by selecting the types of spending that are compared. In some studies, the comparisons and assumptions are credibly close to economic reality; in others, the starting point for the research is sufficiently different from economic reality or sufficiently selective that the outcomes must be treated with caution.

The Defense Department, for example, tends to assume that because 35,000 jobs may be sustained by $1 billion of defense spending, 35,000 jobs will disappear if defense spending is cut by $1 billion. However, cutting this sum from the defense budget would not lead automatically to the loss of this number of jobs; the employment impact would depend to a significant degree on the nature of the reduction and on what was done subsequently with the $1 billion.

The first problem involves determining whether or not defense spending has actually been cut. The DOD's "job loss" argument is usually made in the context of a disagreement over the proposed level of defense spending for a given year. The administration requests a certain level of growth over the previous year; the Congress reduces that request by some amount. However, as long as actual defense outlays (especially those for weapons procurement and research and development) grow from one year to the next, the existing level of employment in the defense sector may be presumed to remain constant or to grow, although perhaps more slowly than the Defense Department may have anticipated. No

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86. CBO, *Defense Spending and the Economy, supra* #10, p. 43. The CBO study makes the reasonable assumption that defense spending should include the salaries and benefits for the Defense Department's military and civilian employees, in addition to the demand generated in the private sector for purchases of goods and services. When CBO counted only defense purchases from industry there was some difference with nondefense purchases, the former creating 210,000 jobs per $10 billion spent, a difference of 4,000 jobs per $1 billion of spending.

actual jobs will necessarily be lost as a result of providing lower growth in the defense budget than that requested.

Moreover, the actual impact on employment in the defense industry depends greatly on the composition of the defense budget -- whether it emphasizes spending on personnel or on "investment" (procurement, research and development, and military construction)[87] -- and on the degree to which the "backlog" of appropriated but still unspent defense dollars contains funds in excess of projected requirements.[88] A budget emphasizing reductions in personnel outlays might have no impact on industry employment and might simply contain a lower pay raise or retirement benefits within the Defense Department, rather than actual reductions in Pentagon employment. Investment spending reductions below the administration's request might have little or no impact on industry employment, moreover, if they were cushioned by a large appropriations backlog.

The actual use made of a federal dollar taken from the defense budget and the economic context in which such a cut is made will also make a difference with respect to its impact on employment. Returned to the economy in the form of deficit reduction, a billion dollar defense cut could mean some loss of jobs in the defense sector. However, a defense cut in the context of an expanding economy might also lead to lower federal borrowing requirements, increased private sector investment, and as a result, some new job creation. Spent elsewhere in the federal budget, the same funds could employ directly a significant number of people, including some in the defense sector and some outside it. Of course, these funds might also be used for programs that would create significantly fewer direct or indirect jobs -- for instance, transfer payments, which are less immediately stimulating to the economy than direct government purchases of goods and services.[89]

The Question of Job Loss

The argument that defense spending growth actually deprives the economy of jobs also needs to be examined carefully.[90] If it is true that alternative forms of

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87. The investment share of defense spending has risen sharply since 1981. See Defense Budget Project, *The FY 1987 Defense Budget: Preliminary Analysis* (Washington, DC: Defense Budget Project, 1986).

88. The Defense Department's backlog of appropriated, but unspent funds has grown from $92 billion in FY 1980 to a projected total by the end of FY 1987 of roughly $260 billion. See Defense Budget Project, *The Pentagon Funding Backlog: Can the Defense Department Manage More Growth?* (Washington, DC: Defense Budget Project, 1986).

89. Weinberger, *supra* #76, p. 68.

90. The job loss argument is most clearly stated in the work of Marion Anderson, particularly in *The Empty Pork Barrel, supra* #79. For critiques of this argument which inform the following discussion, see the 1983 Congressional Budget Office Study, Mosley, *supra* #5 and Riddell, *supra* #83.

federal spending create marginally more direct and indirect jobs than defense, the issue is not one of "jobs lost", but rather of jobs in other sectors of the economy which the analyst might prefer, as opposed to those created by defense spending.

Several assumptions make this job loss assertion problematic. One commonly made assumption is that defense dollars come out of a slice in a fixed federal pie: if defense spending goes up, domestic spending goes down. Although there has been such a tradeoff since 1981, it has not been true for the federal budget at any previous point in peacetime, as noted above. Instead, domestic spending and defense spending have tended to rise together from the 1950s until the beginning of the 1980s.[91]

This assumption portrays the federal budget as a zero-sum game.[92] However, federal spending is not zero-sum; the pool of resources is not fixed. The government could fund defense out of borrowed resources, not domestic programs, for example. As a result, as the experience of the 1960s makes clear, it is possible to increase both domestic and defense spending even in wartime (although not without other economic consequences, depending on the method of financing). Jobs in the defense sector and jobs in the non-defense sector can both grow out of such a spending pattern.[93]

More broadly, as the 1980s suggest, it is not clear that increases in defense spending are a direct cause of job losses in the rest of the economy. The job losses of the early 1980s resulted from larger forces operating in the American and international economies, as well as from a conscious choice by the Reagan administration to trim domestic programs, not by an automatic mechanism linking defense growth to non-defense employment.

Another version of this zero-sum assumption, built into some models, is that the taxpayers who are funding defense might otherwise spend their tax dollars on

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91. U.S. Representative Les Aspin notes that direct dollar-for-dollar transfers between domestic and defense programs do not happen in the Congress: "...in reality, Congress does not work that way." See *Defense Spending and the Economy* (Washington, DC: Office of Representative Les Aspin, 1984), p. 3. It remains true, however, that the choices made within the federal budget can have consequences for economic trends with respect to regional, sectoral or labor force developments (see below).

92. In a 1981 article, economist Lester Thurow appears to make this assumption in comparing defense spending to a private budget: "...as in any private budget, if you allocate more to one form of consumption, you must allocate less to some other form of consumption." Thurow, *supra* #10.

93. In theory, of course, high levels of spending such as those during the Vietnam War might lead ultimately to full employment, which could make the employment tradeoff zero sum. See below, section on "Defense Sector Employment," for discussion of the full employment problem.

activities that would create more employment.[94] It is far from clear, however, that taxpayers are foregoing other forms of expenditure by being taxed for defense. Especially when the budget deficit is being funded by borrowing and the economy is operating below full capacity, taxpayers are not being denied significant disposable income because they are being taxed for defense. The 1981 tax cut, in particular, actually increased disposable income for private consumers, although defense spending was rising at the same time.[95] A different model might make the more realistic assumption that tax dollars, savings dollars and consumption dollars are not necessarily involved in a zero-sum relationship.

