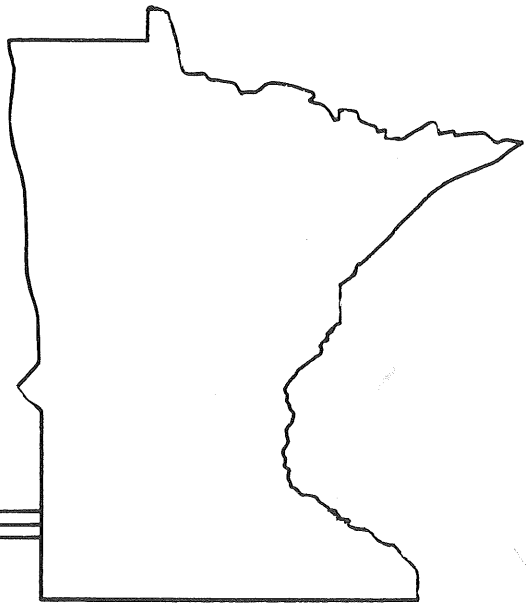
MILITARY PRODUCTION and the MINNESOTA ECONOMY



A Report for the
Minnesota Task Force
on Economic Conversion

May 1989

Military Production and the Minnesota Economy

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Contents

Preface

The Minnesota Economic Conversion Task Force has authorized the release of this report. The purpose of the report is two-fold. First, the report offers an understanding of the economic issues surrounding military goods production in Minnesota. Second, based on extensive research and analysis, the report proposes recommendations that would help the state and its citizens meet the challenges facing the portion of the economy supported by military production.

This study was conducted by noted regional economist and University of Minnesota faculty member Dr. Wilbur Maki. Dr. Maki was assisted by researchers David Bogenschultz, Christine Evans, and Michael Senese.

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Summary

Pentagon cuts have already arrived in Minnesota and more will likely follow. Hundreds of military-related layoffs at Honeywell, Unisys, FMC and Control Data emphasized this point. Consequently, policy makers must understand the role of the military in Minnesota's economy to generate effective ways of coping with such cuts.

Findings

1. In 1987, Minnesota taxpayers lost $1.8 billion, $418 per person, in taxes to the Pentagon. Minnesotans paid $4.7 billion in taxes to the military in 1987 and received $2.9 billion in military expenditures, largely contracts for durable goods.

2. Minnesota loses when military spending increases and gains with domestic spending increases. Minnesota received and will probably continue to receive a low share of total military spending. However, because Minnesotans effectively use federal entitlements, Minnesota received a higher share of federal social spending than Pentagon spending.

3. Five of 351 military contractors received 85 percent of total contract dollars; and the seven county metropolitan area received 96.3 percent of all 1987 contract awards. The metropolitan area's share rose slightly from its 1982 level of 95.7 percent. This urban-rural imbalance existed in spite of Pentagon efforts to encourage rural bidding on contracts.

4. Pentagon spending patterns exacerbated difficult economic times in Greater Minnesota. Income from workers on military contracts was disproportionately concentrated in the metro area, which is relatively more prosperous than Greater Minnesota (despite pockets of severe urban poverty). All of Minnesota's rural counties paid more in Pentagon taxes than they received back in military contracts. In short, Pentagon spending amounts to a redistribution of wealth from less well-off Greater Minnesota to the more well-off metropolitan area.

5. The Minnesota durable goods sector is especially dependent on military spending. For example, Pentagon purchases accounted for 88 percent of all ordnance-industry purchases, 87 percent of communications purchases, 57 percent of transportation purchases and 54 percent of professional/scientific instrument purchases. Some industries, such as computers and scientific instruments, would be surprisingly sensitive to cuts in new weapons procurement. This dependency underscores the need for Minnesota firms in the technology-intensive durable goods sector to change. They must move quickly from military dependency and take advantage of export opportunities by expanding civilian product lines and using research and development money to enhance competitiveness in civilian markets.

6. If the military budget were reduced by 20 percent and the funds allocated to social sectors (housing, medical care, education, infrastructure),

Minnesota would experience a net gain of 9,400 new jobs, with corresponding increases in employment earnings and gross state product. Even if the 20 percent cut were simply returned to the taxpayer and used for private consumption, Minnesota could expect a net gain of about 8,100 jobs. This policy option, however, is less desirable, because it leaves important social needs unmet.

Note that estimates of national military spending used in this report are conservative. They do not include military expenditures in the Department of Energy or expenditures used to pay off the Pentagon's portion of the national debt. They include only expenditures reported for the Defense Department in the *Federal Expenditures by State for Fiscal Year 1987*, U.S. Census Bureau (1988).

Conclusions

This report documents that Minnesotans paid more to the Pentagon than they got back in 1987. Jobs in those industries that are dependent on military contracts are especially vulnerable to cuts in military spending. However, if a shift from military to social spending occurred, Minnesotans would gain in total jobs and economic output as well as meet currently unmet social needs.

Recommendations

A. The state should conduct an annual study of the impact of military spending. Because the military budget will continue to be vulnerable to future budget cuts and because this study documents clear economic dependencies in certain sectors, there is a need to understand the vulnerability of specific industries to cuts. Also, to help plan how these industries adapt to Pentagon cuts, the study should identify areas of expanding markets that require comparable technologies and work skills.

B. The state should expand its program of economic conversion and continue support for extensive training and retraining. Such a program would lessen the income and personal hardships of workers losing jobs due to military cuts. A conversion program would include civilian product development and marketing and engineering analysis. The program would also include economic assistance for capital equipment and funding and support for workers in transition. While some of these services are currently available through various federal, state and local agencies, the overall conversion program should have at least one coordinator who can help labor, community and business groups gain access to such services.

C. The Minnesota Congressional delegation should support:

i) A budget-neutral shift from military spending to social spending. Such a shift should be based upon the true needs of our nation's defense and the true needs of people.

ii) The establishment of a national economic industrial conversion program such as the one embodied in H.R. 101, authored by Representative Ted Weiss of New York.

Because Minnesota gains with social spending and loses with military spending, a shift to social spending will create jobs and benefit people. A national conversion program will help workers and industries adjust to defense cuts, not only in Minnesota but in other states as well.

The Current Context

As President Bush attempts to deal with the United States' economic problems, there is widespread consensus that the Reagan military buildup must end, if only for economic reasons. Comptroller General Charles Bowsher, a Reagan appointee, issued a 26-volume report citing staggering U.S. deficits and advising President Bush to rethink the United States' worldwide military commitments. Yet, while the "rethinking" proceeds, military cuts have already arrived in Minnesota. The Pentagon recently reported a 14 percent drop, a $350 million reduction, in the value of military contracts awarded in Minnesota between fiscal 1987 and 1988. As a result, Minnesota's four largest contractors experienced hundreds of layoffs in 1988.

If military cuts had been made during the early 1980s, the funds could have been spent to make the U.S. competitive in the world market for civilian products. Now, President Bush may have to make military cuts just to service the national debt as well as stabilize the U.S. world economic position. And most observers agree that he has little maneuvering room. Although he needs to reduce the federal deficit, lower government spending may bring on or intensify the recession that many economic analysts predict. Though increased federal spending over the next few years could counteract the predicted recession, this option has negative consequences because of the deficit spending carried on by the Reagan administration during a period of prosperity.

The Task Force Report

As policy makers across the country plan responses to cuts in military spending, the Minnesota State Task Force on Economic Conversion has completed this timely report on the economic effects of military spending in Minnesota. The report lays out some new facts that are vitally important to Minnesotans. The report also examines policy options that would sustain the Minnesota economy as cuts occur in military spending.

The study uses baseline data on military taxation and military spending from a number of federal and private sources. These figures are based on the most conservative accounting of actual military spending. They include only Pentagon spending and exclude Department of Energy spending on nuclear and other weapons or the portion of interest on the national debt supporting military expenditures. These exclusions are included in military spending by many respectable analysts.

A computer model simulated the economic consequences for Minnesota of a $44 billion cut in Federal military spending. (The cut represents a 25 percent reduction in procurement spending and a 12.5 percent reduction in non-procurement spending.) This figure was chosen because it is of significant magnitude to demonstrate economic trends clearly and it also corresponds with cutbacks proposed by responsible persons in Congress and elsewhere. Note that this study does not advocate any particular level of military cuts, but only seeks to demonstrate what effects would occur in Minnesota.

The computer model, known as IPASS (Interactive Policy Analysis Simulation System), analyzes the inter-industrial effects of the military cuts. The analysis uses an input/output model, with the inter-industrial relations defined by known characteristics in the Minnesota economy. One set of tables shows the IPASS model's prediction if this cut were made and the monies were not reallocated. These figures are useful in identifying which economic sectors would be damaged and may need state economic conversion assistance.

Another set of tables shows what would happen in Minnesota if the funds from the military cut were reallocated to housing and other construction, improved medical care, education, infrastructure improvements, environment, job training and transfer payments to individuals. The assumptions Maki, Bogenschultz, Evans and Senese used in constructing this alternative were partly dictated by surveys of need and by extrapolation from 1987 federal spending trends. The amount reallocated to new housing, for example, would provide homes for 600 families — nearly all the families currently in shelters.

Distribution of Pentagon Taxes and Expenditures

In 1987, Minnesotans paid an estimated $4.74 billion in personal income taxes appropriated to the Department of Defense. Approximately $2.9 billion came back into the state in the form of contracts for weapons and other goods and services, Defense Department wages and salaries, and military retirement pay. The net result was that Minnesotans paid an estimated $1.76 billion more to support the Defense Department than the department spent in the state, a difference equal to $418 per Minnesotan. Table 1 shows the sources of Pentagon spending and the calculation of tax losses.

Table 1
Sources of Minnesota Pentagon Spending, 1987[a]

Amount Expenditures	(dollars in millions)
Procurement Contracts $25,000 and over	2,424
Procurement Contracts[b] under $25,000 (estimate)	239
Payroll (active and inactive duty)	314
Total Spent in Minnesota	2,977
Minnesota Taxes to Pentagon	4,740
Net Loss	1,763
Loss Per Capita (in dollars)	418

Sources: Military Spending Research Service (1988) and U.S. Census Bureau (1988). Note that all references to military spending are for Federal Fiscal Year 1987, which ran from October 1, 1986, to September 30, 1987. Note also that all contracts are prime contracts; analysis of sub-contracts is not possible because information regarding location and type of work contracted is not available.

[a]Appendix A explains and shows, at the county level, the calculation of Minnesota tax support of the Pentagon.

[b]This estimate adds an additional 9.843 percent to the amount for contracts over $25,000. The Center for Economic Conversion developed the estimate because the Pentagon does not keep detailed summaries on the smaller contracts.

Procurement contracts (those for weapons, weapon-related research, buildings, supplies and services) accounted for almost 90 percent of Pentagon spending in Minnesota[1]. Most of the remaining 10 percent of military spending in the state in 1987 took the form of military payroll and retirement pay. Total military payroll was $314 million, including $196 million of wages and salaries paid to military (active and inactive) and civilian Department of Defense personnel. An additional $118 million went to Minnesota veterans as military retirement pay.

Geographic Distribution

Figure 1 shows the 1987 Pentagon tax burden, county by county. Not only was the state as a whole a net loser, but also 85 of the 87 counties were net losers. Only Hennepin and Ramsey counties received more military dollars than they paid out in Pentagon taxes, and perhaps even this is an illusion, because many metro wage earners work in one county and pay their taxes from homes in another county. By combining figures from seven counties, the metro area as an economic unit suffered a per capita loss of $21 for the overall metro area.

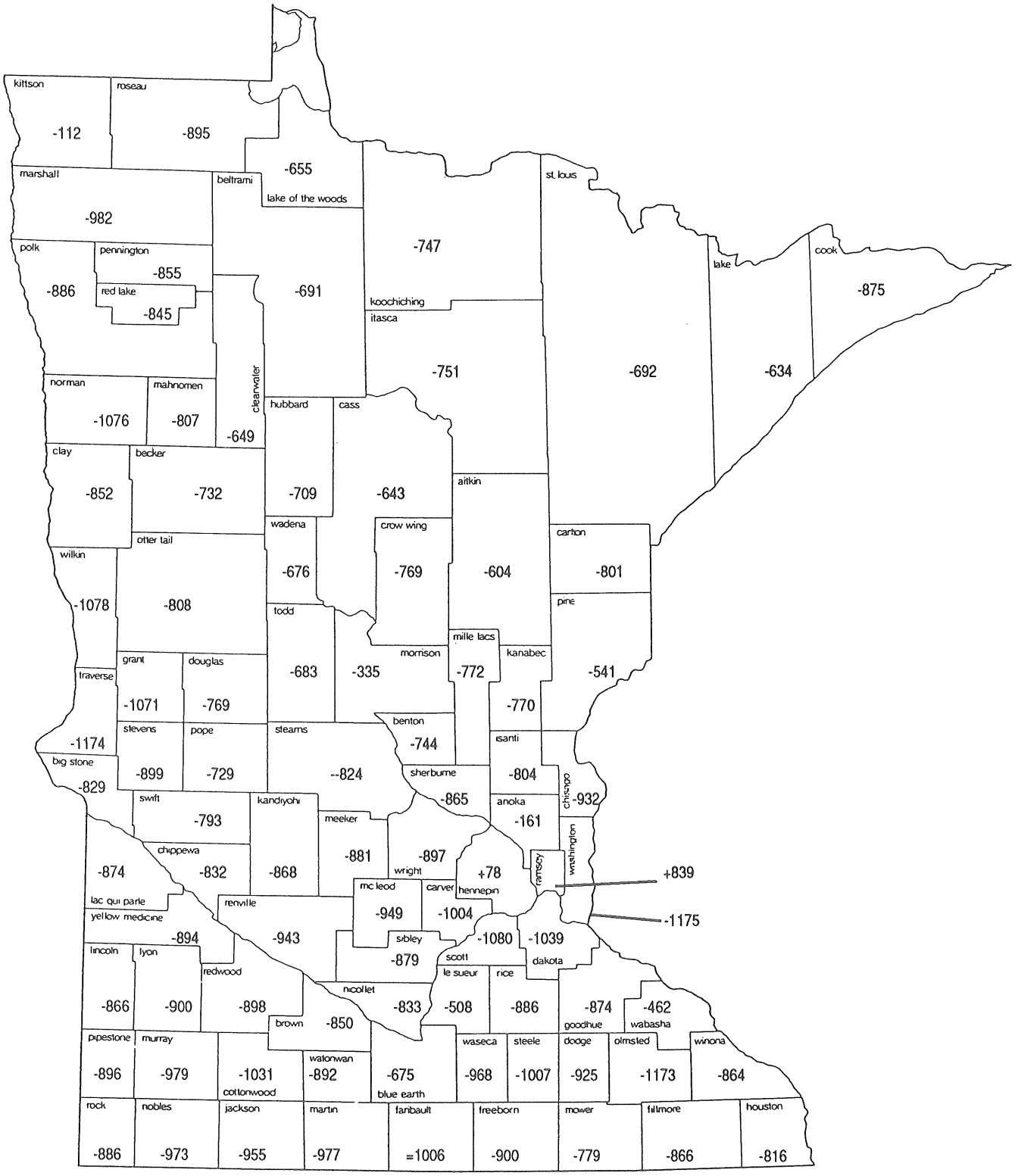
The urban loss, however, was slight when compared to Greater Minnesota. Losses per capita in Greater Minnesota were 16 to 56 times greater than metro losses. Consequently, the Pentagon tax burden effectively redistributed money from rural to urban areas.

