The Impact of Military Spending on Pittsburgh's Economy: 1995 Report to the Mayor

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EXECUTIVE SUMMARY

This report updates previous reports on *The Impact of Military Spending on Pittsburgh's Economy* through the years 1991 to 1993. Additionally, this report includes Allegheny County and the six county Pittsburgh metropolitan region in the analysis, recognizing that the benefits and costs of defense spending in the area do not stop at the city limits. A number of key findings and conclusions emerge from this report:

- Though the City of Pittsburgh, as well as Allegheny County and the Pittsburgh region are not defense-dependent areas, compared to many others in the country, defense and military spending brings in billions of dollars each year in the form of defense prime contracts, military and civilian base payrolls, and veterans benefits, including medical facilities.

- In 1993, Pittsburgh's military tax burden (the amount of taxes city residents and firms pay to support military functions of the federal government) totaled $414.8 million, representing a 14 percent increase between 1991 and 1993. The per capita tax burden for City residents stood at $1,121 in 1993, a value greater than both the Pennsylvania and U.S. figures.

- The City of Pittsburgh gains from defense spending in terms of dollars coming into the city versus the military tax burden. Between 1991 and 1993, the City received net benefits of $40 million, on average.

- Veterans benefits constitute the largest source of defense spending in the City, with medical facilities making up largest portion of veterans dollars.

- In Allegheny County and the six county Pittsburgh region, the defense balance sheet yields a deficit. In both, the military tax burden exceeded the benefits from military spending, though their per capita military tax burdens were higher than the City's level.

- Defense prime contracts represent the largest source of defense spending in both Allegheny County and the region. Within Allegheny County, firms in nearly three dozen municipalities received defense prime contracts.

- Westinghouse dominates the region in terms of military prime contractors. It is the only firm in the Pittsburgh region listed among the largest contractors in the nation, garnering $636 million in prime contracts 1993.

- Total defense prime contracts in the region averaged $636.8 million between 1991 and 1993, with an average of 214 firms receiving prime contracts each year. In the City, an average of 79 firms received defense prime contracts.

- An estimated average of 4,797 people were employed in defense-related jobs in the City of Pittsburgh between 1991 and 1993. This does not include an additional 1,520 workers in civilian and military base positions over the period, nor does it include persons working in veterans hospitals.

- The service sector contained 57 percent of defense-related jobs in the city of Pittsburgh, with manufacturing making up another 39 percent of the total. Educational institutions, especially Carnegie Mellon University's Software Engineering Institute, employed fully one-third of the defense-related workforce in the city. Within manufacturing, electrical machinery and instruments represented the largest industrial sectors.

- An average of 25,254 defense-related jobs were located in Allegheny County during the study period. Eighty-five percent of these were manufacturing jobs, with most of these concentrated in electrical machinery. An additional 12 percent of defense-related jobs were in the service sector.

- An estimated 9,000 defense-related jobs are projected to be lost between 1991 and 1997. Many area firms are already feeling the effects of lost contracts through job layoffs and cutbacks. Further changes in defense priorities will no doubt increase defense-related job losses.

- Current policies assisting small and medium-sized defense-related firms to expand their commercial businesses are concentrated in the manufacturing sector. The Southwestern Pennsylvania Industrial Resource Center coordinates the Manufacturing Extension Program with several other area agencies. This, along with Ben Franklin Technology Center's role in the Technology Reinvestment Projects, are the major programs in the region related to defense and military conversion.

- Additional efforts are needed by both the city and the county to support these ongoing activities. As the Regional Industrial Revitalization Report recommended, the Pittsburgh region needs to build on its strengths in manufacturing and support expanding new industries. Many defense-related activities in the region fall within these targeted sectors and could benefit from a regional initiative promoting growth.

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The report and its conclusions are those of the authors and do not reflect the views or positions of these colleges or their organizations.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION AND OVERVIEW

This report fulfills the requirements of Section 204 of the Home Rule Charter of the City of Pittsburgh, as amended by voter referendum on November 2, 1982. The amended section reads as follows:

> The Mayor shall present an annual report on the tax monies per capita and the total by the citizens of the City of Pittsburgh to the federal government that is allocated to military spending. The report shall include an analysis of the impact of the military budget on the City's economy in relation to jobs and social services. The Mayor shall advertise this analysis in two prominent daily newspapers in the city.