Many input/output models assume full employment, meaning that a shift of funds to defense automatically means economic resources are taken away from other activities in an equivalent amount. This assumption makes the conclusions of such models particularly problematic. Were this true in the current economy, those engaged in other work would find they would loose their jobs as defense spending rose, unless their skills could be transferred to the defense sector. One more job in defense, under this assumption, necessarily means the loss of at least one job, possibly more, in some other sector. The American economy has generally operated significantly below full employment, however, since the end of World War II. Except for a few periods of strong economic activity, spare production capacity and labor have generally existed in the economy.[96] An increase in defense spending may actually use this spare capacity and labor, reducing its impact on employment in other sectors.[97]

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94. Anderson, *Empty Pork Barrel, supra* #79, p. 1, makes the argument as follows: "If people all over the country are paying high taxes, a substantial percentage of which goes to the Pentagon, they do not have control over that money. This means that they build fewer houses, buy fewer cars, take fewer vacations and vote lower taxes for their state and local government....One must also ask how that dollar would have been spent if the Pentagon had not received it -- if instead it had been used by consumers to buy the goods and services which they needed or had been turned over to state and local governments to meet public needs."

95. One might argue that federal borrowing can affect the supply of available capital for other investment purposes and exert upward pressure on interest rates. There is little evidence of such a relationship, however (see above, Chapter II). Even if it were true, the consequences for job creation (or presumed job loss) are far from self-evident.

96. Some research, CBO notes, assumes that," because a higher share of GNP spent on defense is associated with a lower share spent on other things, higher real defense spending will necessarily lead to lower real spending elsewhere. Such a conclusion follows only if the economy is at full employment, which is hardly an accurate description of today's U.S. economy." CBO, *Defense Spending and the Economy, supra* #10, p. 43, note 4.

97. Wassily Leontief and Faye Duchin have been developing dynamic models that permit the relaxations of restrictive assumptions, including that pertaining to full employment, in some applications of the model. See Leontief and Duchin, *supra* #30.

Defense Sector Employment

Some comparisons also make assumptions about the nature of the defense sector itself which can weaken their conclusions. For example, the argument is often made that defense is a high technology sector; more of the funds in the defense industry go for materials, technology and equipment, and less for labor, relative to other sectors of industry.[98] There is little evidence, however, that defense production overall is significantly more capital intensive than other sectors. While airframes, air engines, and missiles can be highly capital intensive, electronics assembly, shipbuilding, and communications equipment are far less so.[99]

Moreover, many models clearly undercount the actual number of jobs generated by the defense budget. Comparisons of defense-related employment must be comprehensive, including civilian and military jobs in the Defense Department as well as those in the private sector. Both sets of jobs are essential to the performance of military tasks.[100] Employment comparisons often do not include Defense Department employment, but only count jobs generated in the private sector by defense purchases of goods and services. This may, in part,

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98. See DeGrasse *supra* #10 and M. Anderson, *The Empty Pork Barrel, supra* #79, who argues (p. 1) that defense production is "technically very complex, it involves large amounts of expensive raw materials, and even more expensive equipment. Therefore, less of the money spent goes towards hiring people and more goes toward buying high priced equipment than when the money is spent on civilian purchases."

99. Duchin suggests that a breakdown of defense employment among the different types of defense production would probably show variations of labor and capital intensity. See Faye Duchin, "Economic Consequences of Military Spending," *Journal of Economic Issues*, 17, No. 2, June 1983, pp. 543-553. There is also little evidence that defense sector production equipment is more expensive than that used in other sectors of manufacturing. Despite recent Defense Department investments in computer-aided and robotic production equipment, much of the defense sector machinery is quite old, dating, in some cases, from the 1950s. See Gansler, *supra* #17.

100. Department of Defense, *Atlas/State Data Abstract for the United States, Fiscal Year 1984* (Washington, DC: Department of Defense, 1985) p. 117. More than 3.3 million people work directly for the Department of Defense. There is also a curious discrepancy in one study between the researcher's estimate of jobs in the defense sector and data from the Defense Department. In *The Empty Pork Barrel*, military industry employment is estimated at 790,800 in 1977 and 1978. M. Anderson, *supra* #79, p. 6. The Defense Department estimated 1977 defense-related industry employment at 1,710,000, a difference of nearly one million jobs. Department of Defense, *Atlas/State Data Abstract*, pp. 118-119 and Mosley, *supra* #5, p. 91.

explain the marginally lower number of jobs generated by defense spending compared to alternative forms of public expenditure.[101]

Other studies have attempted to include direct Department of Defense jobs as part of the employment calculation, but appear to underestimate actual Department of Defense employment in a systematic way.[102] The 1983 CBO analysis clearly includes all Defense Department spending, not just defense purchases, and thus counts all direct and indirect jobs created in the Defense Department and in industry by defense spending. As a result, its comparison of employment outcomes may be the most comprehensive and accurate to date.

Indirect Employment

A final assumption involves the degree to which models count the number of jobs which result from the wages spent by those employed directly and indirectly by defense spending. Looking at induced employment, the Congressional Budget Office model suggests that defense dollars have a relatively higher impact in the second through the fifth years of spending (a higher "multiplier") than other forms of federal spending. This would mean that as defense dollars are spent by workers, or spent or invested by contractors, they will generate greater employment in the economy in out-years than would comparable non-defense spending, at least compensating for the difference that might be found in direct and indirect employment. However, other economic models generate different multipliers, some of which show non-defense spending with a larger multiplier than defense spending, thus changing the outcome.[103]

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101. See, for example, Barry Bluestone and John Havens, who suggest that a shift in federal funds from defense to "rebuilding" industries (largely infrastructure) would create 6,400 additional jobs per $1 billion of shifted output. This differential can be compared to that of 4,000 per $1 billion found by CBO, *Defense and the Economy, supra* #10 and the 3,100 difference found by Brancato and LeGrande *supra* #78, p. 1. Part of the difference in impact, however, stems from the fact that the model being used counts only private sector demand generated by defense purchases of goods and services, but does not include direct Defense Department employment related to those purchases. Barry Bluestone and John Havens, "Reducing the Federal Deficit Fair and Square," paper prepared for the Symposium on the Fortieth Anniversary of the Joint Economic Committee, January 1986, pp. 22-29. Making a similar comparison, Bracanto and LeGrande show a "purchases" difference of 3,700 jobs. See, also, Riddell, *supra* #83, p. 28.