James Anderson's[2]1986 study of the impact of military spending on 1,200 agricultural counties in 25 states showed that even when federal payments and loans to the agricultural sector were factored in, the Pentagon drain was so large that agricultural counties still suffered a net loss. The Minnesota agricultural counties in Anderson's

[1]Procurement contract dollars are amounts credited to a contractors account, to be spent within the next three years, although most is spent within the designated fiscal year. Federal accounting reports do not show exactly when the money is spent. For this reason, this report adopts the general practice of using contract amounts as expenditures. Note that the amounts not spent during the 1987 fiscal year are offset by amounts spent in 1987 but reported in earlier years.

[2]Dr. Anderson, Michigan State University, is a noted authority on military spending.

Figure 1
Net Pentagon Tax Flow per Person — 1987
(Amounts in Dollars)



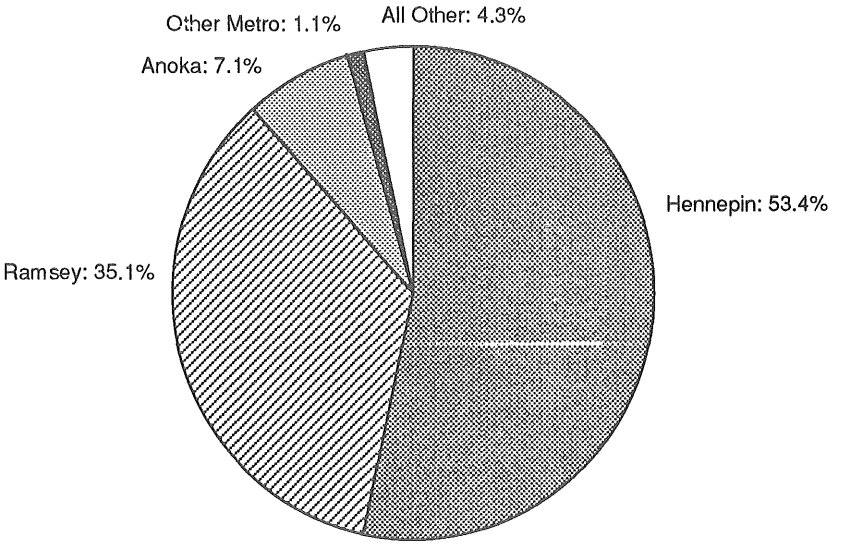
study had a net payout to the Pentagon of $2 billion, offset by a $1.2 billion net gain in agricultural expenditures, resulting in an overall net loss of $857 million to agricultural Minnesota.

In spite of a travelling program offered by the Pentagon's Defense Logistics Office to help rural bidders win military contracts, the Pentagon's drain of rural area resources is clearly documented. In 1982, the percentage of procurement contracts performed in the metro area was 95.7 percent (MSRS, 1985). In 1987, it was 96.3 percent. Figure 2 shows the metropolitan area's dominance at the county level.

The *1987 Economic Report to the Governor* also addressed the widening economic gap between the metropolitan area and the rest of the state. The report noted that indices of growth such as per capita income and retail sales have been rising faster in the metropolitan area. The report also showed that four out of five new manufacturing jobs created between 1976 and 1984 were in the metro area.

The report concluded that economic growth is not being shared equally within the state, and an increasingly greater portion of the state's economy is focused in the metro area. (Metropolitan communities, however, do not share economic growth equally; some of the poorest parts of the state are in the metro area.) Although there are a number of reasons for this inequity, the disparity between urban and rural Pentagon purchases makes the tax burden a major contributor.

Figure 2
Department of Defense Expenditures by County — 1987



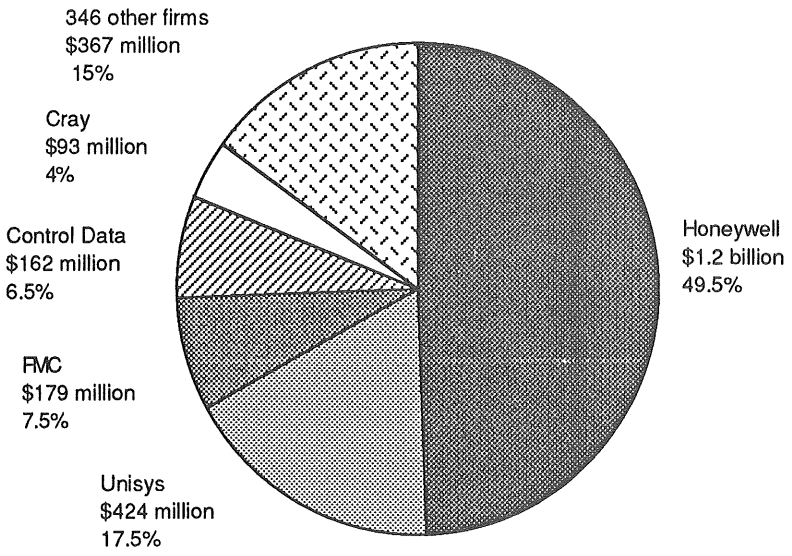
Source: Military Spending Research Service, 1988.

Distribution Across Firms

Large corporations were the primary beneficiaries of Pentagon business. Figure 3 shows that one firm, Honeywell, received nearly 50 percent of procurement dollars; and that five firms accounted for 85 percent of military procurement expenditures.

Note that the top five firms, as well as others, performed the majority of their military business in the metropolitan area. Appendix B contains detailed descriptions of the activities of Honeywell, Unisys, FMC, and Control Data. (The appendix also contains information regarding military spending at the University of Minnesota and for the Strategic Defense Initiative, Star Wars.)

Figure 3
Department of Defense Procurement Expenditures by Company — 1987



Source: Military Spending Research Service, 1988.

Sectoral Composition of Military Spending in Minnesota

Procurement spending, for contracts over $25,000, accounted for 27,300 jobs in 1987. These contracts totaled $2.4 billion.[3] This amount nearly equaled the total sales in Minnesota's computer industry. The amount spent and number of military-dependent jobs comprised 1.3 and 1.6 percent of Minnesota's total jobs and output, respectively. Despite these small percentages, U.S. military procurement activities affect virtually every industry in Minnesota.

Because a strong local infrastructure has grown up to supply and support military contractors in the Twin Cities, military procurement expenditures have large indirect effects inside the state. Indirect effects consist of: 1) backward linkages from military contractors to local industries supplying their inputs, and 2) consumption resulting from income earned by employees of military contractors. Taking these supply and consumption linkages into account provides an estimate of the total impact of military contracting in Minnesota.

[3]There is currently no systematic collection of data for contracts less than $25,000. Using the Center for Economic Conversion's estimate, the Pentagon likely spent an additional $239 million for these smaller contracts in Minnesota. The remaining analysis does not consider this additional spending because there is no accurate method to distribute the sum to specific IPASS industrial sectors. The analysis also excludes payroll and pension as this money is not likely to be cut.

As Table 2 shows, taking both direct and indirect effects into account, Pentagon contracts provided employment for about 5.5 percent of Minnesota workers, approximately 116,345 jobs. The initial $2.4 billion coming into the state generated an additional $6.6 billion in total state output, with the value of the direct and indirect production totaling $9 billion.

The economic importance of military spending varied widely from industry to industry. Four economic indicators useful in demonstrating the importance of military spending across sectors of the economy are: *employment* (number of full-time equivalent jobs), *labor earnings* (wages, salaries, and other types of labor income, including earnings of the self-employed), *value added* (the selling price of a product minus the cost of materials to make it), and *gross output* (the total value of what is produced, without subtracting that portion of the value contributed by purchased inputs).

In 1987, the largest sector of military procurement was the manufacturing of durable goods, which accounted for almost one-third of all output and over one-quarter of the jobs created by military spending. Other sectors with less total output generated by military purchases accounted for a greater share of the total jobs supported by military procurement because of the higher number of workers per unit of output. For example, the dollar value for transportation, utilities and communication sectors generated by military contracts is less than one-quarter of that for durable manufactured goods, but generated about twice the number of jobs. Another example is trade, which provided about the same number of jobs as durables, but produced less than half the output value of durables.

Minnesota's durable goods sector was, and probably still is, particularly dependent on military spending. About 16 percent of its gross output and 15 percent of its total employment were supported by military procurement in 1987. In all other industries, Pentagon spending supported less than 9.3 percent of total output and less than 8 percent of total jobs.

Within the manufacturing sector, just seven industrial sectors received over 80 percent of all military contracts in 1987. As with the rest of the U.S. economy, procurement spending in Minnesota is heavily concentrated in the technology-intensive industries of ordnance, computers, professional/scientific instruments and communications. Figure 4 illustrates.

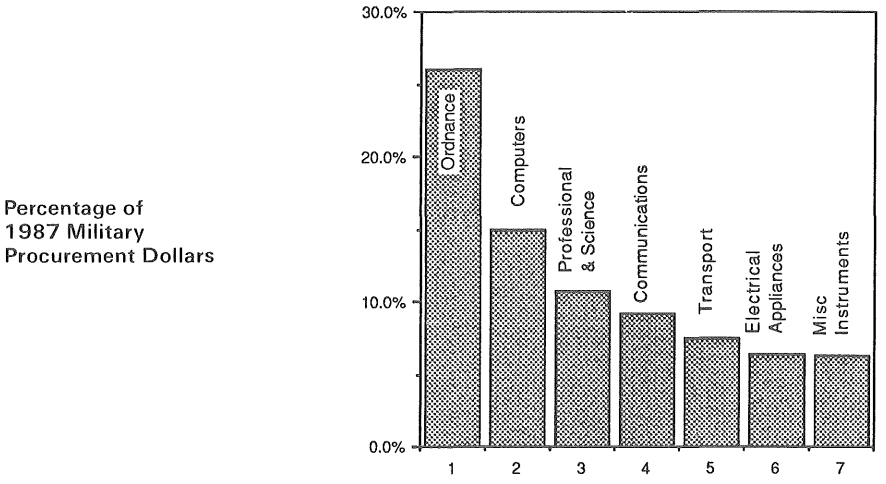
Combined, these three industries received 50 percent of Minnesota's contract dollars in 1987.

Table 2
Direct and Indirect Impacts of Procurement Spending 1987
(Dollars in millions)

	Employment		Labor earnings		Value added		Gross output	
Sector	Number	Percent of State	Dollars	Percent of State	Dollars	Percent of State	Dollars	Percent of State
Agriculture	537	1.0	6	1.7	33.2	1.7	122.4	1.8
Mining	44	0.1	1.2	0.6	2	0.7	3.6	0.6
Construction	4,856	8.0	197.6	8.5	230	8.6	608.0	9.3%
Manufacturing								
Non-durable	3,280	2.4	90.4	2.5	148.8	2.6	595.6	2.7
Durable	29,804	15.3	1,088.4	19.0	1,419.2	18.9	2,862.4	16.4
Trans., utilities, & communication	55,332	5.6	174.8	6.0	332.8	6.2	704.8	6.3
Trade	31,692	5.5	471.2	5.6	798	5.8	1,269.6	5.8
Finance, insurance & real estate	7,616	5.5	190.4	5.6	952.8	5.3	1,331.6	5.4
Private services	27,816	5.6	521.6	5.4	779.6	5.6	1,306.8	5.5
Government	5,368	1.5	142	1.5	149.2	1.6	178.4	1.8
Total	116,345	5.5	2,883.6	6.3	4,845.6	6.1	8,983.2	6.2

Sources: Department of Commerce (1988) "Regional Economic Information System" data for 1986 with IPASS extrapolations for 1987 and Military Spending Research Service (1988).

Figure 4
Top Industries by Procurement Amount — 1987



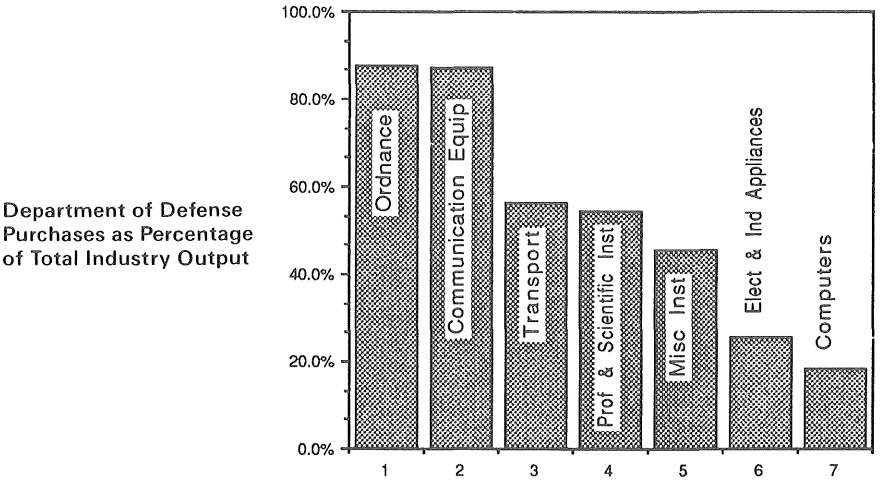
Source: Military Spending Research Service, 1988.

Ordnance alone accounted for over one-fifth of all procurement dollars. Being relatively capital-intensive, these industries generated fewer jobs per dollar invested than other durable goods industries. The technology-intensive industries have potential for growth in civilian domestic and export markets, but their military dependency inhibits this growth. It also makes them vulnerable to cuts in procurement spending, as the model simulation in the next section shows.

Figure 5 shows that durable goods industries had varying degrees of dependency on military spending.

While the computer sector had the second highest amount of military contract dollars, only 18 percent of the sector's additional total output was military-related. On the other hand, 88 percent of gross output of ordnance, which includes guns, ammunition, torpedoes, missiles and missile launcher systems, was purchased by the military. The Pentagon purchased almost an equal share (87 percent) of the total output of communications equipment. The major military products in this category are communication devices for military aircraft and ships. Also, over half of all professional and scientific instruments produced in the state were for military purposes.

Figure 5
Military-dependent Manufacturing Sectors — 1987



Sources: Department of Commerce, 1988. "Regional Economic Information System" for 1986 with IPASS extrapolations for 1987, and MSRS, 1988.

Comparative Analysis: Impact of Military and Domestic Spending Patterns

As stated above, the Pentagon purchased $2.4 billion worth of goods and services in Minnesota in 1987, directly supporting some 27,300 jobs. An additional 90,000 jobs were created in industries that sell intermediate inputs to the military contractors or in industries producing the consumer goods and services purchased with the income received by employees of military contractors and sub-contractors.

Does this mean that a significant reduction in military spending would result in overall loss of jobs in the state? Not at all — unless the money not spent by the Pentagon would vanish, stuffed into the proverbial mattress. Minnesotans would have an even greater number of jobs created if the tax dollars collected to support the military were spent differently.

Many studies of the national economy have shown that a transfer of federal spending from military to civilian purchases would result in a net gain of jobs (Anderson *et al.*, 1986; Bezdek, 1975; Dresch & Goldberg, 1973; Mosley, 1985). Consequently, the government not only sacrifices jobs when it spends on the military but also the human benefits of social programs that would otherwise receive the money. In sacrificing social programs, people's health, families' livelihoods, children's education and the environment become the real losses. Further, the government forgoes opportunities when resources are invested in research to develop weapon systems as opposed to investing in research to make industries more productive or to improve people's quality of life.