The Impact of Military Spending Report was produced annually from fiscal years 1982 through 1989, with the first report prepared by the Office of the City Treasurer and subsequent reports under contract by the University of Pittsburgh.[1] The goal of the report was to present an annual review of the impact of military spending in Pittsburgh. The Charter stipulated an accounting of tax monies Pittsburgh residents sent to the federal government annually and an analysis of the impacts of defense spending on the city.

Context of the Report

During the Cold War, the Reagan-era military buildup pushed defense spending to its highest levels ever in a peacetime economy (see Figure 1). At the same time, the economy of the United States was undergoing a tremendous restructuring of its manufacturing base.[2] These forces contributed to growth in select regions of the country, while other regions experienced economic decline. Along with much of the industrial midwest, the Pittsburgh region was particularly hard hit by the changes in the economy, with scores of plant closings and eventually over 120,000 manufacturing workers losing their jobs. Over these same years, other regions boomed, often aided by burgeoning military spending in procurement and research and development.[3]

For many whose regional economies faced the depths of the recession in the early 1980s, the "permanent war economy," expressed by Seymour Melman,[4] meant that regions of decline were funding a disproportionate share of the military build up, while not receiving a commensurate share of funds from the federal government. These funds ranged from research and development -- where government sources represent 70 percent of all R&D money, with nearly three-quarters of that related to the military -- to procurement contracts, bases, salaries and

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[1] See William Dunn, Jan Jernigan and Gary Zajac, The Impact of Military Spending on Employment and Social Services, Graduate School of Public and International Affairs, University of Pittsburgh, 1988, 1989, 1990.

[2] See, for instance, Barry Bluestone and Bennett Harrison, The Deindustrialization of America (New York: Basic Books, 1982).

[3] Ann Markusen et al., The Rise of the Gunbelt: The Military Remapping of Industrial America (Oxford: Oxford University Press, 1991).

[4] The Permanent War Economy: American Capitalism in Decline (New York: Touchstone, 1974).

veterans benefits. During the 1980s, procurement and R&D increased in their share of total DOD spending from 29 percent in 1975 to 41 percent in 1989. Though all categories of defense spending increased during the 1980s, the relatively more rapid increase in procurement and R&D meant that much of the defense build up was dedicated toward developing new weapons and military systems rather than increasing the size of the Armed Forces. Much of this procurement and R&D spending was concentrated in select regions across the country -- in California in Silicon Valley, Los Angeles and Orange County, in New England in Connecticut and around Boston's famed Route 128, and in other parts of the country such as St. Louis, Seattle, Huntsville, and Dallas-Fort Worth. Many of these places have been celebrated as centers of high technology and metropolitan area growth, often owing in part to a crucial role played by defense spending.