102. Anderson counts Pentagon and defense industry employment in 1977 and 1978 as averaging 2.2 million employees each year, while the Defense Department reported an average of 3.1 million. The source of the difference is not clear. M. Anderson, *The Empty Pork Barrel, supra* #79, p. 6.

103. CBO, *Defense and the Economy, supra* #10 notes in an appendix that the Wharton model shows a higher multiplier for non-defense spending. At a 1980 symposium organized by the Defense Department, the Merrill-Lynch model indicated a significantly higher multiplier for defense spending over non-defense spending for each of five years following initial expenditure. See Cimerino paper

The CBO estimates of the employment impact of defense spending, nevertheless, take the most even-handed approach and incorporate realistic assumptions about the economy and the composition of defense spending. Defense outlays in general do not appear to have a substantially different impact on the number of jobs in the economy than other forms of public and private spending.

Regional, Sectoral and Labor Market Impacts

The **total number** of jobs in the U.S. economy created by defense spending may not be the most significant measure of its impact on employment. Defense dollars create jobs in some regions of the country, but not in others; they create jobs for certain parts of the labor force, but not for others, and jobs in specific sectors of industry, but not in others. The overall employment impact of the defense dollar may not be significantly different from that of other federal spending programs, but because defense can stimulate certain sectors of the economy, it can affect employment in those specific sectors.

Spending dollars on defense represents a choice -- explicit or implicit -- about some of the impacts federal spending will have on employment (and economic development in general) in subsets of the U.S. economy. Where jobs will be created and for whom is a significant issue with respect to the impact of defense spending on employment. Even these impacts, however, should not be overstated, since the larger economic context can be an important element. While defense dollars clearly do flow into specific regions and to specific types of workers and researchers in specific manufacturing sectors, they are not the only factor having an impact on the geographic and industrial economy of the United States.[104]

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at the Department of Defense, *Symposium on the Impact of Defense Expenditures, supra* #76, p. 41.

104. The case can be overstated: "We have, in the postwar period, endured a costly and relatively undernoted reorganization of our industrial, occupational and regional structure in the U.S. This reorganization is the product of a 'quiet industrial policy' conducted via the Pentagon." Ann R. Markusen, "The Economic and Regional Consequences of Military Innovation," *Working Paper No. 442* (Berkeley, CA: Institute of Urban and Regional Development, University of California, May 1985), p. 1. See, also, Ann R. Markusen, "The Militarized Economy," *World Policy Journal*, 3, No. 3, Summer 1986, pp. 495-516, which argues that the U.S. economy has shifted in composition "from civilian to military production." (p. 502). That such a shift has occurred is not clear, nor, as Markusen notes, can the changes in the U.S. manufacturing sector be linked solely to defense production.

A Northeast/Midwest Regional Institute report on the distribution of defense spending also tends to overstate the point: "It is evident...that defense spending will take on an increasingly important role in shaping regional economies, the growth of industries, and employment patterns. The DRI model projects that the impact of defense expenditures will continue to be concentrated in several states... Particularly sharp increases in the defense share of total production are projected

As previously noted, the American economy is subject to a far broader range of economic forces and pressures than those growing out of the level of defense expenditure. Over time, in fact, defense outlays have been a declining share of U.S. gross national product, falling from a level of roughly 9 to 10 percent of U.S. GNP in the post-Korean War 1950s to an average of roughly six percent during the first half of the 1980s. This decline is due largely to the more rapid growth of non-defense sectors in the U.S. economy than those directly related to defense.

The economic growth of some regions of the country and the decline of others, the rise and fall of specific sectors of the economy and changes in employment grow not only out of defense outlays, but also out of the rise and fall of investment in other sectors of production and out of changes in the international market, among many other factors.[105] Any conclusions about the specific impact of defense outlays on regional or sectoral employment or on the types of jobs in the labor market must be viewed within the larger context of economic change.

The totality of federal spending is also an important context for understanding the impact of defense outlays on the American economy.[106] In peacetime years since 1954, defense outlays have grown more slowly than federal transfer payments or grant-in-aid programs. These other federal programs have also had an impact on economic growth and employment in some regions and certain sectors of the economy (e.g., the dramatic rise in the health services share of the GNP since the late 1960s).

Finally, it is important to understand that the impact of public and private sector spending on employment and growth occur and change over time. All too often, a snapshot of data for one or two years is used to demonstrate how crucial defense outlays are to employment or output in a specific occupation, sector or geographic region. Data on changes over time in these relationships frequently

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for Virginia, Alabama, Washington, and California." Virginia Mayer, *The Pentagon Tilt: Regional Biases in Defense Spending and Strategy* (Washington, DC: Northeast-Midwest Institute, 1985), p. 73. Given the relatively flat defense spending share of GNP projected for the future and the absence of contextual data on larger economic trends in the study, this conclusion should be qualified.

105. See Chapter III above.

106. The annual reports on defense spending in New York prepared by U.S. Senator Daniel Patrick Moynihan are careful to provide both the federal budget and revenue contexts for their conclusions about defense spending. See, for example, Senator Daniel Patrick Moynihan, *New York State and the Federal Fisc: IX; Fiscal Year 1984* (Washington, DC: Office of Sen. Moynihan, July 1985), esp. p. 33, 35-37.

are not provided and, in some cases, do not exist. Hence, the conclusions drawn are, at best, only partially correct.[107]

Geographic Impacts

Federal spending, including that for defense, is not distributed equally across the population and territory of the United States. Data for 1986, for example, show that 71.9 percent of all defense payroll and contract dollars are concentrated in 15 states.[108] Listed by rank:

1. California	6. Massachusetts	11. Pennsylvania
2. Texas	7. Maryland	12. Connecticut
3. Virginia	8. Ohio	13. Washington
4. New York	9. Missouri	14. New Jersey
5. Florida	10. Georgia	15. Arizona

Whether this pattern of spending is compared to the share of these states' contribution to the federal income tax, to the GNP or to the population, the defense dollar is clearly unevenly distributed.

