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Institute of Urban and Regional Development
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Ann R. Markusen

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Defence spending: a successful industrial policy?

by Ann R. Markusen

Most economic analysts who advocate an industrial policy for the US implicitly assume that we do not presently have such a policy. The enormous twentieth-century success of the US economy and *laissez-faire* ideology are credited with the repugnance of successive administrations, Democratic and Republican alike, for any type of national sectoral planning. Instead, macroeconomic policies such as general tax cuts and government spending levels have been relied upon to solve aggregate underconsumption crises. The Congress, too, has preferred across-the-board business incentives such as accelerated depreciation allowances and investment tax credits. The only generally acknowledged exception is agriculture, where persistent intervention is explained by the unusual structure of this sector, with its millions of politically-mobilized farmers; farm policy has been successful precisely because it *is* a sectoral policy, closely tailored to the peculiarities of American agriculture.

However, in the postwar period, military spending has increasingly served as an implicit industrial policy. Its remarkably planned nature and its successes demonstrate that the state is *not* averse nor ill-equipped to pursue a targeted sectoral policy in the US. In this paper, I chart out a number of features of this instance of national sectoral planning and evaluate the political, economic and geographical consequences of it.

I The evolution of military-related production

For most of human history, military activity has been largely a labour-intensive phenomenon, requiring human-scale weapons and transportation (spears, armour, muskets, grenades, horses). Most of this paraphernalia was either crafted by hand in cities (guns) or produced in government facilities (ammunition). The shift to capital-intensive means of warfare took place in the latter half of the nineteenth century, epitomized by the innovation of the modern warship, which was not simply a means of troop transport but an enormous armed weapon. Concomitant with this shift in the conduct of war, a historical shift in the source of military *material* took place, as a productive shift away from small businesses and the state in favour of large corporate entities. In part, this was a calculated political strategy of newly formed monopoly corporations in steel, shipbuilding and engineering, whose vulnerability to periodic depressions and to heightening international competition forced them to turn to the state as client. Beginning in the 1880s, military equipment procurement began to shift from government arsenals and dockyards toward private firms, institutionalizing the practice of the military contract. The stimulation of competition among inventors and manufacturers and the creation of a reservoir of suppliers for rapid response in wartime became the rationale for this state patronage.¹

Over the course of the twentieth century, successive generations of technologies have evolved as the leading edge in a rapidly changing strategic environment: from warships to machine guns, tanks, submarines, bombers and fighters, aircraft carriers, poison gas and other chemical forms of warfare, missiles, biological warfare and nuclear weapons.² Built into this weaponry is an astonishing array of sophisticated electronics and communications equipment which permit it to be mobile, targetted, responsive and even intelligent. Indeed, it is not far-fetched to argue that the most recent Kondratieff long wave was touched off by a series of military-underwritten innovations in aircraft, electronics, communications equipment and scientific instruments. These innovations have formed the basis for the initiation, and often the sustenance, of an entirely new set of sectors and corporations popularly referred to as the military-industrial complex. And in the postwar period, this 'industry' has managed to become a central and permanent feature of the economic landscape.

II The defence industry

The military-industrial complex can be characterized either by the firms which dominate it or by the sectors which are most military dependent. Since most

¹ Kaldor, 1981, 31–35. For an elaboration of this historical development, and the accompanying shift of military-related production away from older cities to peripheral areas, see Markusen, 1986.

² See Tobias *et al.*, 1982, for a short history of weaponry. Koistinen, 1980, covers the evolution of the military industrial complex.

data are available on a sectoral rather than a corporate basis, and because of the conglomerate nature of many corporations, defining the industry as a series of defence-oriented sectors is preferable. Table 1 shows shares of output accounted for by the Department of Defense budget for 1979, 1982 and 1987, as well as the expected rate of growth of these sectors under Reagan. These shares were computed by the Bureau of Industrial Economics using their input-output matrix, so that they include indirect as well as direct effects. However, they exclude a number of other important budgetary commitments, such as the Department of Energy's nuclear warhead and waste activities, the defence-related portions of the National Aeronautics and Space Administration, and the activities of the National Guard, Coast Guard, the Federal Emergency Management Agency, and others. They also do not track the growing importance of arms sales abroad. Nevertheless, while they understate the military dependency of these sectors, they are a good guide to the sectoral membership of the military industrial complex and the relative dependence of each of state demand.

An impressive literature remarks on the uniqueness of military markets.³ The buyer is a monopsonist. But the state does not use its market power to depress prices; on the contrary demand for military products appears to be highly price inelastic. Instead, quality and promptness of delivery appear to be the major factors in the competition for prime contracts. On the supply side, these sectors are highly concentrated and that the role of the state seems to have abetted that concentration. The top 100 companies account for 70% of total business, the top 25 for 50%, and the top five for 20% (Gansler, 1980, 128–44). Firms generally compete with only one or a few others for the initial contract for a large weapons system and once it is awarded, exercise a virtual monopoly. As a result relationships between corporate management and Pentagon officials are close and continual, a not insignificant factor in the perpetuation and stability of defence demand. Indeed, the Pentagon sometimes passes over the best bid and awards a new system to a firm whose 'turn is next'.