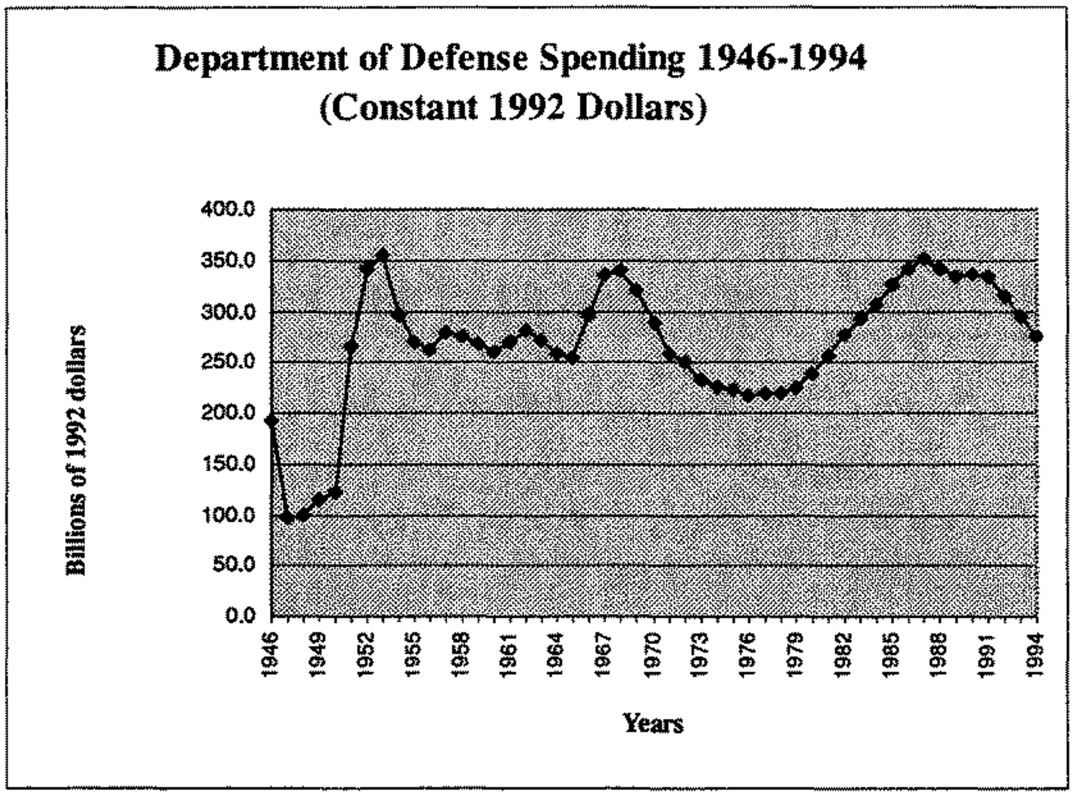

Figure 1

Source: Economic Report of the President (Washington, D.C.: U.S. Government Printing Office, February 1995).

The Local Initiative

The Pittsburgh *Mayor's Report* presented a way to determine how the expanding federal military budget affected the city. Defense spending increased by nearly 18 percent in fiscal years 1981 and 1982 and continued to rise thereafter to a peak in 1989, the year the Berlin Wall came down. Like many other places in the industrial midwest, Pittsburgh did not contain a large concentration of defense-production companies. For many here, the defense buildup was viewed as shifting federal resources to places benefiting from Cold War procurement away from those reeling from the forces of economic restructuring.

Citizens alarmed about a shift in federal priorities towards defense and away from arms control and social and urban concerns established the *Mayor's Report* as a vehicle for studying these impacts and bringing them to a public dialog. In the early 1980s, peace and social justice activists in the Pittsburgh area began to pressure the city government to fund a study to inform the public about how the federal government spent their tax dollars for military purposes and how this spending affected the community. Many wanted the information in support of the growing disarmament movement. Similar proposals were being advanced in other cities at that time, most notably in Baltimore, under the direction of the national Jobs With Peace campaign. Despite opposition from the mayor and lack of endorsement by either of the two local daily newspapers, the ballot initiative passed, and the city was committed to funding such a study.

The early reports provided basic information on the role of military spending on the local Pittsburgh economy, focusing on defense contracts received by Pittsburgh firms and estimating the military tax burden within the city. Later reports expanded the analysis to include estimates of the number of jobs created by defense contracts and the impact of defense spending on federal funding for human services in the city.[5]

By the early 1990s, sentiment had grown within city government that the existing format of the report provided little in the way of useful policy information. An analysis of the *Report* over fiscal years 1987 through 1989 shows little change in the dollar flows in Pittsburgh over these last years of the Cold War and their impact on the Pittsburgh economy. Changes in international relations stemming from the end of the Cold War and potential military downsizing also called into question the basic premise of the study that increasing military spending, driven by global ideological confrontation and an entrenched national defense "iron triangle" was harming the economy.

Calls for resurrecting the *Report* began in 1993, as the issue of the "peace dividend" was being raised around the country. The Pittsburgh chapter of the World Federalist Association, with support from many of local institutions, convened a conference on economic conversion to raise the issue in local debates. Following the election of Mayor Tom Murphy in 1994, the city followed its mandate to commission the report again. The *Report* was resumed this year by the City Council, with support from the community, Council President Jim Ferlo and Mayor Tom Murphy's Office.

This *Report* thus has been conducted with the understanding that the environment under which the report was first initiated has fundamentally changed. The Cold War has ended. The euphoria over the peace dividend has faded as the defense budget, while lower, remains at nearly $260 billion. This *Report* covers a wider ground than previous reports, in an effort to understand

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[5] See Dunn et al, Impact of Military Spending, annual.

the role defense spending plays in both the city and the region. For most of the information reported here, we include measures for the city, Allegheny County, and the six county metropolitan region.[6] The county and metropolitan region represents a more appropriate level of analysis in an area where many workers commute over jurisdictions, and economic benefits and costs are thus spread beyond the city limits. As required by the Charter, an analysis of tax totals remains at the heart this report, but also included here are military base and veterans spending, and industry and firm-level analyses of the impacts of defense spending. Covering fiscal years 1991-1993, this report can contribute to current and future economic planning and reporting.