If national priorities shifted from military to civilian spending, not only would pressing social needs be better met but also an overall increase in employment could be expected as an additional benefit. Just as military spending does not create jobs equally across all industries, occupations, or regions, a shift of resources would not benefit all industries. Industries with the largest share of their total output in military contracts could suffer job losses unless conversion efforts were undertaken.

The purpose of this section is to discover what the sacrificed employment opportunities are in Minnesota — with its specific mix of industries and current level and type of military procurement. This section also identifies industries which would benefit directly from new priorities in public spending. It also identifies sectors which, without industrial economic conversion and retraining programs, would expect net job losses.

Federal Spending Shift Simulations

The IPASS simulation assumes a 25 percent cut of military procurement spending and a 12.5 percent reduction of non-procurement spending at the federal level.[4] These levels of reduction were chosen because they are large enough to illustrate the linkages between military spending and other areas of the state's economy.

The hypothetical cuts amount to $43.744 billion at the federal level, and are made across the entire spectrum of military contractors without specifying particular weapons systems or contractors. Minnesota's share of such a cut would amount to a loss of $606 million of Department of Defense purchases. The IPASS model shows the distribution of this decrease in military output across 75 sectors of economic activity, with the resulting loss of jobs, earnings and total output. The direct and indirect losses from procurement cuts represent only one side of the ledger. To complete the accounting, the impact of alternative uses of these resources must be calculated. The IPASS model can demonstrate not only what would be lost but also what would be gained by reallocating military spending to public services.

Effects of Military Cuts. The predicted direct loss of jobs from removing $606 million in military procurement from final demand for Minnesota production is 6,800. An additional 22,300 indirect

[4]The simulation does not assign non-procurement cuts to Minnesota. Likely targets of such cuts would be large domestic or foreign bases, which accounted for 36 percent of Pentagon spending.

jobs would be lost in local industries which sell inputs to military producers and which sell consumption goods and services to people who earn income in military industries. The predicted total effect of the $606 million reduction is the loss of 29,100 jobs, $2,246 million in gross output, $1,212 million in value-added and $721 million in labor earnings. Table 3 shows the direct, indirect and total losses for 10 industrial sectors. A 75-industry table is in Appendix C.

The industries hardest hit by direct job loss would be ordnance, professional and scientific instruments, communications equipment and computers. Thousands of jobs would also be lost in industries such as restaurant, retail, wholesale and other services. In order to mitigate the negative impact on durable manufacturing, all levels of government, business and labor need to begin planning the conversion of military goods production to civilian goods production.

Effects of Increased Social Spending. On the other side of the ledger, the IPASS model shows what Minnesota would gain if the dollars cut from the military were reallocated to social programs. The total savings available for alternative federal spending is $43.744 billion (reductions of 25 percent of procurement and 12.5 percent of non--procurement spending in 1987). Many of the public service and social programs funded by the federal government are available to states and communities only if applied for or claimed by local agencies. On average, Minnesota receives a larger proportion of non-military expenditures versus military expenditures (U.S. Census Bureau, 1988) and so could expect to receive a larger share of the $43.744 billion increase in social expenditures than it would lose from the same amount of reductions in the Pentagon budget.

Table 3
Economic Effects of a 25 Percent Cut in Procurement Spending

Industry	Employment			Earnings			Value added			Gross output		
	Direct (no.)	Indirect (no.)	Total (no.)	Direct (mil.$)	Indirect (mil.$)	Total (mil.$)	Direct (mil.$)	Indirect (mil.$)	Total (mil.$)	Direct (mil.$)	Indirect (mil.$)	Total (mil.$)
1 Agriculture, forestry	0	-179	-179	0.0	-1.5	-1.5	0.0	-8.3	-8.3	0.0	-30.6	-30.6
2 Mining	-4	-6	-11	-0.1	-0.2	-0.3	-0.2	-0.4	-0.5	-0.3	-0.6	-0.9
3 Construction	-76	-1,138	-1214	-3.0	-46.4	-49.4	-3.5	-54.0	-57.5	-8.8	-143.2	-152.0
4 Mnfg., Non-durable	-81	-739	-820	-1.9	-20.7	-22.6	-3.3	-33.9	-37.2	-15.2	-133.7	-148.9
5 Mnfg., Durable	-6,259	-1,192	-7,451	-224.3	-47.8	-272.1	-278.0	-76.8	-354.8	-541.0	-174.6	-715.6
6 Tranportation, communication & utilities	-160	-1,173	-1,333	-5.3	-38.3	-43.7	-8.3	-75.0	-83.2	-22.4	-153.8	-176.2
7 Trade	0	-7,923	-7,923	0.0	-117.8	-117.8	0.0	-199.5	-199.5	0.0	-317.4	-317.4
8 Finance, insurance and real estate	-6	-1,898	-1,904	-0.1	-47.6	-47.6	-3.0	-235.2	-238.2	-3.7	-329.2	-332.9
9 Private services	-250	-6,703	-6,954	-6.1	-124.3	-130.4	-10.1	-184.8	-194.9	-14.6	-312.1	-326.7
10 Government	0	-1342	-1342	0.0	-35.5	-35.5	0.0	-37.3	-37.3	0.0	-44.6	-44.6
11 Total	-6,837	-22,293	-29,131	-240.8	-480.1	-720.8	-306.4	-905.1	-1,211.5	-606.0	-1,639.8	-2,245.8

Source: Interactive Policy Analysis Simulation System, 1989.

For example, in 1987, Minnesota received 2.24 percent of federal Medicaid expenditures and 2.69 percent of agriculture research and extension services. This is due to the large role of the health and farming industries in the state economy. Table 4 summarizes total federal funding for 13 high-priority federal programs and shows the calculations for Minnesota's share of program funding increases, based on the state's share in 1987.

The transfer of $43.744 billion to these programs at the national level would represent a 51 percent increase in their combined spending levels. Thus a 25 percent cut in military procurement and 12.5 percent cut in non-procurement Pentagon spending could **buy** a 51 percent increase in funding for an entire range of programs from education and health to protecting the environment and providing job retraining.

Minnesota's share of any increase in expenditures in these programs could be expected to be at least equal to the state's share of present expenditures. As shown in Table 4, this would amount to an additional $313 million in Medicaid, $181.3 million in income maintenance and in-kind assistance to poor people, $137 million for rebuilding highways and bridges, etc. In total, the increases in social spending would bring in $821 million to the state economy.

The difference between what Minnesota would lose in Pentagon contracts and gain in other federal expenditures is a **conversion dividend** amounting to $215 million. This can be considered as a bonus to Minnesotans — a net gain of federal expenditures. Using the same military reductions for a tax cut would bring a dividend of $151

Table 4
Priority Sectors for
Increased Public Services Spending
(Dollars in millions)

Federal program[a]	1987 Federal spending (1)	Minnesota receipts: Federal spending in Minnesota (2)	Minnesota receipts: Percent total federal (3)	Increase in federal spending (4)	Increase in federal spending in Minnesota (3) × (4) (5)
Job training	$3,009.92	$ 43.56	1.45	$ 1,544.99	$ 22.36
Agricultural research	571.87	15.38	2.69	293.54	7.89
Economic development construction	629.69	9.49	1.51	323.22	4.87
Education	8,693.62	152.35	1.75	4,462.45	78.19
Medicaid	27,316.67	610.63	2.24	14,021.69	313.44
Public housing	3,547.12	61.36	1.73	1,820.74	31.49
Roads, bridges	12,609.13	267.61	2.12	6,472.29	137.36
Day care	657.82	5.393	0.82	337.66	2.77
Income transfers	14,955.26	216.95	1.45	7,676.56	111.36
Food, nutrition	9,507.71	138.23	1.45	4,880.32	70.95
Forest service	432.49	5.88	1.36	221.99	3.02
EPA compliance	333.13	5.22	1.57	170.99	2.68
EPA clean-up	2,955.94	67.36	2.28	1,517.29	34.58
Total	85,220.37	1,599.42	1.88	43,743.74	820.86

Source: U.S. Census Bureau, 1988.

[a]The programs listed refer to currently existing programs. For example, "Job training" monies would directly fund the Job Training Partnership Act programs; "Education" monies would fund the entire range of federal education programs; "EPA compliance" monies would pay for regulatory actions; etc.

million.[5] (Note, while Minnesota receives more with federal spending shifts, the changes do *not* increase the total federal budget. This makes the shift budget-neutral.)

The IPASS model predicts that the budget-neutral shift from military spending to social services would create 9,424 new jobs and $667 million in additional gross output. Thus, the new domestic spending more than offsets losses caused by military cuts. Table 5 presents these and other results. The more detailed 75-industry table is in Appendix D.

Large numbers of new direct jobs would be created in construction, hospitals and medical services. Many additional jobs would be created in restaurant, retail, and other service sectors and business and professional services. Thus, even without an industrial economic conversion program, Minnesota would benefit from a cut in the military budget and a reallocation of the proceeds to social spending.

Table 5
Combined Effects of New Domestic Spending and a 25 Percent Cut in Procurement Spending

Industry	Employment			Earnings			Value added			Gross output		
	Direct (no.)	Indirect (no.)	Total (no.)	Direct (mil.$)	Indirect (mil.$)	Total (mil.$)	Direct (mil.$)	Indirect (mil.$)	Total (mil.$)	Direct (mil.$)	Indirect (mil.$)	Total (mil.$)
1 Agriculture, forestry	58	67	125	0.7	0.5	1.3	1.6	2.9	4.5	3.6	10.5	14.0
2 Mining	57	12	69	1.7	0.4	2.1	3.1	0.8	3.9	5.6	1.1	6.8
3 Construction	835	992	1,826	35.1	41.8	76.9	41.0	48.9	89.8	112.5	134.5	247.0
4 Mnfg., Non-durables	379	156	535	10.3	4.7	15.0	17.6	7.8	25.4	76.3	31.4	107.7
5 Mnfg., Durables	-5,242	1,009	-4,233	-195.1	23.0	-172.1	-238.4	18.9	-219.5	-442.1	44.0	-398.1
6 Transportation, communications, utilities	300	318	618	8.3	10.0	18.3	17.8	19.5	37.3	28.5	41.6	70.1
7 Trade	2,366	1,551	3917	35.0	25.6	60.7	58.3	43.7	102.0	89.9	66.0	155.9
8 Finance, insurance & real estate	411	421	831	9.7	10.3	20.0	60.4	40.6	101.0	81.5	59.7	141.3
9 Private services	4,566	980	5,547	107.5	23.0	130.6	143.6	38.3	181.9	252.8	60.9	313.6
10 Government	81	108	189	2.2	3.0	5.2	2.5	3.3	5.7	6.4	2.4	8.7
11 Total	3,811	5,613	9,424	15.5	142.4	157.9	107.4	224.7	332.1	215.0	452.1	667.1

Source: Interactive Policy Analysis Simulation System, 1989.

Economic Dislocation and Economic Conversion

Though a shift from military to domestic spending would bring added jobs, the shift would also bring dislocation and suffering for workers in the military-dependent industries. Dislocation would be partly mitigated by the increased funding in federal retraining programs. Yet, significant dislocation could occur without deliberate economic conversion.

Economic conversion is the shifting of resources to change faltering or vulnerable industries into more stable and productive ones. In the case of military-dependent industries, "conversion includes the formulation, planning and execution of organizational, technical, occupational and economic changes required to turn manufacturing industry from military to civilian use" (Melman, 1988, pp. 21-22). Change in this way would mean saving jobs and plants, avoiding major economic dislocation and lost plant capacity.

Efficiently using worker skills and production capacity, conversion strategies have the potential to create significant economic benefits.

[5]According to the IPASS simulation, even if the 25 percent military cut were not reallocated but simply given back to the taxpayers for personal consumption expenditures, there would be a net gain of 8,114 jobs in Minnesota. However, over 5,000 of these new jobs would be in restaurant, retail and service sectors; many would be poorly paid. Further, important social needs in housing, health care and infrastructure would remain unmet. For these reasons, the reallocation of the military cuts into social service spending seems the more desirable policy choice. Appendix E contains the data involved in calculating the tax cut dividend.

Conclusions

This report has shown that Minnesotans' support of Pentagon spending drained the state economy of $1.8 billion in 1987. Further, this drain is especially severe in Greater Minnesota — a region trying to recover from harsh economic times.

Also the report has shown that military spending robs the state of jobs and funding that could otherwise be spent on social programs to meet human needs. On the one hand, Minnesotans lose out on employment opportunities. On the other hand, the government diverts funds away from critical programs designed to meet human needs — such as education, housing, health and a clean environment. Further, research supporting military product development diverts monies away from researching social needs and problems as well as methods to improve industrial productivity. Policy makers choose, and these are the results. As these negative effects will probably continue, policy makers should use this report's recommendations to counteract the likely economic hardships.

In detailed analysis, the study has also demonstrated that certain manufacturing industries in Minnesota are especially dependent on military spending. If more cuts follow the 1988 pattern, Minnesota workers in these industries will suffer income loss and personal hardship. However, this suffering need not be severe. A program of converting military goods producers to civilian goods producers would stem the effects of military-related layoffs. All levels of government, business and labor should work together to ensure that such a program is implemented.

Recommendations

1. To clarify Minnesota's economic vulnerability to Pentagon cuts, the state **should** conduct an annual study of the impact of military spending. Such a study should also identify areas of expanding markets that require technologies and work skills comparable to current military manufacturers.

2. To lessen the income and personal hardships of workers losing jobs because of military cuts, the state **should** expand the program supporting industrial conversion and continue support for extensive training and retraining. An industrial conversion program would include civilian product development and marketing and engineering analysis. The program would also include economic assistance for capital retooling and funding and support to workers in transition. Such a program would mitigate the losses in the durable goods industries sustaining federal cuts. While some of these services are currently available through various federal, state and local agencies, the overall conversion program should have at least one coordinator who can help labor, community and business groups gain access to such services.

3. Because Minnesota benefits from domestic spending and loses with military spending and because Minnesotans have and will suffer from military cuts, the Minnesota Congressional delegation **should** support:

A. A budget-neutral shift from military spending to social spending. This shift should be based on the nation's true defense needs and the true needs of people.

B. The establishment of a national economic industrial conversion program, such as the one embodied in H.R. 101, authored by Representative Ted Weiss of New York.

Appendices

Appendix A — The Pentagon Tax in Minnesota — FY 1987

The Pentagon Tax analysis compares Minnesotans' tax support of the Pentagon with the military expenditures put back in Minnesota. The Center for Economic Conversion developed the methodology.

Calculation

Pentagon Tax = A × B × C × D

Sources

(A) Pentagon outlays — Office of Management and Budget, "Budget by Agency and Account," *The Budget of the United States Government, FY 1987*, U.S. Government Printing Office.

(B) Minnesota share of federal taxes — "Table C55, Allocation of the Federal Tax Burden by State," *Facts and Figures on Government Finance* (1988-1989 ed.), The Tax Foundation, Johns Hopkins University Press.

(C) Population Ratios — "County and State Populations — 1986," Minnesota State Demographer, St. Paul.