The nature of the military product is also unique. Unlike most other commodities and services, the goal is not to standardize the product, minimize costs of production and saturate markets. Weapons, military equipment and transport vehicles are increasingly few in number and highly sophisticated in nature. They are produced in what are essentially large craft shops rather than on an assembly line. Because the cold war has perpetuated a competition in which the object is to render the enemy's weaponry obsolete, military products embody continuous innovation. As a result, the production process is very labour-intensive, with disproportionate numbers of both design-oriented workers (engineers, technicians) and skilled craft workers (machinists, metalworkers).

³ See in particular, Baldwin (1967), Peck and Scherer (1962), Adams and Adams (1982), Melman (1974), Marfels (1978), Adams (1981) and Gansler (1980).

Table 1 Defence market share, 1979, 1982 and 1987. Defence industrial base industries ranked in order of 1982 defence shares

SIC code	Title	1979	Defence share of output		Defence output growth
			1982	1987	1982/87
		(%)	(%)	(%)	(%)
15-17	Construction of new military facilities	100.0	100.0	100.0	21.6
3795	Tanks and tank components	78.1	93.8	95.0	47.2
3483	Ammunition, exc. small	95.1	90.9	93.2	55.6
3489	Ordnance, nec	85.1	79.7	81.2	35.3
3761	Complete missiles	71.0	67.5	79.4	64.4
3731	Shipbuilding and repair	47.9	61.7	62.1	24.1
3662	Radio and TV communication	44.8	58.0	62.5	54.2
3724	Aircraft and missile engines	42.3	53.5	56.1	32.9
3764					
3728	Aircraft and missile equipment	43.4	41.2	44.2	34.9
3769					
3721	Aircraft	35.0	40.4	46.1	58.7
2892	Explosives	19.5	34.3	41.2	58.7
383	Optical instruments	21.6	28.0	30.7	38.0
3811	Engineering instruments	23.5	27.7	33.6	59.9
3163	Non-ferrous forgings	18.0	27.0	29.8	43.3
3482	Small arms ammunition	25.4	25.0	39.9	129.5
3676-9	Electronic components	12.0	17.0	19.8	49.3
3369	Non-ferrous foundries, nec	20.3	15.8	17.8	44.5
3484	Small arms	19.3	13.8	6.5	-43.3
3715	Truck trailers	6.4	13.3	15.4	52.4
3471	Plating and polishing	9.6	12.8	15.4	55.4
3674	Semiconductors	9.5	12.5	12.5	51.4
3399	Primary metal products, nec	6.4	11.9	13.8	48.3
3599	Machinery, exc. elec.	5.7	9.7	11.8	52.6
3361	Aluminum foundries (castings)	7.9	9.1	11.2	58.5
1	Water transportation	6.5	8.7	10.4	47.3
3356	Non-ferrous rolling and drawing	11.6	8.6	10.1	48.6
3825	Instruments to measure elec.	5.6	8.4	9.8	49.7
3398	Metal heat treating	7.5	8.3	9.7	47.8
2441	Wooden containers	12.0	8.0	10.0	51.2
2449					
3624	Carbon and graphite products	6.1	7.7	9.3	51.4
3362	Brass, bronze and copper castings	5.0	7.5	9.3	51.4
45	Air transportation	7.1	7.5	10.2	64.2
3334	Aluminum production	5.8	7.5	9.0	51.4
pt.334					
3299	Non-metallic mineral products	6.6	7.5	8.6	45.0
3469	Metal stampings	5.8	7.3	9.1	60.3
3671-3	Electron tubes	8.3	7.3	11.5	105.3
3573	Computers	3.6	7.1	12.7	141.0
3443	Fabricated platework	7.3	6.9	8.6	62.4
345	Screw machine products	5.6	6.9	8.6	57.5
3462	Iron and steel forgings	7.9	6.9	7.6	31.4