THE MILITARY SPENDING BALANCE SHEET

Defense spending not only affects the military preparedness of the nation, but generates economic and social impacts on the particular places where spending takes place. In this section, we estimate both the military tax burden and the benefits accruing to the city and region from national defense spending. The military burden represents the costs of defense spending to local residents. These are estimated as the taxes paid by Pittsburgh residents that go directly to the military portion of the federal budget. The local benefits of defense spending include federal spending in Pittsburgh and the region that support military and defense-related activities. We then compare these estimated costs and benefits to tally the military spending balance sheet for the city, county and region.

As with many economic activities, the economic benefits of federal spending may be accompanied by various economic and social costs. This report focuses only on direct costs, as estimated by the taxes paid by local residents. Indirect costs of defense spending, though not estimated here, include how federal dollars might have otherwise been spent, resulting in possible reduced spending on social programs, such as health care, poverty, infrastructure, and housing. Indirect costs also include environmental problems caused by weapons production and nuclear waste disposal, waste and fraud, and security challenges posed by large arsenals of nuclear weapons. A detailed estimation of these indirect costs is beyond the scope of this report; the primary measure of costs will be contained in the military tax burden estimation.

Likewise, the direct benefits of defense spending in the community generates indirect and induced effects as well. Here, direct benefits include military dollars flowing into the area through defense contracts to local firms, veterans benefits, military payrolls, and civilian payrolls. These monies ripple out into the regional economy through subsequent rounds of spending through the multiplier effect. In this report, however, we include only direct payments as the benefits of military spending in the region.

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[6] The Metropolitan Statistical Area includes Allegheny, Beaver, Butler, Fayette, Washington, and Westmoreland counties.

Military Spending: Benefits

Benefits to the city, county and region were derived by combining the various forms that direct defense spending takes. Data on prime contracts, veterans benefits (pensions, medical and other), and reserve military base payrolls for both military and civilian employees were collected from U.S. Department of Defense (DOD) documents and other reports available to the public.

Defense prime contracts: The first estimate of dollars flowing into the region comes in the form of defense prime contracts. The DOD contracts out work to private sector firms (and nonprofits) through prime contracts.[7] Of all firms in the Pittsburgh region receiving contracts from DOD, only Westinghouse ranks in the top twenty nationally (see Table 1).[8]

Table 1
Top 20 Companies in the U.S. Receiving DOD Prime Contracts
Fiscal Year 1993

Company	Award (millions $)	Percent of total	Company	Award (millions $)	Percent of total
1. McDonnell Douglas	5,311.2	4.4	11. Litton Industries	2,334.4	1.9
2. Northrop	4,851.0	4.0	12. Grumman	2,182.7	1.8
3. Lockheed	4,650.4	3.8	13. Loral	1,815.4	1.5
4. General Dynamics	4,463.7	3.7	14. AT&T	1,337.6	1.1
5. General Electric	4,007.8	3.3	15. Rockwell	1,233.4	1.0
6. General Motors	3,694.1	3.0	16. Textron	1,161.1	0.9
7. Raytheon	2,840.7	2.3	17. Bath Holding	1,148.4	0.9
8. United Technologies	2,802.9	2.3	18. Westinghouse	1,147.2	0.9
9. Boeing	2,495.2	2.0	19. TRW	1,012.5	0.8
10. Martin Marietta	2,356.1	1.9	20. IBM	931.8	0.8
Top 20 Contractors	51,77.9	45.5			
Total, all Contractors	121,438.0	100.0			

Source: U.S. Department of Defense, 100 Companies Receiving the Largest Dollar Volume of Prime Contract Awards, Fiscal Year 1993 (Washington, D.C.: Directorate for Information, Operations and Reports, 1991)..