(D) Per Capita Income Ratios — "County and Metropolitan Area Personal Income — 1986," *Survey of Current Business*, U.S. Bureau of Economic Analysis.

The total Pentagon tax burden for Minnesota (A × B) is allocated to the counties according to population (C). This amount is adjusted by per capita income (D) in consideration of the fact that higher income individuals are taxed at a higher rate.

Net result — Total pentagon spending minus the Pentagon tax burden.

Per Capita Results — Net results divided by population.

Counties	Adjusted Pentagon contract amount[a] (000)	Pentagon payroll amount[b] (000)	Total Pentagon spending (000)	Pentagon tax burden (000)	Net gain or loss (000)	Gain or loss per capita ($)
Minnesota	2,662,610	314,155	2,976,765	4,740,200	-1,763,435	-418
Metro area	2,574,948	191,159	2,766,107	2,810,419	-44,312	-21
Aitkin	1,186	643	1,829	10,041	-8,212	-604
Anoka	189,820	9,961	199,780	235,411	-35,630	-161
Becker	-48	1,641	1,593	23,230	-21,637	-733
Beltrami	0	1,861	1,861	24,666	-22,805	-691
Benton	94	2,425	2,520	22,680	-20,160	-744
Big Stone	0	524	524	6,575	-6,051	-829
Blue Earth	10,648	3,728	14,376	48,778	-34,401	-675
Brown	2,310	1,583	3,893	27,683	-23,791	-850
Carlton	232	1,540	1,771	25,734	-23,963	-801
Carver	4,262	1,236	5,497	46,572	-4,1074	-1,004
Cass	1,294	1,034	2,328	16,156	-13,828	-643
Chippewa	357	1,223	1,580	13,395	-11,814	-832
Chisago	101	902	1,003	27,200	-26,197	-932
Clay	971	3,206	4,177	44,889	-40,712	-852
Clearwater	0	248	248	5,896	-5,647	-649
Cook	-29	124	95	3,710	-3,615	-882
Cottonwood	0	627	627	14,959	-14,332	-1,031

Appendix A (continued)

Counties	Adjusted Pentagon contract amount[a] (000)	Pentagon payroll amount[b] (000)	Total Pentagon spending (000)	Pentagon tax burden (000)	Net gain or loss (000)	Gain or loss per capita ($)
Crow Wing	867	2,353	3,220	37,496	-34,277	-769
Dakota	22,611	25,948	48,559	285,671	-237,112	-1,039
Dodge	0	433	433	14,587	-14,154	-925
Douglas	526	1,223	1,749	24,129	-22,379	-769
Faribault	123	593	716	19,219	-18,503	-1,006
Fillmore	747	629	1,376	19,905	-18,530	-866
Freeborn	981	1,443	2,424	33,486	-31,062	-900
Goodhue	3,421	2,259	5,679	40,134	-34,455	-874
Grant	29	236	265	7,439	-7,174	-1,071
Hennepin	1,422,551	84,932	1,507,483	1,430,805	76,678	78
Houston	0	997	997	16,504	-15,507	-816
Hubbard	0	608	608	11,170	-10,562	-709
Isanti	188	1047	1,235	21,566	-20,332	-804
Itasca	0	1,777	1,777	33,712	-31,935	-751
Jackson	41	597	638	13,242	-12,604	-955
Kanabec	0	363	363	10,070	-9,708	-770
Kandiyohi	0	2,281	2,281	35,342	-33,061	-868
Kittson	0	173	173	7,065	-6,891	-1,112
Koochiching	0	704	704	12,215	-11,511	-747
Lac Qui Parle	0	742	742	9,481	-8,739	-874
Lake	0	355	355	7,641	-7,286	-634
Lake of the Woods	356	110	466	2,991	-2,525	-665
Le Sueur	11,121	732	11,852	23,741	-11,889	-508
Lincoln	0	220	220	6,802	-6,583	-866
Lyon	919	1,396	2,315	24,803	-22,489	-900
McLeod	632	1,329	1,961	31,575	-29,614	-949
Mahnomen	0	150	150	4,429	-4,278	-807
Marshall	0	341	341	12,327	-11,986	-982
Martin	1,438	1,090	2,527	26,464	-23,936	-977
Meeker	0	1,042	1,042	19,636	-18,593	-881
Mille Lacs	398	1,001	1,399	15,988	-14,589	-772
Morrison	357	11,835	12,192	22,317	-10,125	-335
Mower	7,483	1,700	9,182	39,467	-30,285	-779
Murray	0	304	304	10,677	-10,374	-979
Nicollet	425	1,026	1,451	24,451	-22,999	-833
Nobles	0	964	964	21,015	-20,050	-973
Norman	0	333	333	9,482	-9,149	-1,076
Olmsted	3,567	4,977	8,544	123,517	-114,973	-1,173
Otter Tail	93	2,252	2,345	44,524	-42,179	-808
Pennington	150	704	855	12,655	-11,800	-855
Pine	3,031	819	3,850	15,052	-11,202	-541
Pipestone	0	594	594	10,452	-9,858	-896
Polk	2,747	1,276	4,023	33,604	-29,581	-886
Pope	638	330	968	9,279	-8,311	-729
Ramsey	933,719	61,453	995,172	597,312	397,861	839
Red Lake	0	140	140	4,367	-4,227	-845
Redwood	0	704	704	17,320	-16,617	-898
Renville	0	840	840	19,317	-18,476	-943
Rice	169	2,710	2,879	44,945	-42,066	-886
Rock	0	506	506	9,724	-9,218	-886
Roseau	0	465	465	12,277	-11,812	-895
St. Louis	16,549	24,245	40,794	18,0544	-139,750	-692
Scott	1,399	1,812	3,211	57,429	-54,218	-1,080

Appendix A (continue

In Appendix A, the line for Steele County should read:

693 1036 1730 31925 -30195 -1007

Counties	Adjusted Pentagon contract amount[a] (000)	Pentagon payroll amount[b] (000)	Total Pentagon spending (000)	Pentagon tax burden (000)	Net gain or loss (000)	Gain or loss per capita ($)
Sherburne	327	1,067	1,394	30,970	-29,576	-865
Sibley	994	722	1,716	14,896	-13,180	-879
Stearns	881	4,905	5,786	99,594	-93,807	-824
Steele		693	1,036	1,730	31,925	-30,195
Stevens	0	578	578	10,108	-9,530	-899
Swift	0	759	759	10,350	-9,591	-793
Todd	29	1,017	1,045	18,393	-17,348	-683
Traverse	0	200	200	6,189	-5,989	-1,174
Wabasha	7,823	987	8,810	17,818	-9,008	-462
Wadena	0	783	783	10,184	-9,401	-676
Waseca	368	525	893	18,409	-17,515	-968
Washington	585	5,819	6,405	157,220	-150,816	-1,175
Watonwan	325	646	971	11,583	-10,612	-892
Wilkin	0	224	224	8,737	-8,512	-1,078
Winona	970	2,733	3,703	43,709	-40,007	-864
Wright	1,007	2,192	3,199	61,051	-57,851	-897
Yellow Medicine	0	365	365	11,983	-11,618	-894

[a]Includes prime contract obligations over $25,000 for FY 1987 (U.S. Census Bureau, 1988) and the adjustment based on the Center for Economic Conversion's estimate of contracts under $25,000. The Military Spending Research Service, Inc. supplied contract information for contracts over $25,000. The Federal Procurement Data Service did the primary collection. All FMC contracts not having a product-service code designating research and development were reallocated from the Minneapolis facility in Hennepin Count to the Fridley production facility in Anoka County.

[b]The Pentagon payroll amount is reported in the *Consolidated Federal Funds Report for County and Subcounty Areas, FY 1987* (vol. 1-2), published by the U.S. Census Bureau. Wages and salaries for military and civilian employees were allocated to each county. In addition, retired military pay was allocated to each county according to its percentage of total state population. The Defense Department's *Atlas/Data Abstract for the United States, FY 1987* provides data for total retired military pay.

Note that "Total Pentagon spending" is the adjusted prime contract amounts plus the "Pentagon payroll amount." Becker and Cook counties had negative prime contract awards due to de-obligation of previous commitments. These negative awards were not adjusted nor were they included in "Total Pentagon spending."

Appendix B

This appendix describes military activities of the four largest Pentagon contractors in Minnesota. The "big four" are Honeywell, Unisys, FMC and Control Data. This section also examines military research activities by service branch, at the University of Minnesota and corporate activities related to the Strategic Defense Initiative.

The Big Four

The information used to compile the following descriptions included Military Spending Research Service contract reports and annual reports of the companies involved. Note that all four companies produce components of nuclear weapons systems (Donnay, 1989).

Honeywell, Inc. Honeywell has two major military-related businesses: Space and Aviation Systems; and Defense and Marine Systems. In 1987, Space and Aviation Systems represented 28 percent of Honeywell's total sales. Fifty percent of these sales were to the military, 30 percent were commercial and 20 percent for space systems, some of which could be military. In 1986, Honeywell purchased Sperry Corporation's Aerospace Division and integrated it into its Space and Aviation Systems. Defense and Marine Systems is Honeywell's other military-related

business. Marine Systems, primarily lightweight torpedoes, accounted for 35 percent of the business' sales; the other 65 percent of sales were from precision and conventional weapons.

Space and Aviation Systems consists of two groups (Space Systems and Military Avionics) and seven divisions. The headquarters and manufacturing plants of all the divisions except for the Military Avionics Division, are located outside of Minnesota. The Military Avionics Division is headquartered in Minneapolis and has manufacturing plants in Minneapolis and Clearwater, Fla. This division produces "laser inertial navigation and guidance systems, flight controls, inertial sensors, radar altimeters, automatic test systems, helmet-mounted display and sighting systems" (Military Conversion, 1988, p.30). The largest contract received by the Military Avionics Division in 1987 was $24 million for its continued work on radar altimeters for the Air Force's B-52 Stratofortress.

Defense and Marine Systems Division has two groups, each with three divisions. The Defense Systems Group's divisions are all headquartered in Minnesota. The Armament Systems Division is based in Brooklyn Park, Minn., with plants in New Brighton, Minn., and Joliet, Ill. It manufactures ammunition, fusing and infantry weapon systems. The Edina based Ordnance Division also has plants in New Brighton and St. Louis Park, Minn., and Horsham, Pa., and produces air-delivered, free-fall cluster bombs for the Air Force and ground vehicle mine delivery systems for the U.S. Army. The Precision Weapons Operations Division produces precision weapons at its headquarters and plants in Minnetonka, Minn.

Two of the Marine Systems Group's divisions are based in Minnesota. The Underseas Systems Division is headquartered in Hopkins with plants in Hopkins and New Hope. This division received two major contracts from the U.S. Navy for the Mk46 torpedo and Mk48 torpedo, totaling $300 million and $136 million respectively. The Mk46 torpedo is the Navy's primary anti-submarine weapon, and the Mk48 is the Navy's advanced lightweight torpedo. The Advanced Marine Systems Operations division is also based in Hopkins and has a plant in San Diego, Calif. It is primarily engaged in producing unmanned underwater vehicles and advanced anti-submarine warfare systems.

Honeywell sales in 1987 totaled $6.67 billion. The company received $2.01 billion in contract awards from the Department of Defense, for 30 percent of its total sales. Over half of Honeywell's Department of Defense Pentagon contracts for 1987 were performed in Minnesota. The company received almost $1.2 billion from the Department of Defense to perform defense-related research, development and production in Minnesota during 1987. Honeywell Information Systems received $335,000; Honeywell Bull, Inc. received $459,000; Honeywell Finance, Inc. received $472,000; and Honeywell, Inc. the remaining $1,196,943,000. Included in Honeywell, Inc.'s $1.19 billion award are two of only three military-related 1987 Department of Energy (DOE) contracts performed in the state. The two DOE contracts were for $1.85 million in research and development in exploratory weapons development at Honeywell's Hopkins plant.

Unisys Corporation. The Unisys Corporation supplies the global arms market with sophisticated information systems. Among the nation's top 10 defense electronics contractors, Unisys was selected in 1987 as a major component supplier for the U.S. Navy's AEGIS combat system. The AEGIS is the Navy's advanced anti-air warfare system. It is expected that this system will be placed aboard more than 50 guided missile cruisers and destroyers and will become the primary feature of Navy battle group anti-aircraft defenses.

The Eagan-based Defense Systems Division of Unisys received $424.2 million in prime defense contract during 1987. This is an 87 percent increase over the $227.2 million it received in 1981. Unisys contracts heavily with the U.S. Navy and has benefited from the Reagan administration's development of a 600-ship Navy. Unisys' contracts are primarily in computers and data processing equipment. The Defense Systems Division's two largest contracts in 1987 were for the UNIVAC AN/UYK-7 and AN/UYK-20 shipboard computers for the Navy. It received $170 million for work on the AN/UYK-7 Command and Control computer and $94 million for work on the tactical operations minicomputer AN/UYK-20.

FMC Corporation. The FMC Corporation, with headquarters in Chicago, Ill., is a major international producer of machinery and chemicals for industry, agriculture and government. The Naval Systems Division of FMC is headquartered in Minneapolis with a major production facility in Fridley, Minn., 10 minutes from downtown Minneapolis. Recently, FMC began operations at a non-union facility in South Dakota.

Naval Systems is a major producer of gun mounts and guided missile launching systems for the U.S. Navy. Recently, the corporation had also

manufactured weapon components for the U.S. Army. However, the data does not show any 1987 Army contracts being performed in Minnesota. The San Jose facility is still heavily involved in producing the Bradley Personnel Carrier for the Army.

In 1987, FMC was Minnesota's third largest military contractor — with $179 million in prime contracts, almost 8 percent of all prime contract dollars. It received $62 million for work on the MK-13 missile launch system for the Navy. The MK-13 fires conventional missiles and has the versatility of firing both surface-to-surface and surface-to-air missiles. The second largest contract was for the MK-41, amounting to $51 million. The MK-41 is the vehicle launch system for nuclear and conventional missiles.

The corporation also received $13.7 million for work on the MK-45 gun mount. The Mark 45 is the smallest and most versatile 5-inch 54 caliber gun mount. It is the main gun battery on the Navy's newest destroyers and cruisers.

Control Data Corporation. Control Data Corporation's Government Systems Group supplies technically advanced military computers and peripherals, software systems and services. It received $162 million in 1987 for 6.6 percent of prime contract dollars awarded in Minnesota that year. CDC produces the PMSP — Parallel Modular Signal Processor — which assists aircraft in processing large amounts of data. Incoming data is separated and distributed among multiple processors, allowing various types of complex problems to be handled very rapidly. In 1987, CDC received $70.6 million for electronic equipment for the F-14 TOMCAT and another $11.6 million for the F-18 HORNET. Control Data also received a major contract of $30.6 million for AN/UYK-3 memory units, which improve the capabilities of the AN/AYK-14 Navy standard airborne computer.