Table 1 — *continued*

SIC code	Title	Defence share of output			Defence output growth
		1979	1982	1987	1982/87
		(%)	(%)	(%)	(%)
3333	Zinc smelting	9.0	6.8	8.2	41.9
pt. 334					
47	Transportation services	6.8	6.7	7.7	37.5
3541	Machine tools — cutting	6.1	6.2	7.5	54.4
3544—5	Special dies and tools	4.9	6.0	7.5	45.4
3562	Ball bearings	4.6	5.8	6.8	45.4
3499	Fabricated metal products	5.0	5.6	6.8	53.4
281	Chemicals	5.5	5.6	7.1	53.3
2865—9					
3312	Blast furnace steel mills	4.5	5.6	6.7	45.6
3339	Refining of non-ferrous nec	6.6	5.6	6.5	39.3
pt 334					
3351	Copper rolling and drawing	5.5	5.5	7.1	66.3
3313	Electrometallurgical products	4.9	5.4	6.3	26.7
101	Iron mining	5.7	5.0	6.0	43.8
106					
32	Lead smelting	6.2	5.0	6.8	70.0
pt 334					
3542	Machine tools forming	5.0	4.8	6.3	70.0
332	Iron and steel foundries	3.9	4.5	5.2	45.1

Source: Henry, 1983

III Military procurement as a sectoral policy

Military spending operates as a disguised sectoral policy in two important ways. First, it acts as an intermediate-run economic stimulant, filtered predominantly through the manufacturing portion of the economy. Second, it serves as a long-term planning strategy, both by encouraging innovation in certain product lines and by bolstering our balance of payments through a distinctive specialization in arms trade. This is not to say that the strategic role of arms is not the predominant source of demand for them, but merely that like other categories of public expenditure, they play a complex role in the overall performance of the economy, in both the short and long term. Nor is it my purpose here to argue that this route to economic growth is the best that can be had under the circumstances. Indeed, there are ways in which the reliance on military spending as an industrial policy creates its own contradictions. Nevertheless, it is an instance of concerted state planning for a distinct sector of the economy which has been much more successful than neo-classical critiques of the ineptitude of government intervention would admit.

1 *Procurement as a stimulant to manufacturing activity*

Most industrial policy debates stress the prosperity of our basic manufacturing sectors as the key to overall economic viability. This view is justified by tenets fundamental to regional development planning, known as economic base theory. The argument is that most sectors in an economy are secondary or tertiary, that is their sales are dependent upon the dynamism in a number of 'basic' sectors whose output is largely exported. Previously, this model was applied mainly to regional resource-based economies, but as the US is increasingly integrated in the world market, the need to compete internationally makes the model more applicable to the economy at the national level than was true in the past. Indeed, it is likely that the continued sluggishness of the economy despite the Reagan tax cuts of the early 1980s is a result of the enormous shift of consumer spending toward imports, which have expanded dramatically since 1967; the tax rebates leaked out of the economy at a rate which the administration did not anticipate.

Defence spending has a rather nice built-in feature which militates against this leakage. For strategic reasons, the Department of Defense refuses to let more than a small percentage of its purchases be produced abroad. And when an imported product threatens to become too critical, it requires US contractors to build their own domestic plants. This occurred recently, for instance, in the 'precursor' carbon fibres area, where the Air Force requested that American Cynamid, Celanese and Hercules build their own plants for this important aerospace material input (Bloch, 1984, 23–24.) Thus a 'Buy America' policy is already an entrenched practice at the Pentagon at the same time that Commerce espouses a free trade philosophy in all its other dealings.

Military procurement outlays, then, will create a new surge in investment activity that will ripple nicely through the rest of the economy. This impact will affect manufacturing more directly than almost any other form of federal government macroeconomic policy. The list of sectors in Table 1 demonstrates that the most heavily defence-dependent sectors are almost entirely found within manufacturing. Of those sectors with more than 10% of their output dedicated directly to DOD in 1979, all are manufacturing sectors, with the exception of military construction. Transportation and mining sectors are the only other immediate beneficiaries of defence spending. These figures confirm an earlier government study which concluded that 66% of all private employment attributable to Department of Defense spending (direct and indirect jobs but not induced jobs) occurred in manufacturing sectors (Oliver, 1971, Table 4).

Military procurement as macroeconomic stimulant has its drawbacks, however. Since it focuses on a group of innovative sectors with relatively highly paid, especially engineering labour, it creates less jobs per dollar of expenditure than would social services spending. Even in secondary rounds, higher income earners are more apt to save than spend out of their incomes, with lower multiplier effects (Gold *et al.*, 1981, 149–59). Military spending is thus not apt to strengthen mass consumer goods markets. Furthermore, since it creates demand for materials and labour

which are already scarce (unemployment rates among engineers are among the lowest in the nation), it tends to create an inflationary bias in some segments of the economy without alleviating unemployment among the hardest hit groups. Despite an economywide recession, inflation has remained at double-figure rates in key industries serving the military, such as aircraft and missiles, in the past five years (DeGrasse, 1983, 124; Dumas, 1982, 7–9).