[7] Prime contractors may subcontract part of their work to other firms. Unfortunately, reliable subcontractor data are not publically available from DOD. For any one contract, part of it may be subcontracted to another firm in another location. Thus contracts reported for the City of Pittsburgh may find only part of the dollars being spent locally, with the remainder going to firms elsewhere in the country or abroad. By the same token, Pittsburgh area firms may be receiving subcontracts from contractors outside the region. Previous research has found that places with large contractors also receive substantial subcontracts from other regions. See, for instance, Markusen et al., Rise of the Gunbelt, p. 15.

[8] Rockwell International, which previously maintained their headquarters in Pittsburgh, relocated their corporate office to El Segundo, California, where their North American Aircraft division was located.

Westinghouse dominates the region in terms of contract dollars received (see Table 2) and engages in defense-related production and research in a variety of locations in the region.[9]

Table 2
Top Pittsburgh Region Firms Receiving DOD Prime Contract Awards
Fiscal Years 1991-1993
(thousands of dollars)

1991		1992		1993	
Westinghouse	437,522	Westinghouse	328,280	Westinghouse	636,902
CMU/SEI	49,884	CMU/SEI	55,437	CMU/SEI	55,849
Lane Const.	27,484	Lane Const.	39,009	National Forge	17,894
Mine Safety	21,255	Contraves	13,579	Contraves	9,978
SW Petroleum	15,604	National Forge	12,718	Lane Industries	8,169
Contraves	12,313	NUS Corp.	6,144	CACI Int'l	5,828
Carnegie Group	7,854	Mine Safety	5,772	Michael Baker	5,357
Int'l. Technology	4,872	National Draeger	5,078	Eastman Kodak	3,926
G. Valdes Ent.	4,585	HJ Heinz	3,302	Mine Safety	3,311
HJ Heinz	2,639	RA Glancy	2,903	HJ Heinz	3,267
Univ. of Pgh.	2,437	Frost & Keeling	2,792	Theta Tech.	3,137
Dravo Corp.	2,400	IT Corp.	2,000	Univ. of Pgh.	3,101
NUS Corp.	2,343	Dairyland Sales	1,965	Jones Group	2,700
Chevron	2,330	CACI Inc.	1,709	Fore Systems	2,751
Dairyland	2,216	Dravo	1,650	Dairyland Sales	2,543
National Draeger	2,079	Int'l Technology	1,606	Bachrach Inc.	2,357
Benton	1,997	Invotech	1,561	Hydro Group	2,093
PA Assoc. Blind	1,736	Univ. of Pittsburgh	1,544	Int'l. Tech. Corp.	2,060
Magnascreen	1,721	Fore Systems	1,337	Halliburton	1,507
Keystone Coal	1,564	Foerster Inst.	1,328	URS Corp.	1,315

Source: U.S. Department of Defense, Prime Contract Awards by State, County, Contractor, and Place, annual.

Following Westinghouse, the Software Engineering Institute, a Federally Funded Research & Development Center of the Department of Defense, receives the region's second largest share of defense dollars through a contract under Carnegie Mellon University. Most of the other firms on

[9] This information was obtained from the Department of Defense, Prime Contract Awards over $25,000 by State, County, Contractor and Place (Washington, D.C.: Directorate for Information, Operations and Reports, 1993) for all cities in the region. However, the authors found mistakes in this data source. For instance, firms not located in the region were listed as receiving contracts here. One firm we contacted in California that was listed as receiving a $32.6 million contract in 1993 told us that they maintained a sales representative in Pennsylvania, but no contracting office in southwestern Pennsylvania. Nor had they ever received a contract the size which was reported in the data base, though the spokesperson said they certainly wished they had a contract that size. Owing to the hundreds of contracts let locally, we could not verify each contract individually, but did attempt to confirm many of them.

the list fall within the manufacturing and engineering categories, reflecting both the types of work that DOD funds and the region's specialization. Appendix A lists all firms receiving prime contracts for the three years by city, county and Standard Industrial Classification (SIC) code.

Within the region, the city of Pittsburgh receives the largest number of contracts of any municipality (see Table 3 and Appendix A).[10] Furthermore, the vast majority of prime contracts go to firms in Allegheny County, which received between 89 percent and 95 percent of the total contracts in the region between 1991 and 1993. These are spread among nearly three dozen communities in the county. Over the 1991-1993 period, the region received an average of $656 billion per year in defense prime contracts.