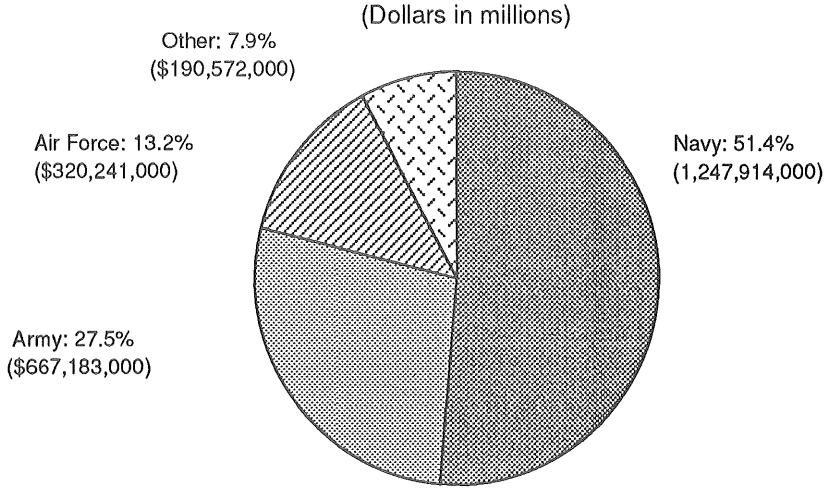
Contracting Agency

Minnesota's defense industry wears Navy blue, owing 51 percent of all prime procurement dollars to Navy contracts (Figure 6).

The majority of these are performed by FMC, Control Data, Honeywell, Cray and Unisys. The Army on the other hand awarded most of its Minnesota contract dollars to Honeywell, which received 79 percent ($528,118,000) of Army procurement dollars spent in Minnesota.

Twenty-eight Department of Energy contracts were performed in Minnesota in 1987, and of these, only three were identified as being military related. Honeywell received two contracts for $1.85 million for research and development in exploratory weapons development. The data does not indicate whether this is for nuclear or conventional weapons development. ASV Inc. in Marcell, Minn. received $46,000 to provide products for ground effect vehicles. The Department of Commerce indicated that DOE had none or an insignificant amount of military-related contracts in Minnesota in 1987. The Department of Commerce found that in 1987, the Department of Energy awarded $7.6 billion in military-related contracts in the United States. A

Figure 6
Procurement Contracts by Service Branch and Agency — 1987



Source: Military Spending Research Service, 1988.

third of this amount went to two states. New Mexico received $1.386 billion and South Carolina received $1.138 billion.

University of Minnesota

According to the University of Minnesota's Research & Technology Transfer Administration Office (ORTTA, 1987), the overwhelming share of military-related expenditures related to research. Total research expenditures in 1987 were $3.9 million. This constituted 3.7 percent of all federally sponsored research at the university.

Growth in military research has averaged nearly 11 percent per year from 1981-1988 (ORTTA, 1981-1989). This exceeded the average increase in total federal research almost ten-fold. Overall, from 1980 - 1988, the amount spent on Defense Department projects has more than doubled. See Table 6.

In 1987, research projects included work on offensive weapons including nerve gas and targeting devices. Nerve gas projects have received special public concern (Doerr, 1987).

Military-related activities involving the University of Minnesota and its faculty include research projects, ROTC student education, the training of engineers and other workers, and faculty consultations. Study of the university focused on research. Worker training, ROTC education and faculty consultations, however, may also provide significant levels of service for the Pentagon (Halley, 1989). In addition, the Super Computer Center, a for-profit company with 10 percent University ownership, could quite possibly contract with major military contractors (Halley, 1989). Time limitations prevented a detailed examination of the center's activities.

Table 6
Federal Research Spending at the University of Minnesota
(in constant dollars)

Year	Department of Defense Dollars	Total	Department of Defense percent of total	Percent growth Department of Defense research	Percent growth in total research
1980	1,769,134.	91,197,702	1.94	n.a.	n.a.
1981	1,779,558.	82,300,705	2.16	0.59	-9.76
1982	2,201,379.	82,557,564	2.67	23.70	0.31
1983	2,246,386.	75,506,407	2.98	2.04	-8.54
1984	2,404,239.	71,377,780	3.37	7.03	-5.47
1985	3,550,570.	77,418,238	4.59	47.68	8.46
1986	3,649,804.	88,032,601	4.15	2.79	13.71
1987	3,444,816.	92,413,190	3.73	-5.62	4.98
1988	3,716,339.	97,540,550	3.81	7.88	5.55
Average	2,751,359	84,260,527	3.26	10.76	1.16

Sources: "Levels and Trends in Sponsored Programs at the University of Minnesota" (1981-1988), Office of Research and Technology Transfer Administration — University of Minnesota and Winifred A. Schumi, Asst. Director of Research and Technology Administration, letter dated February 8, 1989.

Appendix B (continued)

Stars Wars

The Pentagon estimated Strategic Defense Initiative or Star Wars spending at $10 million, .4 percent of all Minnesota military spending. Table 7 shows the Minnesota contractors, with Honeywell receiving the largest share at 58 percent.

Table 7
Star Wars in Minnesota

Contractor	Location	Dollars spent (000,000)
Honeywell	Minneapolis	5.98
Mayo Clinic and Foundation	Rochester	2.90
Control Data	Minneapolis	1.05
FMC	Minneapolis	.30
Totals		10.23

Source: Strategic Defense Information Office, 1988.

The Federation of American Scientists (1988), however, estimated higher levels of Star Wars spending in the state. By reviewing all defense contracts and identifying those that have strategic defense applications, they estimated that Star Wars spending in the state exceeded $17 million dollars for FY 1987.

Given either estimate, Star Wars spending in Minnesota seems relatively insignificant compared to the $2.4 billion spent on contracts overall. With full program development, however, spending could dramatically grow. And if full development occurs, Minnesota would suffer a "brain drain" from the commercial research sector to the military research sector (Nimroody, unpublished). This would be a major stumbling block for a state competing in national and international markets.

Many question the feasibility and long-term usefulness of Star Wars. Also, arms control agreements may curtail the program. These concerns make Star Wars program especially vulnerable to cuts. As the Federation of American Scientists (1988) stated, "The danger that the program might be greatly truncated as a result of an arms control agreement is a constant source of concern" (p. 1).

Appendix C — Economic Effects of a 25 Percent Cut in Procurement Spending (75-Industry Table)

Industry	Employment			Earnings			Value added			Gross output		
	Direct (no.)	Indirect (no.)	Total (no.)	Direct (mil.$)	Indirect (mil.$)	Total (mil.$)	Direct (mil.$)	Indirect (mil.$)	Total (mil.$)	Direct (mil.$)	Indirect (mil.$)	Total (mil.$)
1 Livestock	0	-95	-95	0.0	-0.8	-0.8	0.0	-3.0	-3.0	0.0	-19.1	-19.1
2 Food & feed	0	-64	-64	0.0	-0.4	-0.4	0.0	-4.8	-4.8	0.0	-10.7	-10.7
3 Agricultural services, forestry & fish	0	-20	-20	0.0	-0.3	-0.3	0.0	-0.5	-0.5	0.0	-0.8	-0.8
4 Iron ore mining	0	-0	-0	0.0	-0.0	-0.0	0.0	-0.0	-0.0	0.0	-0.0	-0.0
5 Other metal mining	-4	0	-4	-0.1	-0.0	-0.1	-0.2	-0.0	-0.2	-0.3	-0.0	-0.3
6 Coal mining	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7 Petroleum & natural gas	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8 Stone, clay & glass	0	-6	-6	0.0	-0.2	-0.2	0.0	-0.4	-0.4	0.0	-0.6	-0.6
9 Chemicals, fertilizers & minerals	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10 New construction	-40	-802	-842	-1.7	-34.6	-36.3	-2.0	-40.6	-42.6	-5.8	-114.8	-120.5
11 Maintenance, repair & construction	-35	-336	-371	-1.2	-11.8	-13.1	-1.4	-13.5	-14.9	-3.0	-28.4	-31.4
12 Ordnance	-1,998	174	-1,824	-81.7	7.1	-74.6	-93.3	-0.2	-93.5	-170.9	-0.4	-171.3
13 Meat products	-14	-71	-85	-0.3	-1.8	-2.2	-0.4	-2.2	-2.6	-3.3	-18.0	-21.3
14 Dairy products	-5	-33	-39	-0.1	-0.8	-0.9	-0.2	-1.5	-1.7	-1.6	-10.7	-12.3
15 Grain milling	-16	-13	-30	-0.4	-0.4	-0.7	-0.9	-0.9	-1.8	-3.7	-3.7	-7.5
16 Food NEC*	-17	-114	-131	-0.5	-3.4	-3.9	-0.8	-6.2	-7.0	-3.4	-25.4	-28.8
17 Textile goods & tobacco	-0	-2	-3	-0.0	-0.0	-0.0	-0.0	-0.1	-0.1	-0.0	-0.2	-0.2
18 Apparel & related products	-14	-53	-68	-0.2	-0.9	-1.1	-0.3	-1.2	-1.5	-0.8	-3.5	-4.4
19 Logging	0	-2	-2	0.0	-0.1	-0.1	0.0	-0.1	-0.1	0.0	-0.4	-0.4
20 Other wood products	0	-81	-81	0.0	-1.4	-1.4	0.0	-1.9	-1.9	0.0	-6.4	-6.4
21 Furniture & fixtures	-7	-21	-27	-0.1	-0.5	-0.6	-0.2	-0.7	-0.9	-0.5	-1.7	-2.2
22 Paper & allied products	-8	-48	-56	-0.2	-1.7	-1.9	-0.4	-2.5	-2.8	-1.1	-7.4	-8.5
23 Printing & publishing	-4	-282	-286	-0.1	-8.1	-8.2	-0.1	-12.0	-12.1	-0.3	-28.1	-28.4
24 Chemicals & allied products	-2	-69	-71	-0.0	-2.3	-2.3	-0.1	-4.3	-4.3	-0.3	-13.2	-13.5
25 Petroleum refining	-1	-29	-30	-0.0	-1.0	-1.0	-0.1	-2.4	-2.4	-0.6	-21.7	-22.3
26 Rubber & plastics	-0	-6	-6	-0.0	-0.2	-0.2	-0.0	-0.2	-0.2	-0.0	-0.6	-0.6
27 Leather products	0	-17	-17	0.0	-0.3	-0.3	0.0	-0.5	-0.5	0.0	-1.1	-1.1
28 Glass, stone & clay	-0	-22	-23	-0.0	-0.9	-0.9	-0.0	-1.1	-1.2	-0.1	-2.9	-3.0
29 Ferrous metal	-0	-10	-10	-0.0	-0.3	-0.3	-0.0	-0.4	-0.4	-0.0	-0.9	-0.9
30 Primary metals NEC*	0	-21	-21	0.0	-0.7	-0.7	0.0	-0.8	-0.8	0.0	-1.9	-1.9
31 Fabricated metals NEC*	-27	-116	-143	-0.7	-3.4	-4.1	-1.0	-5.0	-6.0	-2.5	-12.2	-14.7
32 Computers	-723	-174	-898	-39.3	-13.6	-52.8	-48.8	-18.1	-66.9	-90.5	-33.5	-124.0
33 Other office equipment	-4	-2	-6	-0.1	-0.1	-0.2	-0.1	-0.1	-0.2	-0.3	-0.2	-0.5
34 Construction mining equipment	-7	-3	-10	-0.1	-0.1	-0.2	-0.2	-0.1	-0.3	-0.5	-0.4	-0.9
35 Non-electrical machinery NEC*	-185	-405	-590	-5.1	-12.5	-17.7	-6.8	-16.9	-23.6	-16.5	-41.1	-57.7
36 Electrical industrial apparatus	-440	-98	-538	-12.7	-4.1	-16.8	-16.8	-5.9	-22.6	-38.4	-13.4	-51.8
37 Household appliances	0	-13	-13	0.0	-0.3	-0.3	0.0	-0.4	-0.4	0.0	-1.2	-1.2
38 Communication equipment	-764	30	-734	-25.3	-0.6	-25.9	-27.8	-1.1	-28.9	-55.4	-2.2	-57.7
39 Electrical components & accessories	-30	-211	-241	-0.7	-5.0	-5.7	-0.8	-6.0	-6.8	-2.1	-16.1	-18.2
40 Misc. electrical equipment	-31	-65	-96	-0.9	-2.1	-2.9	-1.1	-2.7	-3.9	-3.2	-7.9	-11.1
41 Motor vehicles	-17	-15	-32	-0.6	-0.6	-1.2	-0.8	-0.8	-1.6	-2.8	-3.1	-6.0
42 Other transportation equipment	-380	17	-363	-15.2	-0.7	-15.9	-20.9	-0.9	-21.8	-45.2	-2.0	-47.2
43 Professional & scientific instruments	-1,172	-44	-1,216	-27.6	-3.2	-30.8	-35.4	-5.2	-40.6	-64.9	-9.5	-74.4
44 Medical instruments & supplies	-2	-85	-88	-0.1	-3.2	-3.3	-0.1	-5.0	-5.1	-0.3	-9.7	-10.0
45 Misc. instrument products	-381	11	-370	-11.9	-0.5	-12.5	-20.4	-1.5	-21.8	-38.2	-2.7	-40.9
46 Misc. manufacturing	-91	-36	-127	-2.2	-1.1	-3.3	-3.5	-1.9	-5.4	-8.5	-4.6	-13.1
47 Railroad transportation	0	-80	-80	0.0	-2.8	-2.8	0.0	-3.5	-3.5	0.0	-6.5	-6.5
48 Local & intercity transportation	0	-103	-103	0.0	-2.8	-2.8	0.0	-3.9	-3.9	0.0	-5.5	-5.5
49 Trucking & warehousing	0	-245	-245	0.0	-6.5	-6.5	0.0	-10.2	-10.2	0.0	-17.1	-17.1
50 Water transportation & pipelines	0	-13	-13	0.0	-0.7	-0.7	0.0	-1.8	-1.8	0.0	-5.0	-5.0
51 Air transportation	-129	-161	-290	-4.3	-6.2	-10.5	-5.5	-7.9	-13.5	-17.7	-25.4	-43.1
52 Transportation services	-0	-60	-60	-0.0	-0.9	-0.9	-0.0	-1.3	-1.3	-0.0	-2.4	-2.4
53 Communication services	-17	-293	-309	-0.6	-12.1	-12.8	-1.3	-24.6	-25.9	-1.6	-31.2	-32.8
54 Electric utilities	-14	-118	-132	-0.4	-3.8	-4.2	-1.5	-14.0	-15.5	-3.1	-29.1	-32.1
55 Gas utilities	-0	-78	-78	-0.0	-2.0	-2.0	-0.0	-6.4	-6.4	-0.0	-29.4	-29.4
56 Water & sanitation	0	-23	-23	0.0	-0.6	-0.6	0.0	-1.3	-1.3	0.0	-2.2	-2.2
57 Wholesale trade	0	-1,596	-1,596	0.0	-41.8	-41.8	0.0	-72.0	-72.0	0.0	-108.2	-108.2
58 Eating & drinking	0	-2,319	-2,319	0.0	-21.7	-21.7	0.0	-30.9	-30.9	0.0	-75.9	-75.9
59 Other retail trade	0	-4,008	-4,008	0.0	-54.3	-54.3	0.0	-96.6	-96.6	0.0	-133.3	-133.3
60 Banking & credit services	0	-895	-895	0.0	-25.9	-25.9	0.0	-36.4	-36.4	0.0	-57.5	-57.5
61 Insurance	0	-659	-659	0.0	-18.8	-18.8	0.0	-24.2	-24.2	0.0	-57.0	-57.0
62 Real estate	-6	-344	-350	-0.1	-2.9	-2.9	-3.0	-174.6	-177.6	-3.7	-214.7	-218.4
63 Hotels & lodging	0	-634	-634	0.0	-5.3	-5.3	0.0	-6.9	-6.9	0.0	-16.0	-16.0
64 Personal & repair services	-3	-593	-596	-0.1	-15.1	-15.1	-0.1	-28.8	-29.0	-0.2	-53.7	-53.9
65 Business services	-179	-938	-1,118	-4.2	-22.2	-26.4	-7.3	-38.5	-45.8	-10.2	-53.8	-64.0
66 Professional services NEC*	-26	-437	-462	-1.0	-16.4	-17.3	-1.6	-27.1	-28.6	-2.3	-40.4	-42.8
67 Movies & entertainmet	0	-336	-336	0.0	-3.6	-3.6	0.0	-5.8	-5.8	0.0	-11.7	-11.7
68 Hospitals	0	-747	-747	0.0	-15.7	-15.7	0.0	-16.9	-16.9	0.0	-33.3	-33.3
69 Medical services NEC*	-19	-919	-938	-0.6	-28.3	-28.8	-0.8	-38.6	-39.4	-1.4	-68.2	-69.6
70 Educational services	-24	-644	-668	-0.2	-6.2	-6.4	-0.3	-7.6	-7.9	-0.4	-11.5	-11.9
71 Other services NEC*	0	-1,456	-1,456	0.0	-11.6	-11.6	0.0	-14.6	-14.6	0.0	-23.6	-23.6
72 Federal government enterprises	0	-214	-214	0.0	-7.3	-7.3	0.0	-8.1	-8.1	0.0	-9.2	-9.2
73 State & local government enterprises	0	-157	-157	0.0	-3.4	-3.4	0.0	-4.0	-4.0	0.0	-10.3	-10.3
74 Scrap used in second-hand goods	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
75 Government industry	0	-972	-972	0.0	-24.8	-24.8	0.0	-25.2	-25.2	0.0	-25.2	-25.2
Total	-6,837	-22,293	-29,131	-240.8	-480.1	-720.8	-306.4	-905.1	-1,211.5	-606.0	-1,639.8	-2,245.8

*Not elsewhere classified.