But the most problematic aspect of military procurement as macropolicy is its relatively lumpy form and slow dispersal throughout the economy. Unlike increases in spending in health or education, the process of fashioning RFPs, the bidding and negotiation phases, and the delays in production due to start-up time all act dramatically to delay the rate at which military spending circulates through the economy. This is the *only* reasonable explanation for the fact that input-output studies, which stress the larger multipliers associated with military spending due to its relatively capital-intensive nature, contradict the findings of econometric studies which almost always conclude that social spending is more expansionary than military outlays (Leontieff *et al.*, 1965; Bezdek, 1975; Chase Econometrics Associates, 1975).⁴ Apparently, military spending takes too long to pump its way into the mainstream, whereas education or health dollars immediately work their way through the economy, setting off yet further rounds of consumer and producer spending. The stimulative effects of the Reagan military buildup are only now beginning to be felt throughout the economy, more than two years after the initial authorizations.

2 *Procurement as a long-term planning strategy*

Without question, then, military spending does create jobs, although whether it is the most efficient form of job creation is not proven. But it also acts as a longer-term planning strategy, intentionally or not, because of its profound effects on the composition of the economy and our competitiveness in the international economy. Here, the effects of military-based industrial policy are less auspicious. Critics point to several problems, in the areas of efficiency, flexibility, productivity and innovation.

First of all, the evidence is rather strong from the studies on industry structure cited above (especially Gansler and Melman), that the oligopolistic practices of producers and the cost overruns tolerated by the monopsonistic buyer lead to an inefficient allocation of resources. These sectors can outbid other commercially-

⁴ However, there appears to be some disagreement over whether or not military spending is capital intensive. Leontieff's more recent work, with Duchin (1983), suggests that worldwide military outlays are more labour-intensive and therefore less expansionary than other forms of public expenditure. Gold *et al.* (1981) found that the MX missile would not require high levels of manufactured inputs, but would favour sectors such as business services and among manufacturing sectors, it would purchase disproportionately from glass, cement and aircraft. There may have been a shift over time in the composition of inputs away from capital goods and materials toward labour and services.

oriented sectors for resources, including skilled labour, hampering the ability of the latter to survive in their more competitive markets. Second, critics from both right and left fear that the industry's structure leaves it relatively unprepared to respond flexibly to new strategic concerns; monopolistically restricted output levels and unnecessary product complexity limit the expandability of the system (Gansler, 1980, 109–26; Defense Industrial Base Panel, 1981).

But a more serious charge is that the short-term prosperity of the military-industrial sector undermines our ability to compete in the longer run. Precious resources, including our educated labourpower, are disproportionately dedicated to the design of weaponry with relatively few commercial applications. As a result, productivity in the economy as a whole suffers, because research on capital goods like machine tools is directed toward narrow military needs rather than efficiency in the larger market. This argument has been forcefully developed by Melman (1983) with respect to the machine tools industry and as an alternative explanation for lagging productivity in US manufacturing in the postwar period.

Although some important innovations have been invented and/or underwritten with Pentagon sponsorship — interchangeable parts, integrated circuits, containerization, numerically controlled machine tools — critics like David Noble (1982) charge that the result has been an exaggerated emphasis upon capital intensive methods and automation at the expense of reliability. Others point out that if the same resources had been devoted to consumer electronics, mass transit systems, and alternative energy technologies, we might be in far better shape competitively (Gold *et al.*, 1981; McFadden and Wake, 1983). Indeed, the superior performance of the Japanese in many sectors like steel, autos and consumer electronics, in which the US had a head start so to speak, may be attributable to the absence of military-related production in their economy and the development of a strong business ethic of market saturation, product quality and reliability, and cost minimization.

Military spending patterns over the postwar period are largely responsible for the fact that 'high-tech' industries seem to be the only basic manufacturing sectors with good prospects. High-tech industries are precisely those favoured by military procurement imperatives — innovative, product design, and performance-oriented sectors as opposed to consumer-oriented, standardized product, and efficient production oriented sectors. In a recent study of high-tech industries in the US, we found that almost all of the manufacturing sectors listed in Table 1 were 'high-tech', defined as those with greater than average proportions of scientific and technical occupations (Markusen *et al.*, 1983a; Markusen, 1986). Of the top 20 defence manufacturing sectors, only shipbuilding and non-ferrous foundries were not 'high-tech' by this definition. In addition, the sectors in Table 1 accounted for 47% of all high-tech manufacturing jobs in the 1977 Census of Manufactures, or approximately 2.25 million jobs. By 1984, given the recent buildup, they undoubtedly account for an even higher percentage.

The implication is that the enthusiasm for 'high-tech' growth, presumed to be the epitome of 'sunrise' industries (Thurow, 1980), acts as disguised approval for a basically military-driven pattern of innovation and resource allocation. The notion

'high-tech' has been laundered of this military connection. Most conferences and compendiums of research on high tech assume that we have no federal government high-tech policy, only state and local efforts. Case studies abound of the biogenetics and semiconductor sectors (both, of course, with tremendous early histories of military-related subsidy), while almost no attention is paid to the equally high-tech sectors such as missiles, ordnance and TV and radio communications equipment.