In order to understand the impact of defense spending on the economic geography of the United States, however, one needs more than one year of data. The distribution of defense contracting, and thus of contract-related employment, has clearly shifted over time toward southern and western states. The Northeast/Midwest regional share of prime contract dollars dropped from 71.8 percent in 1951 to 37 percent in 1983, while the share going to the South/West states increased from 28 percent to 63 percent in the same period. The shift was particularly strong away from Indiana, Illinois, Iowa, Michigan, Minnesota, Ohio and Wisconsin, whose total share fell from 31 percent in 1951 to 9.8 percent in

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107. Markusen, "The Militarized Economy," *supra* #104, pp. 500-501, for example, uses Deptartment of Commerce data on defense's share of industry output to conclude that "the Reagan military buildup will reverse a 20-year trend in which commercial demand consistently outpace military output growth in the electronics and computing industries." Actual data, however, are restricted to two years -- 1979 and 1982 -- while Department of Commerce projections are used for 1987. While these data may be suggestive, they are too close in time and do not reflect the levelling off of defense outlays after 1985.

108. California, alone, received more than 18 percent of total Defense Department prime contract awards and compensation payments in FY 1986. While military and civilian pay and retirement benefits tend to be spent largely in the state in which they are paid, it can be argued that roughly half of prime contract dollars are subcontracted, some of which leave the state. Subcontract data is difficult to obtain, making a precise estimate of its impact on the overall distribution of defense spending difficult to estimate. There is, nevertheless, some evidence that subcontracting is also highly concentrated in the prime contract states. Data calculated by the authors from Department of Defense, *Atlas/State Data Abstract, supra* #100, p. 6.

1983. Michigan and Illinois actually received fewer real (after inflation) prime contract dollars in 1983 than in 1951.[109]

For these particular states in the industrial heartland, the gradual disappearance of Pentagon contract dollars in the local economy has probably had some economic impact, over time, on the shift of economic activity and job creation away from the Midwest and toward the Southern and Western periphery of the country.[110] This link is not a simple one, however. Defense spending is not the only element of the U.S. economy which has shifted location in the past 30 years. In such industries as steel and automobiles, changes in production processes, differential costs for labor and raw materials among regions, tax advantages, and the superiority of overseas producers, among many other factors, have had major impacts on plant location, the creation of jobs and changes in the labor force in the Midwest in particular. Regional economic and employment changes cannot be explained solely or even principally in terms of defense spending.[111]

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109. Mayer, *supra* #104, p. 29. Other analysts agree that this shift has had some impact. Ann R. Markusen argues that military contracting has stimulated industrial growth, especially in high technology, from Boston through Long Island (but not the rest of New York State), Florida, Texas and California, while the old industrial heartland (Milwaukee, Chicago, Cincinnati, Buffalo, New York City, Philadelphia, Baltimore and presumably Detroit) have not had that stimulation. See Ann R. Markusen, "Defense Spending and the Geography of High Tech Industries," *Working Paper No. 423* (University of California, Berkeley: Institute of Urban and Regional Development, 1984); Ann R. Markusen, "Defense Spending: A Successful Industrial Policy?," *Working Paper No. 424* (University of California, Berkeley: Institute of Urban and Regional Development, 1984). In 1982 the staff of the Joint Economic Committee concluded that the U.S. defense buildup, concentrated in high technology procurement, "is likely to exacerbate the regional imbalances in the national economy," since the Midwest, with idle plant capacity, is not the region where military equipment is purchased. See Joint Economic Committee, Subcommittee on Economic Goals and Intergovernmental Policy, *The Defense Buildup and the Economy* (Washington, DC: JEC, 1982).

110. As the Northeast/Midwest Regional Institute has described it: "The sheer magnitude of the defense budget, coupled with the extreme disparities in its distribution, make it an important force in regional economic performance." Northeast/Midwest Research Institute (1984), *supra* #104, p. 4.5.

111. Some analysts use tax data and defense spending data to suggest that defense is draining some regions of the country in favor of others. James Anderson argues this case on the basis of defense spending alone. In order to understand these potential distortions, however, one must review all federal spending and taxation rates over a considerable period of time. See James Anderson, *Bankrupting America: The Tax Burden and Expenditures of the Pentagon by Congressional District* (Lansing, MI: Employment Research Association, 1982). Senator Daniel Patrick Moynihan finds that different rates of federal taxation can play an important role in the differential impact of federal spending on the states: "States with the most favorable balances of payments enjoy these large positive balances because of slightly lower than average tax burdens, and much

On the other hand, other states, particularly those on the periphery, have received some economic and employment stimulus from this shift in defense spending.[112] From Long Island through Florida, to Dallas, Los Angeles and Sunnyvale, California, employment in local economies has grown as a result of the inflow of defense dollars. However, this conclusion also needs to be qualified, since the space program, transfer payments to senior citizens and broader changes in the national and international economy have also had an impact on growth and employment in these areas.

The consequences of this stimulus from defense spending are evaluated in different ways. To some critics, such spending has created a condition of dependency, leaving a local economy vulnerable to sudden changes in defense buildup.[113] In this sense, defense spending is little different from other economic activity, such as agriculture or steel, when it is the central element of local economic activity. When a locality is dependent on one contractor, one defense installation or one business of any kind at a given point in time (e.g., Seattle in the late 1960s or the Midwest in the early 1980s), losing contracts, closing the base or watching the international price of grain decline can have significantly negative local economic impacts. The gradual diversification of a local economy, however, tends to insulate a region from such effects.[114]

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higher than average expenditures, in both the defense and non-defense portions of the Federal budget." According to his 1985 report, in 1984, 30 states were in a surplus with the federal government, while 20 states were in a deficit. See Moynihan, *supra* #106, pp. 40-42, 47.

112. The Northeast/Midwest Research Institute points out that the following states have increased their share (and total amount) of Defense Department spending dramatically between 1951 and 1984: Florida - 0.3 percent to 3.9 percent; Georgia - 0.6 percent to 2.1 percent; Mississippi - 0.1 percent to 1.5 percent; Texas - 2.2 percent to 6.9 percent; Virginia - 0.8 percent to 6.0 percent; Arizona - 0.2 percent to 1.1 percent; California - 13.2 percent to 22.2 percent; Missouri - 1.7 percent to 4.7 percent. Virginia Mayer, *supra* #104.