Source: Interactive Policy Analysis Simulation System, 1989.

Appendix D — Combined Effects of New Domestic Spending and a 25 Percent Cut in Procurement Spending

Industry	Employment			Earnings			Value added			Gross output		
	Direct (no.)	Indirect (no.)	Total (no.)	Direct (mil.$)	Indirect (mil.$)	Total (mil.$)	Direct (mil.$)	Indirect (mil.$)	Total (mil.$)	Direct (mil.$)	Indirect (mil.$)	Total (mil.$)
1 Livestock	5	34	38	0.0	0.3	0.3	0.1	1.0	1.2	0.9	6.4	7.3
2 Food & feed	5	23	29	0.0	0.1	0.2	0.4	1.6	2.0	0.8	3.7	4.5
3 Agricultural services, forestry & fish	48	9	58	0.6	0.1	0.8	1.1	0.2	1.3	1.9	0.4	2.3
4 Iron ore mining	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 Other metal mining	-4	1	-4	-0.1	0.0	-0.1	-0.2	0.0	-0.2	-0.3	0.0	-0.3
6 Coal mining	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	-0.2	0.0
7 Petroleum & natural gas	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8 Stone, clay & glass	62	11	73	1.8	0.4	2.2	3.3	0.7	4.0	5.7	1.3	7.0
9 Chemicals, fertilizers & minerals	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.0	0.0
10 New construction	716	865	1,580	30.9	37.3	68.2	36.2	43.8	80.0	102.4	123.8	226.2
11 Maintenance, repair & construction	119	127	246	4.2	4.5	8.7	4.8	5.1	9.8	10.1	10.7	20.8
12 Ordnance	-1,997	179	-1,819	-81.7	7.3	-74.4	-93.3	0.0	-93.2	-170.8	0.1	-170.8
13 Meat products	15	15	30	0.4	0.4	0.7	0.4	0.4	0.9	3.5	3.5	7.0
14 Dairy products	10	8	17	0.2	0.2	0.4	0.4	0.3	0.7	2.8	2.3	5.1
15 Grain milling	-13	6	-8	-0.3	0.1	-0.2	-0.7	0.2	-0.5	-3.0	1.0	-2.0
16 Food NEC*	35	20	54	1.0	0.6	1.5	1.7	1.0	2.7	7.0	4.2	11.2
17 Textile goods & tobacco	8	1	8	0.1	0.0	0.1	0.2	0.0	0.2	0.6	0.1	0.7
18 Apparel & related products	30	5	35	0.4	0.1	0.5	0.6	0.1	0.7	1.7	0.4	2.1
19 Logging	0	3	3	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.4	0.4
20 Other wood products	72	71	143	1.2	1.3	2.5	1.6	1.7	3.3	5.2	5.8	11.1
21 Furniture & fixtures	22	6	27	0.5	0.1	0.6	0.6	0.2	0.8	1.6	0.5	2.1
22 Paper & allied products	15	-3	12	0.5	-0.1	0.4	0.7	-0.1	0.5	2.0	-0.5	1.6
23 Printing & publishing	70	80	149	1.9	2.3	4.2	2.7	3.3	6.0	6.3	7.8	14.1
24 Chemicals & allied products	123	17	140	3.7	0.8	4.5	6.9	1.5	8.4	21.3	4.7	26.1
25 Petroleum refining	44	7	51	1.4	0.3	1.7	3.3	0.8	4.1	30.1	7.5	37.6
26 Rubber & plastics	39	-1	39	1.0	0.0	1.0	1.4	0.1	1.5	3.7	0.2	3.9
27 Leather products	6	2	7	0.1	0.0	0.1	0.2	0.0	0.2	0.3	0.1	0.4
28 Glass, stone & clay	208	-3	204	7.4	0.4	7.8	9.6	0.5	10.1	25.1	1.3	26.4
29 Ferrous metal	84	-7	78	2.4	-0.0	2.4	2.9	-0.0	2.9	6.9	-0.0	6.9
30 Primary metals NEC*	25	-7	18	0.7	-0.2	0.6	0.9	-0.2	0.7	2.2	-0.5	1.7
31 Fabricated metals NEC*	290	1	291	7.7	0.5	8.2	11.2	0.8	12.0	27.2	2.0	29.2
32 Computers	-721	44	-677	-39.1	-0.9	-40.0	-48.7	-2.1	-50.8	-90.2	-3.9	-94.1
33 Other office equipment	2	0	3	0.1	0.0	0.1	0.1	0.0	0.1	0.2	0.1	0.2
34 Construction mining equipment	0	2	3	0.0	0.0	0.1	0.0	0.1	0.1	0.0	0.2	0.2
35 Non-electrical machinery NEC*	-147	221	74	-4.1	6.0	1.9	-5.4	7.9	2.5	-13.2	19.2	6.0
36 Electrical industrial apparatus	-430	78	-351	-12.4	1.3	-11.1	-16.4	1.4	-14.9	-37.5	3.3	-34.2
37 Household appliances	7	9	16	0.1	0.2	0.3	0.2	0.3	0.4	0.6	0.8	1.3
38 Communication equipment	-740	56	-685	-24.5	0.3	-24.2	-26.9	-0.1	-27.0	-53.7	-0.2	-53.9
39 Electrical components & accessories	-28	-148	-177	-0.6	-3.6	-4.2	-0.7	-4.3	-5.0	-1.9	-11.5	-13.4
40 Misc. electrical equipment	20	53	73	0.6	1.6	2.2	0.7	2.1	2.8	2.1	6.0	8.1
41 Motor vehicles	1	2	3	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.3	0.5
42 Other transportation equipment	-377	27	-350	-15.1	-0.2	-15.3	-20.8	-0.3	-21.1	-44.9	-0.7	-45.6
43 Professional & scientific instruments	-1,155	284	-871	-27.2	5.0	-22.2	-34.9	5.6	-29.3	-64.0	10.3	-53.7
44 Medical instruments & supplies	33	73	105	1.1	2.7	3.9	1.7	4.2	5.9	3.4	8.2	11.5
45 Misc. instrument products	-350	30	-320	-11.0	0.2	-10.8	-18.7	-0.2	-18.9	-35.1	-0.4	-35.5
46 Misc. manufacturing	-58	34	-23	-1.4	0.8	-0.6	-2.2	1.1	-1.1	-5.4	2.8	-2.6
47 Railroad transportation	27	42	69	0.9	1.5	2.4	1.1	1.8	2.9	2.0	3.4	5.4
48 Local & intercity transportation	71	11	82	1.9	0.3	2.2	2.7	0.4	3.1	3.8	0.6	4.4
49 Trucking & warehousing	147	112	260	3.8	3.1	6.9	5.8	4.9	10.7	9.8	8.2	18.1
50 Water transportation & pipelines	4	9	14	0.2	0.5	0.7	0.6	1.3	1.9	1.6	3.7	5.3
51 Air transportation	-82	22	-60	-2.7	0.5	-2.3	-3.5	0.6	-2.9	-11.2	1.8	-9.4
52 Transportation services	3	-1	2	0.0	-0.0	0.0	0.1	-0.0	0.0	0.1	-0.1	0.0
53 Communication services	61	63	124	2.3	2.5	4.8	4.6	5.0	9.7	5.9	6.4	12.3
54 Electric utilities	44	23	68	1.3	0.7	2.0	4.8	2.7	7.5	9.9	5.6	15.5
55 Gas utilities	17	31	48	0.4	0.8	1.2	1.3	2.5	3.8	6.0	11.4	17.4
56 Water & sanitation	7	5	12	0.2	0.1	0.3	0.4	0.3	0.7	0.6	0.4	1.1
57 Wholesale trade	463	463	926	11.6	12.1	23.7	19.7	20.5	40.3	29.6	30.8	60.5
58 Eating & drinking	488	240	727	4.6	2.1	6.7	6.5	3.0	9.5	16.1	7.3	23.4
59 Other retail trade	1,415	848	2,263	18.8	11.5	30.3	32.0	20.3	52.3	44.1	27.9	72.1
60 Banking & credit services	202	153	355	5.6	4.4	10.0	7.7	6.0	13.7	12.2	9.4	21.7
61 Insurance	113	204	316	3.3	5.5	8.8	4.1	6.9	11.0	9.7	16.1	25.8
62 Real estate	96	64	160	0.8	0.5	1.3	48.5	27.8	76.3	59.7	34.2	93.9
63 Hotels & lodging	223	42	265	1.9	0.4	2.2	2.4	0.5	2.9	5.6	1.1	6.7
64 Personal & repair services	172	116	288	4.4	2.7	7.1	8.4	5.2	13.6	15.6	9.7	25.3
65 Business services	71	302	373	1.7	6.7	8.4	2.9	11.7	14.5	4.0	16.3	20.3
66 Professional services NEC*	478	197	675	17.8	7.4	25.2	29.4	12.2	41.7	43.9	18.2	62.2
67 Movies & entertainment	77	52	129	0.8	0.5	1.4	1.2	0.8	2.1	2.5	1.7	4.2
68 Hospitals	1,625	-61	1,564	32.3	0.0	32.3	33.6	0.8	34.4	66.2	1.5	67.8
69 Medical services NEC*	1,418	116	1,534	44.0	4.1	48.0	59.9	5.8	65.7	105.7	10.2	115.9
70 Educational services	117	50	167	1.2	0.3	1.5	1.4	0.4	1.9	2.2	0.6	2.8
71 Other services NEC*	385	166	551	3.6	0.8	4.4	4.3	0.9	5.3	7.0	1.5	8.5
72 Federal government enterprises	46	66	112	1.5	2.2	3.7	1.6	2.4	4.0	1.8	2.7	4.5
73 State & local government enterprises	35	27	62	0.7	0.6	1.3	0.9	0.7	1.6	2.2	1.8	4.1
74 Scrap used in second-hand goods	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	-2.3	0.0
75 Government industry	0	15	15	0.0	0.2	0.2	0.0	0.2	0.2	0.0	0.2	0.2
Total	3,811	5,613	9,424	15.5	142.4	157.9	107.4	224.7	332.1	215.0	452.1	667.1

*Not elsewhere classified.

Source: Interactive Policy Analysis Simulation System, 1989.

Appendix D′ — Combined Effects of New Domestic Spending Without Procurement Cut

(Appendix D′ + Appendix C = Appendix D)