Nor is much attention paid to the fact that arms are our fastest growing export. The aerospace industry alone has been responsible for the largest US trade surpluses of manufactured goods of any single industry in the postwar period (Boretsky, 1975, 81). Weaponry produced in the US now accounts for about 45% of total world arms transfers, compared with 20% in 1970 (Boston Study Group, 1982, 258). In 1975, the federal government procured for itself only \$17 billion worth of military equipment, compared with \$12 billion it bought from the US Defence industry for foreign governments. Currently some 840 000 US jobs are generated by foreign military sales (Gansler, 1980, 208–209).

The Reagan administration has aggressively encouraged the expansion of arms sales abroad. Unlike Carter before him, Reagan facilitates the sale of first generation technology to other countries. His administration has furthermore encouraged US corporations to innovate for the special military situations of third world countries, another activity prohibited by Carter. It is difficult to imagine that this permissive stance is purely prompted by strategic considerations; indeed, future worries about international violence would caution against such a liberal policy. The resulting acceleration in arms sales has been dramatic; from a \$10 billion in 1974, sales rose to \$21 billion in 1982 and to \$31 billion in 1983 (Klare, 1983, 90). These rapid gains obscure the real deterioration in our manufacturing balance of trade and undoubtedly mislead the public about the seriousness of our industrial competitive position internationally. Yet, as in agricultural policy, this arms export strategy of reindustrialization may prove successful, if inefficient.

IV Military procurement as distributional policy

Those on the left portion of the spectrum calling for an industrial policy often have explicit equity reasons for doing so. We see it as a way of rescuing the 'disappearing middle', rebuffing the attack on organized labour, combating occupational segregation, preserving hard won gains by women and minorities, and boosting the futures of depressed industrial communities. Military spending as an industrial policy receives rather poor marks for those concerned with these dimensions of industrial restructuring.

1 *Occupational structure*

The current defence buildup has highly uneven impacts on the occupational distribution in the US. Defence-generated employment has always been skewed toward

the professional technical categories in comparison with all US employment, even using a narrow definition of defence demand (Dempsey and Schmude, 1971, 14). In 1970, military-related production accounted for 59% of aeronautical engineers, 38% of physicists, 22% of electrical engineers and 20% of technical, mechanical and metallurgical engineers. In addition, in the early 1970s, several of the most highly skilled blue collar occupations were also highly dependent upon defence demand: 54% of tool and diemakers, 25% of pattern and model workers, 25% of sheet metal workers, 19% of machinists and of airplane mechanics, and 14% of draftsmen (Rutzick, 1970, 11–16).

In the current buildup, it is likely that the engineers will gain even more at the expense of both skilled and unskilled blue collar labour. Almost the entire increase in real defence outlays goes for new weapons and transport systems, rather than for military bases, personnel or standard *materiel* such as uniforms, food and oil; these latter do create more blue collar jobs per dollar spent. Furthermore, the disproportionate share goes to aerospace rather than shipbuilding, a sector which has been much more blue collar traditionally. To compound the uncertain prospects for skilled crafts labour during this buildup, the Pentagon has directly subsidized the automation of many portions of the production process, lowering the embodied labour requirement for fabrication assembly jobs. Despite the number of machinists historically employed by defence-dependent industries, the president of the machinists union (IAM), William Winpisinger, is the most outspoken labour leader criticizing the Reagan militarization. Unfortunately, to date most other labour leaders have not followed suit, sticking to their long standing posture of wholehearted support for military spending.

2 *Military procurement and union busting*

In the past couple of years, a growing number of complaints have been registered by unionists that procurement practices have been employed to bust unions and extract wage concessions.⁵ Workers at Todd shipyards in Los Angeles were forced to accept a wage cut when confronted with the possibility that their employer would lose a major contract to unorganized shipyards at Bath, Maine or Passagoula, Mississippi. The Department of Defense has taken an aggressive attitude towards discouraging union activity, including demanding wage concessions in aerospace, rewarding notoriously antiunion firms like Litton with contracts, and aiding firms in moving to non-union areas within the US (e.g. Raytheon's recent move to Alabama).

Elsewhere, I have suggested that this attitude towards labour may be rooted in the culture of military life (Markusen and Bloch, (1985). Since management

⁵ The material in this section was gathered by Anne Henny and Eric Ingersoll of the Department of City and Regional Planning, University of California, Berkeley; they are in the process of writing up their research results which include a series of interviews with west coast labour representatives.

moves back and forth between the Pentagon and the major military-oriented corporations, it may carry with it the norms of loyalty, collectivity and hierarchy. Unlike the free wage labour system which characterizes other sectors of capitalist production, the military model is a complete internal labour market in which individualist incentives and mobility among services are absent. The notion that the individual soldier might have an interest in conflict with his employer and the corollary, that collective bargaining is a reasonable tool for resolving capital and labour differences, is a complete anathema to the military way of life (see Fallows, 1981, 107–14). This crossfertilization of military culture may explain the virulence of Pentagon animosity towards unions in an environment in which cost minimization is not an issue, as it is for commercially-oriented firms.