113. The "dependency" of a given area on defense spending needs to be analyzed over time and in the broader context of changes in the local or regional economy. Markusen et al., for example, argue that California is heavily dependent on defense contracting. They provide data for California manufacturing employment, however, for only one year (1978), while their overall employment dependency data are 20 years old (1966). Neither set of data is placed in the larger context of changes over the past 20 years in the different sectors of the California economy. See Ann Markusen, Garrette Clark, Charmaine Curtis, et al., "Military Spending and Urban Development in California," *Working Paper No. 425* (Berkeley, CA: Institute of Urban and Regional Development, University of California, June 1984), p. 3.

114. According to data gathered by Professor Al Gutowsky, changes in the economy of Sacramento, California since the mid-1960s have led to a decline in the share of employment dependent on defense spending from 17 percent in 1960 to five percent in 1985. Al Gutowsky, "The Impact of Federal Military Spending on the Greater Sacramento Area," part of a panel presentation at the "Conference

For some communities, moreover, such investment can be seen as a stimulus to such growth and diversification. For example, Long Island's economy, received strong initial stimulus from defense contracting, but is far less dependent on defense spending today than it was in the 1960s.[115] The economies of San Diego, Silicon Valley and Los Angeles received strong stimulus from defense, but have diversified significantly since that original stimulus as other manufacturing has grown up or the principal defense product has found commercial markets larger than that provided by the Defense Department.[116]

A local defense sector, in other words, does not appear to create an unusual dependency or distortion in a local economy. Moreover, local economies do not appear to follow a set or "normal" pattern of economic growth and change in contrast to which defense dependency must be seen as a deviant case. The employment impact of defense spending in different parts of the United States clearly requires further research, using data set in the context of wider economic changes as they have occurred over time, before arriving at definitive conclusions about the degree to which defense spending constitutes a major impact on regional economy and employment.

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on Local Economic Alternative Planning," at California State University, Sacramento, April 26, 1987. The Defense Department's Office of Economic Adjustment has evaluated the experiences of communities which depend on defense installations which have closed. See Department of Defense, Office of Economic Adjustment, *25 Years of Civilian Reuse: Summary of Completed Military Base Economic Adjustment Projects, 1961-1986* (Washington, DC: Department of Defense, May 1986).

115. See Gordon Adams, "Defense Dependency: Grumman and the Long Island Economy," *Newsletter* (New York: Council on Economic Priorities, December 1979) on impact of defense spending on employment on Long Island, which does not examine the wider economic context or historical data.

116. Markusen, et al., note: "[T]he longstanding presence of defense commitments has promoted the growth of the financial and business service sectors in Los Angeles, which has helped the area become more like a major metropolitan center than it was prior to World War II. ...Silicon Valley has enjoyed a unique self-propelled form of growth because of its critical role as chief beneficiary of the semiconductor and computer revolutions." See Markusen, et al., *supra* #113, pp. 10, 11. The Northeast/Midwest Institute provides a current example of such expectations: "A good example of the opportunities for growth, given the necessary funding, is the Army's recent decision to locate its new light armored infantry division at Camp Drum in upstate New York. Previously underutilized, given the amount of land and other capital investment there, Camp Drum will be home to over 10,000 soldiers and their families, and the surrounding area will realize significant growth in business and housing starts. Approximately $1 billion in military construction funds is slated for the area in the near future." Mayer, *supra* #104, pp. 4, 6.

Labor Market Impacts

Defense spending has different impacts on different parts of the labor market. As with economic geography, the funds spent by the Defense Department and its contractors are concentrated, employing researchers and workers with certain kinds of skills. The impact of such spending on the U.S. supply of scientific and technical personnel is a particularly important issue, because, some analysts argue, defense demand may deprive other sectors of the economy of important research talent.[117]

The non-military workforce of the Defense Department and of defense industry includes higher proportions of skilled machinists, metal workers, aeronautical and electronic engineers, scientists, social scientists, lawyers and managers than the American economy as a whole.[118] It might appear, as a result, that federal and industry employment for defense do not provide job opportunities for those parts of the U.S. labor force with higher rates of unemployment -- the less skilled, women and minorities.[119]

Although the Defense Department and its contractors do employ large numbers of skilled workers, the share of these types of workers in total public and private sector employment is actually relatively small -- 5.5 percent -- and has declined significantly since the post World War II peacetime peak of 10.6 percent in 1956. Moreover, although Defense Department and defense industry employment have high numbers of engineers, scientists, technicians, technical workers, managers and craft workers, both the Pentagon and the industry employ substantial numbers of sales and clerical workers, assemblers and operatives, service workers and laborers. More than 45 percent of Defense Department employment and nearly 58 percent of defense industry employment in 1981 consisted of these relatively less skilled jobs, which are generally open to a wide range of workers in the American labor force, including those categories with high rates of unemployment.[120]

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117. See, for example, Markusen, "The Militarized Economy," *supra* #104, pp. 507-508; DeGrasse, *supra* #10, Chapter 4; and Dumas, *supra* #16, Chapter 11.

118. According to the Bureau of Labor Statistics, in 1980 professionals and technicians, managers and craft workers constituted the following shares of employment in key defense sectors: aircraft and parts - 54.1 percent; communications equipment - 52 percent; guided missiles - 73.7 percent. For manufacturing as a whole, these three catagories constituted 33.5 percent of total employment. Data cited in DeGrasse, *supra* #10, Table 1.8, p. 51.

119. Markusen, argues that "defense innovation is a major cause of worsening occupational and income disparities, [and] setbacks in racial and sexual economic progress." Markusen, "The Consequences of Military Innovation," *supra* #104, p. 1.