Industry	Employment			Earnings			Value added			Gross output		
	Direct (no.)	Indirect (no.)	Total (no.)	Direct (mil.$)	Indirect (mil.$)	Total (mil.$)	Direct (mil.$)	Indirect (mil.$)	Total (mil.$)	Direct (mil.$)	Indirect (mil.$)	Total (mil.$)
1 Livestock	5	128	133	0.0	1.1	1.2	0.1	4.0	4.2	0.9	25.5	26.4
2 Food & feed	5	88	93	0.0	0.5	0.5	0.4	6.4	6.7	0.8	14.4	15.2
3 Agricultural services, forestry & fish	48	30	78	0.6	0.4	1.0	1.1	0.7	1.8	1.9	1.2	3.1
4 Iron ore mining	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 Other metal mining	0	1	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6 Coal mining	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	-0.2	0.0
7 Petroleum & natural gas	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8 Stone, clay & glass	62	17	79	1.8	0.6	2.4	3.3	1.1	4.4	5.7	1.9	7.6
9 Chemicals, fertilizers & minerals	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.0	0.0
10 New construction	756	1,667	2,423	32.6	71.9	104.5	38.3	84.4	122.6	108.2	238.5	346.7
11 Maintenance, repair & construction	154	463	617	5.4	16.3	21.7	6.2	18.5	24.7	13.1	39.2	52.3
12 Ordnance	0	5	5	0.0	0.2	0.2	0.0	0.3	0.3	0.0	0.5	0.5
13 Meat products	29	86	115	0.7	2.2	2.9	0.8	2.7	3.5	6.8	21.5	28.3
14 Dairy products	15	41	56	0.3	1.0	1.3	0.6	1.9	2.5	4.3	13.1	17.4
15 Grain milling	3	19	22	0.1	0.5	0.5	0.2	1.2	1.3	0.7	4.7	5.4
16 Food NEC*	51	134	185	1.4	4.0	5.4	2.5	7.2	9.7	10.4	29.6	40.0
17 Textile goods & tobacco	8	3	11	0.1	0.1	0.2	0.2	0.1	0.3	0.6	0.3	0.9
18 Apparel & related products	44	59	103	0.7	1.0	1.6	0.9	1.3	2.2	2.6	3.9	6.5
19 Logging	0	5	5	0.0	0.1	0.1	0.0	0.2	0.2	0.0	0.8	0.8
20 Other wood products	72	152	224	1.2	2.7	3.9	1.6	3.7	5.2	5.2	12.3	17.5
21 Furniture & fixtures	28	26	55	0.6	0.6	1.2	0.8	0.9	1.7	2.1	2.2	4.3
22 Paper & allied products	22	45	67	0.7	1.6	2.3	1.0	2.3	3.3	3.1	7.0	10.1
23 Printing & publishing	73	362	435	2.0	10.3	12.3	2.8	15.3	18.1	6.6	35.8	42.5
24 Chemicals & allied products	125	86	211	3.8	3.1	6.8	6.9	5.8	12.7	21.6	18.0	39.6
25 Petroleum refining	45	36	81	1.4	1.3	2.7	3.4	3.2	6.5	30.7	29.2	59.9
26 Rubber & plastics	39	5	45	1.0	0.2	1.2	1.4	0.3	1.7	3.7	0.8	4.5
27 Leather products	6	18	24	0.1	0.3	0.4	0.2	0.5	0.7	0.3	1.2	1.5
28 Glass, stone & clay	208	19	227	7.5	1.3	8.7	9.7	1.6	11.3	25.2	4.2	29.4
29 Ferrous metal	84	3	88	2.5	0.3	2.7	2.9	0.4	3.3	6.9	0.9	7.8
30 Primary metals NEC*	25	14	39	0.7	0.5	1.2	0.9	0.6	1.5	2.2	1.4	3.6
31 Fabricated metals NEC*	316	117	433	8.4	3.9	12.3	12.2	5.8	18.0	29.7	14.2	44.0
32 Computers	3	218	221	0.1	12.6	12.8	0.2	15.9	16.1	0.3	29.5	29.9
33 Other office equipment	6	3	8	0.2	0.1	0.3	0.2	0.1	0.4	0.5	0.3	0.8
34 Construction mining equipment	7	6	13	0.1	0.1	0.3	0.2	0.2	0.4	0.6	0.5	1.1
35 Non-electrical machinery NEC*	38	626	663	1.0	18.6	19.6	1.4	24.7	26.1	3.4	60.3	63.7
36 Electrical industrial apparatus	11	176	186	0.3	5.4	5.7	0.4	7.3	7.7	0.9	16.7	17.6
37 Household appliances	7	22	29	0.1	0.4	0.5	0.2	0.6	0.8	0.6	2.0	2.5
38 Communication equipment	24	26	49	0.8	0.9	1.7	0.9	1.1	1.9	1.7	2.1	3.8
39 Electrical components & accessories	2	62	64	0.0	1.5	1.5	0.1	1.7	1.8	0.1	4.6	4.8
40 Misc. electrical equipment	51	118	169	1.4	3.7	5.1	1.9	4.8	6.7	5.3	13.9	19.3
41 Motor vehicles	18	17	35	0.6	0.7	1.3	0.8	0.9	1.7	3.0	3.5	6.4
42 Other transportation equipment	3	10	13	0.1	0.4	0.5	0.1	0.6	0.8	0.3	1.3	1.6
43 Professional & scientific instruments	17	328	345	0.4	8.2	8.6	0.5	10.8	11.3	0.9	19.8	20.7
44 Medical instruments & supplies	35	158	193	1.2	6.0	7.2	1.9	9.2	11.1	3.6	17.9	21.5
45 Misc. instrument products	31	19	50	1.0	0.7	1.7	1.7	1.2	2.9	3.1	2.3	5.4
46 Misc. manufacturing	33	71	104	0.8	1.8	2.6	1.3	3.0	4.3	3.1	7.4	10.5
47 Railroad transportation	27	121	148	0.9	4.3	5.2	1.1	5.3	6.4	2.0	9.9	11.9
48 Local & intercity transportation	71	114	185	1.9	3.1	5.0	2.7	4.4	7.0	3.8	6.2	9.9
49 Trucking & warehousing	147	357	505	3.8	9.7	13.5	5.8	15.0	20.9	9.8	25.3	35.2
50 Water transportation & pipelines	4	22	27	0.2	1.1	1.3	0.6	3.1	3.7	1.6	8.7	10.3
51 Air transportation	48	183	230	1.6	6.6	8.2	2.0	8.5	10.5	6.5	27.2	33.7
52 Transportation services	3	59	62	0.0	0.8	0.9	0.1	1.3	1.4	0.1	2.3	2.4
53 Communication services	78	356	433	2.9	14.7	17.6	5.9	29.7	35.5	7.5	37.6	45.1
54 Electric utilities	58	141	199	1.7	4.5	6.2	6.3	16.7	23.0	13.0	34.7	47.7
55 Gas utilities	17	109	125	0.4	2.8	3.2	1.3	8.8	10.1	6.0	40.8	46.8
56 Water & sanitation	7	28	35	0.2	0.7	0.8	0.4	1.6	2.0	0.6	2.7	3.3
57 Wholesale trade	463	2,059	2,522	11.6	53.9	65.5	19.7	92.6	112.3	29.6	139.0	168.6
58 Eating & drinking	488	2,559	3,047	4.6	23.8	28.5	6.5	33.8	40.4	16.1	83.2	99.3
59 Other retail trade	1,415	4,856	6,271	18.8	65.7	84.5	32.0	116.9	148.9	44.1	161.2	205.4
60 Banking & credit services	202	1,048	1,250	5.6	30.2	35.9	7.7	42.3	50.1	12.2	67.0	79.2
61 Insurance	113	863	975	3.3	24.3	27.6	4.1	31.1	35.2	9.7	73.1	82.8
62 Real estate	102	408	511	0.9	3.4	4.2	51.6	202.4	254.0	63.4	248.9	312.3
63 Hotels & lodging	223	676	899	1.9	5.7	7.5	2.4	7.4	9.8	5.6	17.0	22.6
64 Personal & repair services	175	709	884	4.4	17.8	22.2	8.5	34.0	42.5	15.8	63.4	79.2
65 Business services	250	1,241	1,491	5.9	29.0	34.9	10.2	50.2	60.3	14.2	70.1	84.3
66 Professional services NEC*	504	634	1,137	18.8	23.8	42.6	31.0	39.3	70.3	46.3	58.6	104.9
67 Movies & entertainment	77	388	465	0.8	4.2	5.0	1.2	6.6	7.8	2.5	13.4	15.9
68 Hospitals	1,625	686	2,311	32.3	15.7	48.0	33.6	17.7	51.3	66.2	34.8	101.0
69 Medical services NEC*	1,437	1,035	2,472	44.6	32.3	76.9	60.7	44.4	105.1	107.1	78.4	185.5
70 Educational services	141	693	835	1.4	6.5	7.9	1.7	8.0	9.8	2.6	12.1	14.7
71 Other services NEC*	385	1,622	2,007	3.6	12.4	16.0	4.3	15.5	19.9	7.0	25.2	32.1
72 Federal government enterprises	46	279	325	1.5	9.5	11.0	1.6	10.5	12.1	1.8	11.9	13.7
73 State & local government enterprises	35	184	219	0.7	4.0	4.7	0.9	4.7	5.6	2.2	12.1	14.3
74 Scrap used in second-hand goods	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	-2.3	0.0
75 Government industry	0	987	987	0.0	25.0	25.0	0.0	25.4	25.4	0.0	25.4	25.4
Total	10,648.2	27,906.4	38,554.6	256.3	622.5	878.7	413.8	1,129.7	1,543.5	821.0	2,091.9	2,912.9

*Not elsewhere classified.

Source: Interactive Policy Analysis Simulation System, 1989.

Appendix D'' — Economic Effects of New Domestic Spending Without Procurement Cut

(Appendix D'' + Table 3 = Table 5)

Industry	Employment			Earnings			Value added			Gross output		
	Direct (no.)	Indirect (no.)	Total (no.)	Direct (mil.$)	Indirect (mil.$)	Total (mil.$)	Direct (mil.$)	Indirect (mil.$)	Total (mil.$)	Direct (mil.$)	Indirect (mil.$)	Total (mil.$)
1 Agricultural services, forestry & fish	58	245	303	0.7	2.0	2.7	1.6	11.1	12.7	3.6	41.1	44.6
2 Mining	62	18	80	1.8	0.6	2.4	3.3	1.1	4.4	5.9	1.8	7.7
3 Construction	910	2,130	3040	38.1	88.2	126.3	44.5	102.9	147.4	121.3	277.7	399.0
4 Manufacturing, non-durables	461	895	1,355	12.2	25.4	37.6	20.9	41.7	62.6	91.5	165.1	256.6
5 Manufacturing, durables	1,018	2,201	3,219	29.2	70.8	100.0	39.6	95.7	135.3	98.9	218.6	317.4
6 Trans. communication & utilities	460	1,491	1,951	13.7	48.3	62.0	26.1	94.4	120.5	50.9	195.4	246.3
7 Trade	2,366	9,474	11,840	35.0	143.5	178.5	58.3	243.3	301.6	89.9	383.4	473.3
8 Finance, insurance & real estate	417	2,319	2,736	9.8	57.9	67.7	63.4	275.8	339.2	85.3	388.9	474.2
9 Private services	4,817	7,684	12,500	113.6	147.3	261.0	153.7	223.1	376.8	267.4	372.9	640.3
10 Government	81	1,450	1,531	2.2	38.5	40.7	2.5	40.6	43.0	6.4	47.0	53.4
11 Total	10,648	27,906	38,555	256.3	622.5	878.7	413.8	1,129.7	1,543.5	821.0	2,091.9	2,912.9

Source: Interactive Policy Analysis Simulation System, 1989.

Appendix E — Economic Effects of a Tax Cut with a Procurement Cut

Industry	Employment			Earnings			Value added			Gross output		
	Direct (no.)	Indirect (no.)	Total (no.)	Direct (mil.$)	Indirect (mil.$)	Total (mil.$)	Direct (mil.$)	Indirect (mil.$)	Total (mil.$)	Direct (mil.$)	Indirect (mil.$)	Total (mil.$)
1 Livestock	11	55	67	0.1	0.5	0.6	0.3	1.7	2.0	2.1	10.8	12.9
2 Food & feed	5	35	40	0.0	0.2	0.2	0.4	2.5	2.8	0.8	5.5	6.3
3 Agricultural services, forestry & fish	2	10	13	0.0	0.1	0.2	0.1	0.2	0.3	0.1	0.4	0.5
4 Iron ore mining	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 Other metal mining	-4	0	-4	-0.1	0.0	-0.1	-0.2	0.0	-0.2	-0.3	0.0	-0.3
6 Coal mining	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7 Petroleum & natural gas	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8 Stone, clay & glass	0	4	4	0.0	0.1	0.1	0.0	0.2	0.2	0.0	0.4	0.4
9 Chemicals, fertilizers & minerals	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10 New construction	-40	758	717	-1.7	32.7	31.0	-2.0	38.4	36.3	-5.8	108.4	102.7
11 Maintenance, repair & construction	-35	130	94	-1.2	4.6	3.3	-1.4	5.2	3.8	-3.0	11.0	8.0
12 Ordnance	-1,997	178	-1,819	-81.7	7.3	-74.4	-93.3	0.0	-93.3	-170.8	0.0	-170.8
13 Meat products	40	16	56	1.0	0.4	1.4	1.2	0.5	1.7	9.7	3.9	13.5
14 Dairy products	18	7	26	0.4	0.2	0.6	0.7	0.4	1.1	5.2	2.5	7.7
15 Grain milling	-10	6	-4	-0.2	0.1	-0.1	-0.5	0.3	-0.3	-2.2	1.2	-1.1
16 Food NEC*	79	16	95	2.2	0.5	2.7	3.9	1.0	4.9	15.9	4.0	19.9
17 Textile goods & tobacco	1	0	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
18 Apparel & related products	38	-3	35	0.6	-0.0	0.5	0.8	-0.0	0.7	2.2	-0.1	2.1
19 Logging	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20 Other wood products	3	20	23	0.1	0.3	0.4	0.1	0.4	0.5	0.2	1.5	1.7
21 Furniture & fixtures	12	0	12	0.2	0.0	0.3	0.3	0.0	0.3	0.8	0.0	0.9
22 Paper & allied products	-6	-9	-15	-0.2	-0.3	-0.5	-0.3	-0.5	-0.8	-0.8	-1.6	-2.4
23 Printing & publishing	49	49	99	1.3	1.4	2.7	1.9	2.0	3.9	4.5	4.6	9.1
24 Chemicals & allied products	29	-5	24	0.9	-0.1	0.7	1.6	-0.3	1.3	5.0	-0.8	4.2
25 Petroleum refining	10	2	13	0.3	0.1	0.4	0.8	0.2	1.0	7.1	1.9	9.0
26 Rubber & plastics	1	1	2	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2
27 Leather products	15	-0	15	0.2	0.0	0.2	0.4	0.0	0.4	0.9	0.0	0.9
28 Glass, stone & clay	2	0	2	0.1	-0.0	0.1	0.1	-0.0	0.1	0.3	-0.0	0.2
29 Ferrous metal	-0	-4	-4	-0.0	-0.1	-0.1	-0.0	-0.2	-0.2	-0.0	-0.4	-0.4
30 Primary metals NEC*	0	-11	-11	0.0	-0.4	-0.4	0.0	-0.4	-0.4	0.0	-1.0	-1.0
31 Fabricated metals NEC*	-21	-15	-36	-0.6	-0.5	-1.1	-0.8	-0.8	-1.6	-2.0	-2.0	-3.9
32 Computers	-723	17	-706	-39.2	-2.5	-41.7	-48.8	-4.1	-52.9	-90.4	-7.6	-98.0
33 Other office equipment	-3	1	-2	-0.1	0.0	-0.1	-0.1	0.0	-0.1	-0.2	0.0	-0.2
34 Construction mining equipment	-6	1	-5	-0.1	0.0	-0.1	-0.2	0.0	-0.2	-0.5	0.1	-0.5
35 Non-electrical machinery NEC*	-178	157	-21	-4.9	4.1	-0.9	-6.5	5.2	-1.3	-15.9	12.8	-3.1
36 Electrical industrial apparatus	-440	57	-383	-12.7	0.6	-12.0	-16.8	0.5	-16.2	-38.4	1.2	-37.2
37 Household appliances	3	7	11	0.1	0.1	0.2	0.1	0.2	0.3	0.3	0.6	0.9
38 Communication equipment	-761	56	-705	-25.2	0.3	-24.9	-27.7	-0.1	-27.8	-55.2	-0.2	-55.4
39 Electrical components & accessories	-27	-159	-185	-0.6	-3.8	-4.4	-0.7	-4.6	-5.3	-1.8	-12.3	-14.1
40 Misc. electrical equipment	-11	38	27	-0.3	1.1	0.8	-0.4	1.4	1.0	-1.1	4.0	2.8
41 Motor vehicles	-5	1	-4	-0.2	0.0	-0.2	-0.2	0.0	-0.2	-0.8	0.0	-0.8
42 Other transportation equipment	-373	26	-347	-14.9	-0.3	-15.2	-20.6	-0.4	-20.9	-44.4	-0.8	-45.3
43 Professional & scientific instruments	-1,171	241	-930	-27.5	3.9	-23.6	-35.4	4.2	-31.2	-64.9	7.6	-57.3
44 Medical instruments & supplies	3	52	55	0.1	1.9	2.0	0.2	2.9	3.0	0.	3 5.6	5.9
45 Misc. instrument products	-375	29	-346	-11.7	0.1	-11.6	-20.0	-0.4	-20.4	-37.5	-0.8	-38.3
46 Misc. manufacturing	-77	30	-47	-1.9	0.6	-1.2	-3.0	0.9	-2.1	-7.2	2.2	-5.0
47 Railroad transportation	20	16	36	0.7	0.6	1.2	0.8	0.7	1.5	1.5	1.3	2.8
48 Local & intercity transportation	44	-9	36	1.2	-0.2	1.0	1.7	-0.3	1.4	2.4	-0.4	1.9
49 Trucking & warehousing	51	42	94	1.3	1.2	2.5	2.0	1.8	3.9	3.4	3.1	6.5
50 Water transportation & pipelines	4	3	7	0.2	0.2	0.3	0.5	0.4	0.9	1.3	1.2	2.6
51 Air transportation	-46	-5	-51	-1.5	-0.4	-1.9	-2.0	-0.5	-2.5	-6.3	-1.7	-8.0
52 Transportation services	5	-4	2	0.1	-0.1	0.0	0.1	-0.1	0.0	0.2	-0.2	0.0
53 Communication services	116	72	187	4.4	3.0	7.4	8.8	6.1	14.8	11.1	7.7	18.8
54 Electric utilities	47	7	55	1.4	0.2	1.6	5.1	0.9	6.0	10.6	1.9	12.5
55 Gas utilities	25	18	43	0.6	0.5	1.1	1.9	1.5	3.4	9.0	6.7	15.7
56 Water & sanitation	11	4	14	0.3	0.1	0.3	0.6	0.2	0.8	1.0	0.3	1.3
57 Wholesale trade	503	145	648	12.6	3.8	16.5	21.4	6.4	27.9	32.2	9.6	41.8
58 Eating & drinking	1,593	-92	1,501	15.1	-1.1	13.9	21.4	-1.6	19.8	52.6	-4.0	48.6
59 Other retail trade	3688	14	3,703	48.9	0.7	49.7	83.4	3.0	86.4	115.1	4.2	119.2
60 Banking & credit services	543	74	617	15.1	2.4	17.5	20.8	3.4	24.2	32.9	5.4	38.3
61 Insurance	283	205	488	8.3	5.4	13.6	10.3	6.8	17.1	24.3	16.1	40.3
62 Real estate	252	28	280	2.1	0.1	2.3	127.0	8.7	135.7	156.2	10.7	166.9
63 Hotels & lodging	356	-57	299	3.0	-0.5	2.5	3.9	-0.6	3.3	9.0	-1.4	7.5
64 Personal & repair services	386	26	412	9.8	0.4	10.2	18.8	0.7	19.5	35.0	1.4	36.4
65 Business services	-140	198	57	-3.3	4.3	1.0	-5.7	7.5	1.8	-8.0	10.4	2.5
66 Professional services NEC*	97	88	185	3.6	3.3	6.9	6.0	5.4	11.4	8.9	8.1	16.9
67 Movies & entertainment	221	35	256	2.3	0.4	2.7	3.5	0.7	4.2	7.2	1.3	8.5
68 Hospitals	855	-120	736	17.0	-1.9	15.1	17.7	-1.7	16.0	34.9	-3.3	31.6
69 Medical services NEC*	867	-41	826	26.9	-0.9	26.0	36.6	-1.1	35.6	64.7	-1.9	62.8
70 Educational services	555	-22	533	5.5	-0.5	5.0	6.8	-0.7	6.2	10.3	-1.0	9.3
71 Other services NEC*	1,144	55	1,199	10.6	-1.1	9.6	12.8	-1.1	11.7	20.7	-1.8	18.9
72 Federal government enterprises	64	47	111	2.0	1.6	3.7	2.2	1.7	4.0	2.5	2.0	4.5
73 State & local government enterprises	95	4	99	2.0	0.1	2.1	2.4	0.1	2.5	6.1	0.3	6.4
74 Scrap used in second-hand goods	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
75 Government industry	0	-111	-111	0.0	-3.0	-3.0	0.0	-3.1	-3.1	0.0	-3.1	-3.1
Total	5,699	2,415	8,114	-27.3	71.8	44.6	143.0	101.8	244.8	150.8	235.6	386.4