3 *Military procurement and the maintenance of patriarchy and racism*

The role of the military in perpetuating sexism and racism is clear with respect to the composition of the Services, especially at the top. However, little attention has been paid to the question of whether or not women and minorities share proportionally in the jobs created by military procurement and when they do, if their wages are better or worse than they are in other sectors. Evidence from four California case studies recently conducted at the University of California suggests that the answer may be negative.⁶ The more industrialized activities in sectors like shipbuilding and aircraft which generate heavy demands for blue collar workers do seem to rely heavily on black labour, at least in California cities like Vallejo and Los Angeles. In large part, this is the legacy of massive recruitment campaigns during the second world war targetted at southern black labour. In Los Angeles aerospace, blacks are found in proportions higher than their presence in the areawide workforce. In Vallejo, blacks account for 19% of the population, compared to 8% statewide. But in both places, black men are favoured over black women. In Vallejo, a community heavily dependent upon a large naval shipyard, black women have endured both lower than average labour force participation rates and higher unemployment rates.

In the more 'high-tech' communities like Livermore, Silicon Valley and Orange County, blacks are strikingly underrepresented both in the population and in military-related production. In Livermore, the home of a large nuclear weapons lab, blacks amount to less than 1% of the population. Blacks are also underrepresented in Silicon Valley, where they form 3.4% of the population.

Hispanics have generally not shared in the largesse of defence-generated jobs. Especially in Los Angeles, where they form a large portion of the workforce, their participation in the aerospace industry is markedly below that of other groups. Within the County, defence dollars are spatially concentrated far from the largest hispanic communities, in the suburban periphery. Silicon Valley offers more job opportunities for hispanics, largely in low-paid assembly of components rather than in the defence plants directly.

⁶ Markusen *et al.* (1985).

Women do not participate equally in the jobs created by defence work. In aerospace in Los Angeles, they account for a much lower percentage of the workforce than they do citywide. Furthermore, the wages that they receive when they do work in the defence-related industries average far lower than those of men. Women's earnings averaged 61% of men's in aerospace and 51% in communications equipment. In Silicon Valley, women's earnings in the high-tech industries fell as low as 42% of men's.

The dramatic wage gap between men and women in these communities is largely due to occupational segregation. While this is an economywide problem, it seems to be even worse in defence-related activities. For instance, the proportion of working women in Livermore who are engineers is only one third as high as it is for the state as a whole; at the same time, the proportion of men is double the statewide average. Apparently the weapons labs employ disproportionately large numbers of male engineers. Similarly, women comprise 43% of the Los Angeles workforce, but only 26% of the aerospace workforce, largely because they are discouraged from entering skilled blue collar jobs and engineering occupations. This is true, too, in Vallejo, where women account for less than 7% of the crafts workforce, while men account for the other 93%.

4 *Defence spending and human settlement patterns*

Military-related manufacturing is highly skewed toward a 'defence perimeter' stretching from New England through Florida, Texas, California and Washington State. When warfare was still relatively labour-intensive and human-scale, the production of military equipment was an urban-reinforcing function. But in the latter half of the nineteenth century, with the coincidental emergence of the large-scale corporation, the defence contract, and capital-intensive means of warfare, production began to be dispersed toward peripheral enclaves.⁷ Throughout the twentieth century, shipyards, aircraft, space and missile plants, and factories supplying their tailor-made components began to sprout on the outskirts of newer metropolitan areas, like Los Angeles or Dallas or in medium-sized towns like Huntsville, Alabama, or Titusville/Melbourne, Florida. Not surprisingly, research we recently conducted on the location of high-tech industries in the US showed that cities outside the older manufacturing heartland were the greatest recipients of new high-tech jobs and that these types of communities registered higher degrees of high-tech dependency than industrial cities of the older manufacturing belt.⁸

This shift, and its high-tech manifestation, is not simply a frostbelt/sunbelt phenomenon, for New England also benefited disproportionately from procurement in shipbuilding, aircraft engines, and electronics. Rather, the regional tendency is much better captured by the notion of a 'defence perimeter', a striking growth of defence production and activity in all regions outside of the industrial heartland – the

⁷ For an elaboration of this argument, see Markusen (1984).

⁸ See Markusen *et al.*, 1986.

belt stretching from Milwaukee and Chicago through Buffalo, New York City (but not Long Island, which belongs to the defence perimeter), Philadelphia, Baltimore, and back through Cincinnati. This is the region of the country which is most conspicuously not participating in the stimulus from the Reagan industrial buildup.