120. Calculated from Congressional Budget Office, *supra* #10, Table A-11, pp. 63-64.

It remains true, however, that because the defense industry's labor force tends toward skilled, technical and managerial personnel, there are relatively fewer opportunities for the disadvantaged part of the U.S. labor force than in the U.S. economy as a whole. Scientists, engineers and technicians constituted roughly 6.2 percent of the U.S. labor force in 1981, while they constituted more than 13 percent of the Pentagon's labor force and more than eight percent of that of defense industry. While sales and clerical personnel constituted 25.1 percent of the total U.S. labor force that year, they made up less than 24 percent in the Pentagon and 18.6 percent in defense industry. On the other hand, assemblers and operatives constituted 14 percent of the labor force, but more than 15 percent in the Pentagon and more than 22 percent in defense industry.[121]

As with other sectoral arguments, these data must be put into context. Federal employment is not the fastest growing part of the U.S. labor market, while service employment is growing more quickly than manufacturing employment. Moreover, the availability of job opportunities in the U.S. labor market as a whole is less dependent on the directions of federal spending than it is on broader economic trends.[122]

There is some evidence that private sector, defense producers employ a higher proportion of craft workers and operatives than such workers occupy in the U.S. labor force as a whole. However, the defense sector, like other sectors of the economy, is increasingly "high tech", a trend which is unlikely to create employment opportunities for skilled craft workers and operatives.[123]

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121. Data calculated from Congressional Budget Office, *supra* #10, Table A-11, pp. 63-4. The specialized nature of the defense workforce is occasionally overstated, e.g.: "[T]he specialized nature of military employment reduces its economic usefulness. Much of the new employment generated by a military buildup goes to people who need it less." (DeGrasse, *supra* #10, p. 32) See also, Hartung: "Because nuclear systems production provides relatively fewer jobs for those most in need of employment, a freeze would have a much less severe displacement effect than cutbacks in the average industry." William Hartung, *The Economic Consequences of a Nuclear Freeze* (NY: Council on Economic Priorities, 1984), p. 16.

122. Markusen and Markusen et al. argue that "defense-led innovation has had a strong adverse impact on these members of the workforce engaged in basic manufacturing..." (Markusen, "The Consequences of Military Innovation," *supra* #104, p. 14) and that defense spending produces a "shift toward white male professional labor." (Markusen et al., *supra* #113, p. 4). Given the decline over the past thirty years in the defense share of GNP and of the manufacturing labor force, these arguments may not apply on an economy-wide basis, though they may be relevant at a given point in time on a local or regional basis.

123. William Winpisinger, President of the International Association of Machinists, makes a general argument on this point: "It is easy to see that as the military spending curve has shot up to even higher reaches, the number of skilled, semi-skilled and unskilled workers employed in military production has been decreasing, both in absolute and relative terms. William Winpisinger, "Technological Tyranny -- Economic Conversion," in *Economic Dislocation and Job*

The "personnel depletion" argument with respect to scientific, engineering and technical personnel deserves separate discussion. A high proportion of total U.S. employment in specific technical job categories, it is argued, is absorbed by the Defense Department and defense industry, depriving the civilian economy of these skills, with serious consequences for technological development and economic growth.[124] Indeed, a high proportion of total 1981 U.S. employment in some of these categories was employed by the Defense Department and the defense industry, including 61 percent of vocational education teachers, 60.4 percent of mathematical specialists (other than mathematicians and statisticians) and more than 46 percent of aero-astronautical engineers.[125]

Were the share of all such scientific, technical and engineering personnel employed by the defense sector extremely high, this drain would indeed be serious. However, there is considerable disagreement on the proportion of these personnel involved in defense, with estimates ranging from less than 20 percent, to more than half.[126] This disagreement makes a considerable difference with

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Loss, ed. Betty G. Lall (NY: Cornell School of Industrial and Labor Relations, 1985), p. 28.

The share of production workers in the major sectors supplying defense actually varies widely. According to the Bureau of Labor Statistics, the range in 1981 went from a low 30 percent in "complete guided missiles" to 53.1 percent in "aircraft" to 69.9 percent in "electrical components" to 77.4 percent in "blast furnaces and basic steel products." Cited in DeGrasse, *supra* #10, Table 1.7, p. 50. Clearly the production workers argument needs to be disaggregated for the specific sector of the defense industry labor force being described, and data showing changes over time need to be found and analyzed.

124. See William Hartung et al., *The Strategic Defense Initiative: Costs, Contractors and Consequences* (New York: Council on Economic Priorities, 1985), Chapter 3; as well as DeGrasse, *supra* #10; Hartung, *supra* #121; M. Anderson, *The Empty Pork Barrel*, *supra* #79. DeGrasse provides 1980 Bureau of Labor Statistics Data showing that professional and technical employees constituted 55.7 percent of employment in guided missiles, 32.3 percent in communications equipment and 25.4 percent in aircraft, as opposed to 9.1 percent for manufacturing as a whole. DeGrasse, *supra* #10, Table 1.8, p. 51. No time series data are provided.

125. See Congressional Budget Office, *supra* #10, Table A-11, pp. 63-64. See also Bezdek, *supra* #11, and DeGrasse, *supra* #10, on the composition of the defense industry labor force.

126. Marion Anderson, *Neither Jobs Nor Security: Women's Unemployment and the Pentagon Budget* (Lansing, MI: Employment Research Associates, 1982), p. 9: argues that "over half of the U.S. scientists and engineers have been working on military and space contracts." Judith Reppy estimates that 42 percent of U.S. scientific manpower is in defense-related work, "Military R&D and the Civilian Economy," *Bulletin of Atomic Scientists*, October 1985, 41, no. 9, p. 11. DeGrasse, using National Science Foundation data from the late 1970s estimates that 25 to 35 percent of U.S. scientists and engineers were working on defense projects, *supra* #10, p. 102. CBO data suggest this figure may be around 14 percent, *supra* #10.

respect to the pressures on the labor market for technical personnel and the availability of such personnel for commercial work.

Recent research examining employment data over time, suggests that a relatively low and declining proportion of such personnel are absorbed by defense work. According to a 1986 study by the National Research Council, the share of Bachelor degree-level scientists and engineers working on Department of Defense-sponsored projects declined from 18.6 percent in 1972 to 15.5 percent in 1984, while the share for Master degree-level scientists and engineers fell from 23.8 percent to 19.9 percent, and that for doctoral-level scientists and engineers from 10.5 percent to 8.5 percent.[127]

Moreover, the depletion argument tends to imply that the supply of such personnel is static, an additional job in the defense sector subtracting an equivalent employee in the civilian sector. Certainly the market for such personnel has grown sharply, even more so in the private sector than in defense. In 1960, the federal government spent $8.7 billion on research and development (64 percent of the total national investment, public and private). In the same year, private industry spent $4.5 billion on research and development (33.3 percent of the national total). By 1980, federal spending rose to $29.6 billion, but the federal share of total R&D spending fell to 47.6 percent. During the same period, private R&D spending had risen to $30.4 billion, or 48.9 percent of total national R&D.[128]

The supply of scientists and engineers seems to have risen along with the demand. While there does appear to be some lag between demand and supply,[129] the total U.S. supply of scientific and engineering personnel has risen markedly since 1950. According to the National Research Council study, the number of U.S. engineers rose from 527,000 in 1950 to nearly 1.7 million in 1985. The pool of engineering and science technicians rose from 261,000 to 1.12 million, while the pool of life and physical scientists and technicians rose from 117,000 to 378,000.[130] Clearly a larger number of R&D employment opportunities were available in 1980 than twenty years earlier, a larger share of them were in the commercial private sector, and the supply of personnel rose with the demand.