Table 3
Pittsburgh Region Defense Prime Contracts
By City of Pittsburgh and Counties, Fiscal Years 1991-1993
(thousands of dollars)

Place	1991	1992	1993
City of Pittsburgh	127,470	115,180	100,907
Rest of Allegheny County	445,894	349,255	669,878
Allegheny County	573,364	464,435	770,785
Beaver County	5,134	10,926	10,840
Butler County	18,208	2,124	1,585
Fayette County	28,248	31,238	11,840
Washington County	2,971	2,306	796
Westmoreland County	13,792	9,756	11,910
Pittsburgh Region	641,717	520,785	807,886
Pennsylvania	2,948,522	3,064,717	2,968,230
United States	136,677,443	112,285,000	114,794,637

Source: U.S. Department of Defense, Prime Contract Awards by State, County, Contractor, and Place, annual.

Veterans Benefits: The second source used to estimate the total benefits of military spending in the region is veterans benefits. Composed primarily of pensions and medical spending, veterans benefits make up the second largest source of defense spending in the region (see Table 4). In the city of Pittsburgh, the value of veterans benefits is more than twice that of defense contracts. For the region as a whole, however, veterans spending represents less -- nearly two-thirds the average value of defense prime contracts over the 1991-1993 period.

[10] As stated at the outset, totals for the City are best understood within the context of Allegheny County and the region as whole. Many firms which DOD lists for Pittsburgh may have a Pittsburgh mailing address, but perform their work in nearby locales.

In the city of Pittsburgh, most veterans spending goes to operating and maintaining the two large veterans hospitals. Though located in the city limits, both hospitals are regional facilities, serving veterans in the greater southwestern Pennsylvania area and beyond. Federal spending on these medical facilities also comprises the largest portion of veteran's spending in Allegheny County, making up nearly two-thirds of the total veterans benefits in the county in 1993. Outside Allegheny County, veterans pensions form the bulk of veterans spending, with additional medical spending deriving from the veterans hospital in Butler County. For the region as a whole, total veterans spending increased by 11 percent between 1991 and 1992, with an increase in the medical portion of the total comprising most of this gain.

Table 4
Veterans Benefits for Pittsburgh and Region, Fiscal Years 1991-1993
(in millions of dollars)

Place/Benefits	1991	1992	1993
City of Pittsburgh			
Pensions	28.3	28.4	32.8
Medical	176.4	188.2	204.8
Other	17.0	45.0	17.5
Total	221.7	261.6	255.1
Allegheny County			
Pensions	79.3	79.8	82.8
Medical	176.4	188.2	204.8
Other	27.0	55.0	26.0
Total	282.7	323.0	313.6
Pittsburgh Region*			
Pensions	144.1	145.3	150.9
Medical	206.5	222.0	241.1
Other	38.0	68.4	39.0
Total	388.6	435.7	431.0
Pennsylvania	1,426.5	1,512.1	1,552.9
United States	31,214.0	33,633.6	34,716.1

* The Pittsburgh region is defined as the six counties making up the Primary Metropolitan Statistical Region: Allegheny, Beaver, Butler, Fayette, Washington, and Westmoreland.

Source: U.S. Department of Veterans Affairs, Geographic Distribution of Veterans Administration Expenditures, annual.

Military Payrolls: The third and final component of the benefits of military spending in the region consists of payrolls for local military and civilian personnel (see Table 5). Military payrolls in the region represent the smallest of the three components' contribution to the regional economy, totaling $106 million in 1993. Civilian and military payrolls did register strong gains over the three years included in this report, increasing by 65.5 percent between 1991 and 1993.

Table 5
Military Base Payrolls and Employment
Pittsburgh and Region, Fiscal Years 1991-1993

Place	1991	1992	1993
Payrolls: (in millions of dollars)			
Pittsburgh[11]	$48.3	$81.8	$90.2
Allegheny County	$49.2	$82.3	$91.2
Region	$64.1	$97.7	$106.1
Base Jobs:			
Pittsburgh - Civilian	1,022	1,047	1,093
Pittsburgh - Military	461	467	472
Pittsburgh - Total	1,483	1,514	1,565
Allegheny County - Civilian	1,667	1,693	1,696
Allegheny County - Military	541	548	553
Allegheny County - Total	2,208	2,241	2,249

Sources: For Pittsburgh and Allegheny County: U.S. Department of Defense, Atlas/Data Abstract for the U.S. and Selected Areas, annual; and Distribution of Personnel by State and Selected Locations, annual; for surrounding counties: Headquarters of the 99th Army Command, Oakdale, Pennsylvania.