One interpretation of this phenomenon is that this industrial heartland was the product of the relatively egalitarian form of American agriculture, supporting millions of farm operators with adequate incomes to purchase everything from tractors to readymade clothing. Management in industrial belt sectors preferred the Fordist markets of middle-class America, so that at the end of the second world war, they readily reconverted their tank, aircraft and ammunition plants to domestic products. New England did not have this option, since its non-military-oriented manufacturing sectors, such as textiles and shoes, dated from the early industrial revolution and by the postwar period, had been outcompeted by both southern and third world producers.

A second interpretation is that the industrial belt is the historical site of an intense capital/labour conflict which has produced a type of social contract which tolerates high wages, labour participation in restricting the pace and content of work, and a relatively generous social wage. Granted, the ability of midwestern corporations to live with these concessions was based on their oligopolistic prerogatives in an intact American market, but it must also be seen as a victory for labour in a century long struggle. Military-related production appears to have joined the exodus of plants and even entire sectors away from this region of relatively powerful labour unions. This cannot, as in the case of textiles or shoes, be attributed to competitive conditions in product markets, since military suppliers have been under no such cost minimization imperatives. Indeed, military-oriented manufacturers appear to have regularly recruited their own labour force interregionally and constructed their own pool of labour around their new base, offering moving costs to personnel and charging a profit margin on that 'cost'. In addition, the antipathy toward labour unions mentioned above may have contributed to their preference for the defence perimeter.

Within regions, too, military-related firms have demonstrated an antic cosmopolitan bias in locational choice. Whether because of need for space, a desire to speculate on land development nearby, or a preference for building their own type of community, the large prime contractors in most regions are located on the edge of metropolitan areas or increasingly, in relatively isolated medium-sized cities. In the Bay Area, it is the more peripheral communities like Vallejo, Livermore and Silicon Valley which have garnered the lion's share of military dollars. In Los Angeles, it is the suburban areas of the County and of neighbouring counties which host almost all of the military-related manufacturing. This was true in the 1930s as well as today, suggesting this type of manufacturing was a pacesetter in the suburbanization of production. In 1939, for instance, only 7% of aircraft workers in the US were employed in cities of more than 500 000, while 62% were in communities with less than 25 000 people. By contrast, 23% of all industrial workers were in the

biggest cities and only 40% in the smallest. In the same year, the auto industry had 33% of its workforce in cities over 500 000, and machining, 43%.⁹

As an industrial policy, then, military procurement does the opposite of what most liberal and left economists would hope for with respect to community preservation. It encourages growth in those sunbelt areas which are least depressed. It fuels the inflation in housing prices in suburban communities of white collar professionals, such as Silicon Valley and Long Island, where lobbies have formed to ask states to pass legislation to alleviate the 'housing crisis' in these upper-income enclaves. Ironically, it is often suggested that such housing aid is required in order for the city or state to remain 'competitive' in the rapidly changing high-tech arena. The relationship of this housing pressure to the military buildup is conveniently overlooked.

V A preliminary assessment

Overall, then, military spending as a form of sectoral policy gets mixed marks. It 'works', if the criterion for performance is a narrow one of economic stimulus. However, even as a short-term macropolicy, it has troublesome lags, and the evidence is good that spending on other types of output would be considerably more efficient. It does, however, prove that the federal government is perfectly capable of overseeing an industrial policy, if the evidence from agriculture and the public lands is not enough.

More problematic are the long-run implications of the defence buildup for the future performance of the economy. It is unlikely that the type of research and product design encouraged by massive government subsidies will produce the kinds of innovations which will improve our standards of living and enhance productivity. Furthermore, the distributional consequences of this type of industrial policy are clearly negative. Not only is this reprehensible on normative grounds, but this worsening of the income distribution cannot be viewed optimistically by any macroeconomist who understands Keynes's (and Marx's) still unchallenged belief that underconsumption (or overproduction) tend to create crises in the economic life of a nation.

For those interested in the transition to socialism, an industrial policy which targets basic consumer and capital goods sectors would be superior. Efforts to modernize certain basic sectors, explicitly to preserve livelihoods within them, would strengthen the economy, much as farm policy has done since the 1930s. Blue collar workers, their communities and their unions, who form an important political base for progressive politics, would thereby be supported, rather than displaced and destroyed as at present. Industrial innovation would be aimed at improving infrastructure, basic production processes, and use values of consumer

⁹ Cunningham, 1951, 59–65. For an elaboration of this theme of the locational tendencies of military manufacturing and the type of community which results, see Markusen and Block, 1985.

products, rather than at more precisely lethal weapons. An industrial policy could experiment with new forms of organization, including worker cooperatives and community development corporations.¹⁰ Even those who believe that capitalism will crush itself in crisis, or that it will not give way to socialist forms without a struggle, must agree that a short-term policy of this type is a far superior route to political mobilization than the closet military industrial policy of a Reagan. His *laissez faire* policies are creating a highly military-dependent economy with its own specialized labourforce, communities and technocratic bias, and with a stake in the sale and use of arms worldwide.