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127. See National Research Council, *The Impact of Defense Spending on Nondefense Engineering Labor Markets: A Report to the National Academy of Engineering* (Washington, DC: National Academy Press, 1986), Tables 7-9, pp. 74-76. The Office of Technology Assessment concluded in a separate study that 18 percent of engineering personnel are employed in defense-related industries. See Office of Technology Assessment (OTA), *Demographic Trends and the Scientific and Engineering Work Force: A Technical Memorandum* (Washington, DC: US Congress/Office of Technology Assessment, 1985), p. 99.

128. Congressional Budget Office, *supra* #10, Table A-10, p. 62.

129. The OTA study indicates that such a short-term lag can exist. See OTA, *supra* #127, p. 6.

130. See National Research Council, *supra* #127, Table 2, p. 70.

These recent data suggest that the personnel depletion problem may be less serious than supposed. More detailed data needs to be examined, however, since there could be short-term bottlenecks between demand and supply within specific subsets of personnel. The Office of Technology Assessment notes that individual disciplines could experience shortages, though this was not true for "'science and engineering' as a whole."[131] Here, too, supply could respond over time. OTA notes that the number of engineering Bachelor degrees doubled between 1976 and 1984, while the number of Bachelor degrees in computer and informational science tripled between 1977 and 1982.[132]

Sectoral Impacts

Federal spending in general has uneven impacts on employment in different sectors of the economy. Transfer payments, for example, have a broad impact across the economy, with particular impacts in non-durable manufacturing, services, and public sector employment. Spending on health has an impact in the service sector and on public employment. Public works projects, infrastructure, education, energy, among many other alternatives, all have strong impacts in such sectors as services and construction.[133]

Defense spending also provides employment in specific sectors of the economy, especially in ordnance (nearly 80 percent of that sector's 1982 output went to defense), missiles and space vehicles (more than two-thirds), radio and television communications equipment (nearly 60 percent), shipbuilding (more than half), and aircraft engines (more than 40 percent).[134] Changes in defense spending clearly stimulate growth or lead to declines in employment in these sectors.

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131. OTA, *supra* #127, p. 5.

132. *Ibid.* The National Resource Council found that the number of computer specialists in the labor market rose from 276,000 in 1972 to 923,000 in 1985. See NRC, *supra* #127, Table 2, p. 70.

133. The input/output projections of Roger Bezdek show clear differences in the sectors affected by defense as contrasted with domestic social spending. See Bezdek, *supra* #11. See also Mosley, who notes that spending shifts have positive impacts in such areas as medical services, education, pharmaceutical and construction. Mosley, *supra* #5, pp. 100-101.

134. Data from the Department of Commerce, published in Markusen, "Defense Spending and High Tech Industries," *supra* #109, p. 35. The 1980 Defense Department symposium on defense economics noted that the projected 1980s buildup would have a strong impact on growth in ordnance, guided missiles, aircraft equipment and parts, shipbuilding and electrical equipment. See Office of the Secretary of Defense, *supra* #76, p. 2.

It is sometimes argued that defense spending thus distorts U.S. economic development and employment in specific directions.[135] Independent of other economic changes, this conclusion could be correct. The importance of the impact of defense spending, however, depends on changes in the broader economic context over time. Although shifts in defense spending will have an impact on employment in the industries noted, defense is only part of the output of such sectors and these sectors constitute only part of total U.S. output. Employment in the computer, electronics and microcircuit industries, for example, became significantly less defense-related as those industries moved from high defense-related to high consumer-related production starting in the early 1950's.[136] Research is clearly needed which deals with changes in this broader economic context over time.[137]

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Defense spending does not appear to be significantly different from other forms of federal spending with respect to its impact on employment at the economy-wide level. There clearly are more measurable impacts of defense spending increases and decreases in specific regions of the country, parts of the labor market and sectors of production. Even here, however, data is uneven and changes in the broader economic context over time make it difficult to isolate the specific consequences of defense spending.

Regional, labor market and sectoral employment impacts are important, however, although less as matters for economic analysis than in questions of public policy. To some degree, federal spending and policy decisions act as a *de facto* economic and industrial policy, stimulating employment in some parts of the economy as against others. A decision to increase defense spending while decreasing other federal spending gives that policy a specific impact on jobs. Through defense spending, in other words, one creates certain types of jobs in certain regions and in certain industries, within the wider context of economic change. With domestic social spending, one creates jobs in other areas, for other workers, in other sectors.

To some degree, then, the microeconomic employment impact of federal spending is an issue of choice about the impact public spending policies will have

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135. See, for example, Markusen, "The Militarized Economy," *supra* #104, pp. 496-503.

136. Markusen also notes that the computer industry depended heavily on defense in its early years, but that the share of computer output going to defense in the 1980s is between 7 and 12 percent. Markusen, "The Consequences of Military Innovation," *supra* #104, pp. 5, 8.

137. Markusen, "The Consequences of Military Innovation," *supra* #104, p. 7; DeGrasse, *supra* #10, Chapter 1; and M. Anderson, *The Empty Pork Barrel*, *supra* #79, do not provide such a context.

on the direction of employment in the U.S. economy.[138] Since unemployment is especially concentrated among lower skilled workers, minorities, women, and teenagers (parts of the U.S. labor force that work in the sectors stimulated by non-defense spending), increasing defense spending while cutting non-defense programs will have measurable employment consequences in those sectors.

Even at the microeconomic level, however, employment impacts need to be set in the context of federal policy. Tax policies which stimulate private sector investment decisions also have an employment impact, while state and local government spending can exacerbate or counteract a federal spending trend.