The Pittsburgh region has no active-duty military bases. It does house several reserve facilities, with the largest located in Allegheny County, including a military airlift reserve facility and an Army reserve command.[12] These reserve operations accounted for approximately 86 percent of total regional base payrolls in 1993. Furthermore, reserve facilities in Allegheny County supported 1,696 civilian jobs in 1993 and 553 military positions, for a total of 2,249 jobs. The surrounding counties do have some small support facilities, but the payrolls attributed to these counties derive mostly from reservists living there, but serving out of the Allegheny County units. The continued contribution of these facilities to the regional economy was in jeopardy, however, as the Army Reserve Charles E. Kelly Support Center at Oakdale and the 911th Airlift Wing Reserve Station at the Greater Pittsburgh International Airport were slated for closure by the Defense Base Closure and Realignment Commission. The impacts of these facilities on the region are discussed below.

[11] The Department of Defense lists Pittsburgh as the location of these facilities, though they do lie outside the city limits in Allegheny County.

[12] See section below for further discussion of these installations. A complete list of military facilities in the region is contained in Appendix D.

Military Spending: The Tax Burden

We now turn to estimating the costs of defense spending to taxpayers in the city, county and region.[13] The military tax burden represents the amount of local taxes that support the national defense functions of the U.S. government. Included here is an estimation of both individual and corporation income taxes, along with other smaller revenue sources, such as excise taxes. The total comprises the military tax burden for the city, county and region (see Table 6).

Table 6
Military Tax Burden, Pittsburgh and Region, Fiscal Years 1991-1993

Place	1991	1992	1993
Total (millions of dollars)			
Pittsburgh	363.0	399.6	414.8
Allegheny County	1,325.3	1,477.3	1,533.9
Region	2,395.3	2,669.9	2,772.3
Pennsylvania	11,674.2	13,002.6	13,361.2
United States	247,599.0	265,536.2	276,971.0
Per capita (dollars)			
Pittsburgh	981	1,080	1,121
Allegheny County	1,000	1,114	1,157
Region	1,000	1,114	1,157
Pennsylvania	977	1,084	1,109
United States	982	1,041	1,074

Sources: U.S. Bureau of the Census, Statistical Abstract of the United States, 1994; U.S. Internal Revenue Service, Statistics of Income Bulletin, quarterly; and U.S. Office of Management and Budget, 1995 Budget of the United States, annual.

The 1993 city of Pittsburgh military tax burden totaled $415 million, or approximately $1,121 per capita. The city's figure ranks slightly above the per capita figures for both the state of Pennsylvania and the United States as a whole, at $1,109 per capita and $1,074 per capita, respectively, implying that Pittsburgh residents send slightly more per person to Washington to support the Pentagon than does the average state or U.S. resident. Among other cities in the state and the industrial midwest, Pittsburgh ranks in the middle among residents in estimating the per capita military tax burden. Figures for both Chicago ($1,553 per capita) and Philadelphia ($1,223

[13] For a discussion of the derivation of these estimates, see Appendix B.

per capita) show a higher estimated tax burden for these residents while per capita contributions from Detroit ($706) and Cleveland ($650) are lower than Pittsburgh's.[14]

For Allegheny County and the region as a whole, the per capita military tax burden was slightly higher than the figure for the city of Pittsburgh, at $1,157 for each resident in the county and the region in 1993.[15] We find that in all cases the per capita military tax burden increased slightly over the 1991-1993 period. Though defense spending decreased over these three years, albeit only slightly, tax revenues increased with the country's recovery from recession, and, therefore, per capita rates rose over the period.

Benefits and Losses Summary

Tallying up the costs and benefits of defense spending in the region allows us to calculate the balance of the two figures: the military balance sheet. Here, the military tax burden is subtracted from the total benefits of military spending to determine the net benefit of defense spending in the city of Pittsburgh, Allegheny County and the region as a whole.