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¹⁰ For the elements of such a policy for the steel sector, see Markusen, 1983 and Markusen *et al.*, 1983. Bluestone and Harrison, 1982, offer some general criteria for a radical industrial policy.

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Les dépenses militaires ont servi de plus en plus, dans la période qui a suivi la guerre, de politique industrielle aux Etats-Unis. En tant que telles, elles ont subventionné la croissance de grandes industries de systèmes d'armement (aviation, artillerie, missiles, construction navale) et les fournisseurs de haute technologie (spécialement l'électronique, équipement de réception radio et télévision, instruments scientifiques) aux frais des biens de consommation et industries de biens d'équipements plus courants. En tant que politique industrielle, elle a l'avantage d'être fortement orientée vers la fabrication, d'être essentiellement une politique 'd'achat américain' pour des raisons stratégiques, et de créer l'apparence d'une vitalité économique pendant des périodes de restructurations économiques difficiles. Alors que cette politique renie les déclarations néoclassiques que les gouvernements ne peuvent gérer un secteur spécifique avec succès, elle a ses coûts – multiplicateurs keynésien à plus bas niveau, dispersion lente et imprédictible de tout l'économie, pénurie de capital créée artificiellement dans d'autres secteurs, distorsion des priorités d'innovation, et une dépendance croissante sur les ventes d'armes à l'étranger. Elle aggrave le clivage professionnel, encourage la division syndicale, engendre le patriarcat et le racisme et crée des communautés conservatrices, nouvelles et périphériques.

Verteidigungsausgaben werden in den U.S.A. seit dem Zweiten Weltkrieg in immer stärkerem Maße als ein Instrument der Wirtschaftspolitik eingesetzt. Auf diese Weise wird zu Lasten der Konsumgüter- und der gewöhnlichen Kapitalgüterindustrie das Wachstum von Industriezweigen subventioniert, die große Waffensysteme (Flugzeuge, Artilleriewaffen, Flugkörper, Schiffe) und hochentwickelte technische Ausrüstungen (insbesondere Elektronik, Radio- und Fernsehgeräte, wissenschaftliche Instrumente) herstellen. Als ein Instrument der Wirtschaftspolitik haben Verteidigungsausgaben den Vorteil daß sie stark an der Industrieproduktion orientiert sind, daß sie aus strategischen Gründen den Kauf von inländischen Produkten fördern und in Zeiten einer schmerzhaften wirtschaftlichen Umstrukturierung den Anschein wirtschaftlicher Leistungsfähigkeit erwecken. Diese Politik widerlegt zwar die neoklassische Behauptung, daß eine Regierung einen spezifischen Sektor nicht erfolgreich bewirtschaften kann, hat aber seinen Preis – niedrigere Keynes'sche Multiplikatoren, eine langsame und unberechenbare Verteilung in der Wirtschaft, künstlich geschaffene Kapital-knappheit in anderen Sektoren, Verzerrung von Innovationsprioritäten und eine zunehmende Abhängigkeit von Waffenverkäufen in Ausland. Sie verschlimmert die Spaltung zwischen Berufsgruppen, fördert die Zerstörung von Gewerkschaften, schafft patriarchalische Zustände und Rassismus und bringt neue, konservative Randgruppen hervor.

En el período de la postguerra, los desembolsos en la defensa han ilegado a ser, cada vez más, una política industrial en los Estados Unidos. Como tal, ha subvencionado la expansión de

industrias de armamentos (aviones, artillería, misiles, construcción naval), y de los suministradores de tecnología avanzado, (especialmente la electrónica, equipos de recepción de radio y TV, instrumentos científicos), a expensas de los productos de consumo, y de las industrias de bienes capitales productos de consumo, y de las industrias de bienes capitales más convencionales. Como política industrial, tiene la ventaja de estar muy orientada hacia la fabricación, siendo además una política de 'compras en Norteamérica', por razones estratégicas, igualmente creando el aspecto de vitalidad económica durante períodos de una penosa reestructuración económica. Si bien esta política rechaza las declaraciones neoclásicas de que los gobiernos no pueden administrar con éxito sectores específicos, tiene sus desventajas: multiplicadores keynesianos más bajos, una dispersión lenta y difícil de pronosticar por toda la economía, escasez de capital creada artificialmente en otros sectores, distorsión de prioridades innovativas, y una creciente dependencia en la venta de las armas en el extranjero. Agrava la división entre ocupaciones, fomenta la eliminación de los sindicatos, engendra el patriarcado y el racismo y crea nuevas comunidades conservadoras periféricas.