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138. For example, as defense spending rose in the 1980s and cuts were enacted in domestic spending, membership in unions that organize among public employees and service industries declined. See Lance Compa, "Labor and the Military -- A History" in *Economic Conversion: Revitalizing America's Economy*, eds. Suzanne Gordon and David McFadden (Cambridge, MA: Ballinger, 1984), p. 34. See also Judith Reppy, "Long Term Consequences of Military Spending," a paper presented to the International Studies Association meeting in Washington, DC, March 8, 1985, p. 5.

V. The Economic Context And The Importance Of Choice

Defense spending has been unusually high since 1981, compared to other postwar, peacetime years. Defense budgets have doubled, rising from $140 billion in FY 1980 to $290 billion for FY 1987. At the beginning of the decade, there were warnings that such an increase would generate bottlenecks and inflation, that jobs would be lost in non-defense sectors of the economy, that private investment in plant, equipment, and research and development would be crowded out, and that U.S. productivity, economic growth and international competitiveness would suffer.

Most of these predictions have not come true. Rates of inflation have fallen dramatically, rather than risen; unemployment levels remain high, but millions of new jobs have also been created; the economy has been through a recovery that is roughly equivalent to the average recovery in the postwar period. Productivity levels do remain low, however, and the U.S. trade balance has deteriorated dramatically.

This report has examined existing empirical studies on the connection between defense spending and some of the most important indices of economic performance in the United States The goal has been to review an existing body of work, to evaluate how successfully such studies have explained the connection between defense spending and the economy, and to explore areas where they lack explanatory power. The report suggests, in passing, various areas where new research might be pursued.

Overall, the report concludes that defense spending is not sufficient to explain the performance of the U.S. economy since World War II. Changes in economic growth, inflation, technology and employment can best be explained in a wider economic context, using a wider set of data. Changes in defense spending provide too slender an economic reed to carry such broad explanatory power.

With respect to the connection between defense spending and inflation, our review of existing work suggests that all government spending has the potential to be inflationary, and that defense spending is not unique in this regard. In an

era of rapid economic growth, expanding government spending can induce inflation; in times of recession, it may have little, if any, impact on the rate of inflation. In addition, the impact on inflation of such spending depends very much on the way in which it is financed; on whether, for example, taxation removes purchasing power from the economy as government spending puts it in.

Econometric studies which examine the links between defense spending and inflation are inconclusive. There is also little evidence that defense contractor "cost pass-along" management practices are transferred into non-defense sectors, thereby inducing inflation, and very little explanation of how such a transfer actually takes place. In sum, explanations of inflation which focus on wider economic issues and data are likely to be more powerful than ones which try to use defense spending as the principal determinant.

With respect to the connection between defense spending and employment, existing work suggests similar conclusions. There is little evidence that defense spending, as a whole, is worse for job creation than non-defense spending, also taken as a whole. There is evidence that some specific types of government and private spending create more jobs than defense, but no evidence that defense spending actually reduces employment in other parts of the economy. The rise and fall of employment in the U.S. economy depends far more on broader economic developments -- relative changes in economic sectors, international economic developments, the business cycle -- than they do on changes in the level of defense spending.

The more interesting employment effects of defense spending, which are significantly less studied, involve employment in regions of the country, sectors of the economy and segments of the labor force. Even here, a caveat is important: there are a relatively small number of regions, sectors and segments where defense is sufficiently important to make a difference. Nonetheless, it is worth exploring the role defense spending might play in changes in employment between the Midwest and the Southwest, in the growth and decline of different sectors of the economy (manufacturing and services, for example), and in employment levels in different segments of the U.S. labor market (e.g. skilled and unskilled).

The most complex set of relationships occurs between defense spending and productivity, investment, economic growth, technological change and international competitiveness. There have been elaborate efforts to explain this link, but they are not entirely convincing. Statistical correlations between growth and defense spending show some sign of a connection, but methodological problems make the results far from compelling. Moreover, the mere existence of a correlation does not provide a causal mechanism which would link high levels of defense spending to lower levels of growth, investment, or productivity. It is possible, for example, that the causation runs both ways: the government might use defense spending as a counter-cyclical tool, with a decline in economic activity calling forth higher levels of such spending in an attempt to stimulate the economy.

Studies which attempt to explain how defense spending determines economic performance are uneven. There is no evidence that domestic outlays systematically decline as defense spending rises, for example. There appears to be no link between the way defense budgets are financed and economic performance, nor is there a clear link between borrowing to finance military spending and the

high value of the U.S. dollar, which has had negative consequences for U.S. exports.

Tradeoffs which might occur between defense and non-defense production activity in the private sector depend very much on the state of the economy. The absence of a generalized guns/butter tradeoff most likely reflects the fact that the economy usually operates at less than full employment, leaving room for expansion of both domestic and defense outlays. There is a small amount of evidence that high levels of defense spending might have affected productivity and competitiveness in such sectors as machine tools and semiconductors; however, defense spending may well have stimulated rather than depleted the latter sector. There is even less evidence that high levels of defense spending can be linked to the decline of U.S. manufacturing capabilities in such sectors as automobiles and steel.

When it comes to comparing U.S. economic performance with that of other industrialized countries, the issue of context is crucial. A wide range of factors could explain the decline in U.S. competitiveness on international markets, including currency valuations, production cost advantages and more effective links between the public and private sectors. Defense spending does not seem to have compelling power in statistical comparisons made with other nations whose economies have performed better than that of the United States at various points in time.

This being said, the relationship between defense spending and economic growth and performance remains one of the less well studied aspects of the defense/economics link. Studies of the machinery linking defense research and development to broader research in the economy are few and far between. Analyses of long-term links between high levels of defense spending and economic sluggishness do not exist. This area remains one in which fruitful exploration can continue.

There are valid reasons for raising questions about defense spending, which are linked primarily to security issues. The economic impact of defense spending, in our judgement, is not as compelling an object of study, criticism, and praise except as a matter of priorities and public policy choice. The central economic issue is less whether defense dollars are harmful or beneficial to the economy than it is the kind of an economy that one wants, employing whom, producing what.

Since defense spending has differential impacts in the economy, there may be other regions and other sectors of the labor market and of industry that one would like to see stimulated by federal spending. Federal spending is, in most respects, a matter of choice. In an era of rising revenues, many choices are available; in an era of high deficits, harder choices must be made. The economic impact of defense spending should be scrutinized within this arena of public policy choice; its macroeconomic impact is a less compelling focus of criticism or approval.

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