*Not elsewhere classified.

Source: Interactive Policy Analysis Simulation System, 1989.

Appendix E′ — Economic Effects of a Tax Cut Without Procurement Cut

(Appendix E′ + Appendix C = Appendix E)

Industry	Employment			Earnings			Value added			Gross output		
	Direct (no.)	Indirect (no.)	Total (no.)	Direct (mil.$)	Indirect (mil.$)	Total (mil.$)	Direct (mil.$)	Indirect (mil.$)	Total (mil.$)	Direct (mil.$)	Indirect (mil.$)	Total (mil.$)
1 Livestock	11	150	161	0.1	1.3	1.4	0.3	4.7	5.0	2.1	29.8	31.9
2 Food & feed	5	99	104	0.0	0.6	0.6	0.4	7.2	7.6	0.8	16.2	17.0
3 Agricultural services, forestry & fish	2	31	33	0.0	0.4	0.4	0.1	0.7	0.8	0.1	1.2	1.3
4 Iron ore mining	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 Other metal mining	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6 Coal mining	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7 Petroleum & natural gas	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8 Stone, clay & glass	0	10	10	0.0	0.3	0.3	0.0	0.6	0.6	0.0	1.0	1.0
9 Chemicals, fertilizers & minerals	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10 New construction	0	1,560	1,560	0.0	67.3	67.3	0.0	78.9	78.9	0.0	223.2	223.2
11 Maintenance, repair & construction	0	466	466	0.0	16.4	16.4	0.0	18.6	18.6	0.0	39.4	39.4
12 Ordnance	0	5	5	0.0	0.2	0.2	0.0	0.2	0.3	0.0	0.4	0.5
13 Meat products	54	87	141	1.3	2.2	3.5	1.6	2.7	4.3	13.0	21.8	34.8
14 Dairy products	23	41	64	0.5	1.0	1.5	1.0	1.9	2.8	6.8	13.2	20.0
15 Grain milling	7	20	26	0.2	0.5	0.6	0.4	1.2	1.6	1.5	4.9	6.4
16 Food NEC*	96	130	226	2.6	3.9	6.6	4.7	7.2	11.9	19.3	29.5	48.8
17 Textile goods & tobacco	1	3	4	0.0	0.0	0.1	0.0	0.1	0.1	0.1	0.2	0.3
18 Apparel & related products	52	50	103	0.8	0.8	1.6	1.0	1.2	2.2	3.1	3.4	6.5
19 Logging	0	3	3	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.4	0.4
20 Other wood products	3	101	104	0.1	1.7	1.8	0.1	2.4	2.4	0.2	7.9	8.1
21 Furniture & fixtures	18	21	39	0.4	0.5	0.9	0.5	0.7	1.2	1.3	1.7	3.1
22 Paper & allied products	2	39	41	0.1	1.3	1.4	0.1	1.9	2.0	0.3	5.9	6.2
23 Printing & publishing	53	331	385	1.4	9.4	10.9	2.0	13.9	16.0	4.8	32.7	37.5
24 Chemicals & allied products	30	64	94	0.9	2.1	3.0	1.7	4.0	5.7	5.2	12.4	17.7
25 Petroleum refining	11	31	42	0.3	1.1	1.4	0.8	2.6	3.4	7.7	23.6	31.3
26 Rubber & plastics	1	7	8	0.0	0.2	0.2	0.0	0.3	0.3	0.1	0.7	0.8
27 Leather products	15	17	32	0.2	0.3	0.5	0.4	0.5	0.9	0.9	1.1	2.0
28 Glass, stone & clay	3	22	25	0.1	0.9	1.0	0.1	1.1	1.2	0.3	2.9	3.2
29 Ferrous metal	0	6	6	0.0	0.2	0.2	0.0	0.2	0.2	0.0	0.5	0.5
30 Primary metals NEC*	0	10	10	0.0	0.3	0.3	0.0	0.4	0.4	0.0	0.9	0.9
31 Fabricated metals NEC*	6	101	107	0.2	2.9	3.0	0.2	4.2	4.4	0.5	10.3	10.8
32 Computers	1	191	192	0.0	11.1	11.1	0.0	14.0	14.0	0.1	25.9	26.0
33 Other office equipment	1	3	4	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.3	0.3
34 Construction mining equipment	0	5	5	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.4	0.4
35 Non-electrical machinery NEC*	7	562	569	0.2	16.6	16.8	0.3	22.1	22.4	0.7	53.9	54.6
36 Electrical industrial apparatus	1	155	155	0.0	4.8	4.8	0.0	6.4	6.4	0.0	14.6	14.7
37 Household appliances	3	20	24	0.1	0.4	0.5	0.1	0.6	0.7	0.3	1.8	2.1
38 Communication equipment	3	26	29	0.1	0.9	1.0	0.1	1.0	1.1	0.2	2.0	2.2
39 Electrical components & accessories	4	52	56	0.1	1.2	1.3	0.1	1.4	1.5	0.3	3.9	4.1
40 Misc. electrical equipment	20	102	122	0.6	3.1	3.7	0.7	4.1	4.8	2.1	11.9	14.0
41 Motor vehicles	12	16	28	0.4	0.6	1.0	0.5	0.8	1.4	2.0	3.1	5.2
42 Other transportation equipment	7	9	15	0.3	0.4	0.7	0.4	0.5	0.9	0.8	1.2	1.9
43 Professional & scientific instruments	1	285	286	0.0	7.1	7.2	0.0	9.3	9.4	0.1	17.1	17.2
44 Medical instruments & supplies	6	137	143	0.2	5.1	5.3	0.3	7.9	8.2	0.6	15.3	15.9
45 Misc. instrument products	7	18	24	0.2	0.6	0.8	0.4	1.0	1.4	0.7	2.0	2.6
46 Misc. manufacturing	14	66	80	0.3	1.7	2.0	0.5	2.8	3.3	1.3	6.8	8.1
47 Railroad transportation	20	96	116	0.7	3.4	4.0	0.8	4.2	5.0	1.5	7.8	9.3
48 Local & intercity transportation	44	94	139	1.2	2.6	3.8	1.7	3.6	5.3	2.4	5.1	7.4
49 Trucking & warehousing	51	287	339	1.3	7.7	9.0	2.0	12.0	14.0	3.4	20.2	23.6
50 Water transportation & pipelines	4	16	20	0.2	0.8	1.0	0.5	2.2	2.7	1.3	6.2	7.6
51 Air transportation	83	156	240	2.8	5.7	8.5	3.6	7.4	11.0	11.4	23.7	35.1
52 Transportation services	6	56	62	0.1	0.8	0.9	0.1	1.2	1.4	0.2	2.2	2.4
53 Communication services	132	364	496	5.0	15.2	20.2	10.0	30.7	40.7	12.7	39.0	51.7
54 Electric utilities	61	125	187	1.8	4.0	5.8	6.6	14.9	21.5	13.7	30.9	44.6
55 Gas utilities	25	96	121	0.6	2.5	3.1	1.9	7.8	9.8	9.0	36.1	45.1
56 Water & sanitation	11	27	37	0.3	0.6	0.9	0.6	1.5	2.1	1.0	2.5	3.5
57 Wholesale trade	503	1,741	2,244	12.6	45.6	58.3	21.4	78.5	99.9	32.2	117.8	150.0
58 Eating & drinking	1,593	2,227	3,820	15.1	20.6	35.7	21.4	29.2	50.6	52.6	71.9	124.5
59 Other retail trade	3,688	4,022	7,710	48.9	55.0	103.9	83.4	99.7	183.1	115.1	137.5	252.5
60 Banking & credit services	543	969	1,512	15.1	28.3	43.4	20.8	39.8	60.6	32.9	62.9	95.8
61 Insurance	283	864	1,147	8.3	24.2	32.4	10.3	31.1	41.4	24.3	73.1	97.3
62 Real estate	258	372	630	2.2	3.0	5.2	130.1	183.3	313.4	159.9	225.4	385.3
63 Hotels & lodging	356	577	933	3.0	4.8	7.8	3.9	6.3	10.2	9.0	14.6	23.5
64 Personal & repair services	389	619	1,008	9.9	15.5	25.4	18.9	29.6	48.5	35.3	55.1	90.3
65 Business services	39	1,136	1,175	0.9	26.6	27.5	1.6	46.0	47.5	2.2	64.3	66.5
66 Professional services NEC*	122	525	647	4.6	19.7	24.2	7.5	32.5	40.0	11.2	48.5	59.7
67 Movies & entertainment	221	372	592	2.3	4.0	6.3	3.5	6.4	9.9	7.2	13.0	20.2
68 Hospitals	855	628	1,483	17.0	13.8	30.8	17.7	15.2	32.9	34.9	30.0	64.8
69 Medical services NEC*	886	878	1,764	27.5	27.4	54.8	37.4	37.5	75.0	66.1	66.3	132.3
70 Educational services	579	622	1,201	5.8	5.6	11.4	7.1	6.9	14.1	10.7	10.4	21.2
71 Other services NEC*	1,144	1,510	2,654	10.6	10.6	21.2	12.8	13.5	26.3	20.7	21.8	42.5
72 Federal government enterprises	64	261	325	2.0	8.9	10.9	2.2	9.8	12.1	2.5	11.1	13.6
73 State & local government enterprises	95	160	255	2.0	3.5	5.5	2.4	4.1	6.5	6.1	10.6	16.7
74 Scrap used in second-hand goods	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
75 Government industry	0	860	860	0.0	21.8	21.8	0.0	22.1	22.1	0.0	22.1	22.1
Total	12,536.7	24,707.9	37,244.6	213.5	551.9	765.4	449.4	1,006.8	1,456.3	756.8	1,875.5	2,632.3

*Not elsewhere classified.

Source: Interactive Policy Analysis Simulation System, 1989.

Appendix E'' — Economic Effects of a Tax Cut with a 25 Percent Cut in Procurement Spending

Industry	Employment			Earnings			Value added			Gross output		
	Direct (no.)	Indirect (no.)	Total (no.)	Direct (mil.$)	Indirect (mil.$)	Total (mil.$)	Direct (mil.$)	Indirect (mil.$)	Total (mil.$)	Direct (mil.$)	Indirect (mil.$)	Total (mil.$)
1 Agricultural services, forestry & fish	19	100	119	0.2	0.8	1.0	0.7	4.4	5.1	3.0	16.7	19.7
2 Mining	-4	4	-0	-0.1	0.1	0.0	-0.2	0.2	0.0	-0.3	0.4	0.1
3 Construction	-76	887	812	-3.0	37.3	34.3	-3.5	43.6	40.1	-8.8	119.4	110.7
4 Manufacturing, non-durables	265	80	345	6.5	2.2	8.7	10.5	3.5	14.0	47.6	15.7	63.3
5 Manufacturing, durables	-6,143	722	-5,422	-221.0	12.8	-208.2	-273.5	4.8	-268.7	-529.3	10.6	-518.7
6 Tran. communication & utilities	278	145	423	8.6	5.0	13.6	19.6	10.6	30.2	34.3	19.9	54.1
7 Trade	5,784	67	5,851	76.6	3.4	80.0	126.2	7.8	134.1	199.8	9.8	209.7
8 Finance, insurance & real estate	1,077	307	1,384	25.5	7.9	33.4	158.1	19.0	177.1	213.3	32.2	245.5
9 Private services	4,341	162	4,504	75.5	3.5	79.0	100.4	9.1	109.5	182.6	11.7	194.3
10 Government	159	-61	98	4.1	-1.3	2.7	4.6	-1.2	3.4	8.6	-0.8	7.8
11 Total	5,699	2,415	8,114	-27.3	71.8	44.6	143.0	101.8	244.8	150.8	235.6	386.4

Source: Interactive Policy Analysis Simulation System, 1989.

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