We find that the net benefits are positive for the city, but negative for Allegheny County and the region as a whole (see Table 7) The positive figure implies that defense spending brings more dollars into the city than residents and corporations pay out in federal taxes that go to support the defense function of the federal government.[16] Both the total net spending balance and the per capita net balance increased between 1991 and 1992, but decreased by fifty percent between 1992 and 1993. These figures are in line with previous *Mayor's Reports*, which showed that the city of Pittsburgh was a net beneficiary of federal military spending over most of the 1980s.[17]

The results change when viewing the spending balance for Allegheny County and the Pittsburgh region. In all years, the county and the region sent more in taxes for defense to Washington than either received back in military and defense benefits. In 1993, the region's negative balance was nearly four times that of the county for total defense spending, at $1.4 million. Both Allegheny County and the Pittsburgh region registered negative net benefits that were more than double the U.S. per capita average.

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[14] These figures follow the same methodology used to derive the Pittsburgh figures and were obtained from the National Priorities Project, Inc., Reinvest In Baltimore, Detroit, Chicago, and Philadelphia (Northhampton, Mass, 1994) and interview with Barry Bergman, National Priorities Project, September 1994.
[15] The per capita military tax burden for Allegheny County was applied to the Pittsburgh region. Tax figures for the other five counties were unavailable.
[16] Again, the measure here is direct benefits and does not account for multiplier effects that would increase total benefits to all places. Including a multiplier estimate would reduce the negative balances or result in a positive net balance. Furthermore, multiplier effects of defense spending would vary across the three categories used here to determine total benefits, depending on the type of activity and the level of wages. Additionally, to reiterate from above, prime contract data does not take into account subcontracts, unavailable from DOD, which either flow out from the region's contracts or flow in from prime contracts sourced from outside the region.
[17] See Dunn et al, Impact of Military Spending: The 1989 Report. Between 1982 and 1989, only 1984 and 1985 showed negative net benefits to the City.

Table 7
Military Spending Balance Sheet for Pittsburgh and Region
Total and Per Capita Spending, Fiscal Years 1991-1993

	Total (millions of dollars)			Per capita (dollars)		
Place	1991	1992	1993	1991	1992	1993
Pittsburgh:						
Benefits	397.5	458.6	446.2	1,075	1,240	1,206
Burden	362.9	399.6	414.8	981	1,080	1,121
Net Benefit	34.5	58.9	31.4	97	162	82
Allegheny County:						
Benefits	905.3	869.7	1,175.6	680	655	887
Burden	1,325.3	1,477.3	1,533.9	999	1,114	1,157
Net Benefit	(420.1)	(607.5)	(358.4)	(316)	(457)	(273)
Region:						
Benefits	1,094.4	1,054.2	1,344.9	475	449	565
Burden	2,395.3	2,669.9	2,772.4	999	1,114	1,157
Net Benefit	(1,300.9)	(1,615.7)	(1,427.5)	(521)	(663)	(595)
Pennsylvania:						
Benefits	6,565	6,653	6,590	549	555	547
Burden	11,674	13,003	13,361	977	1,084	1,109
Net Benefit	(5,110)	(6,349)	(6,771)	(428)	(529)	(562)
United States:						
Benefits	242,227	221,232	224,363	961	867	870
Burden	247,599	265,536	276,971	982	1,041	1,074
Net Benefit	(5,372)	(44,304)	(52,608)	(21)	(174)	(204)

Sources: Authors' calculations.

The dispersion of population and the concentration of defense activities in the region are the two main forces contributing to the difference between the positive net benefits of military spending to the city of Pittsburgh and the negative effects on Allegheny County and the region. We recommend caution in interpreting these figures too literally, however. We view the results for the county and region as more meaningful of the military spending balance because the benefits spread across jurisdictional borders. Though the dollar benefits of military spending are registered to the place where the firm, plant or facility is located, other social and economic benefits often extend beyond that location. For instance, in 1993, the veterans hospitals in the city of Pittsburgh comprised nearly 50 percent of total veterans spending in the region, including all other medical activities and pensions. This considerable total was not solely to the city's benefit, however, because the hospitals serve veterans from all over the region. Thus the benefits --

medical care -- extend beyond the city of Pittsburgh's boundaries. Likewise, we may presume that some of the hospitals' employees live outside the city, where the economic benefits of their salaries are spent in the greater region (and beyond), rather than in the city proper. In addition to the jurisdictional flows, other problems arise when dollars are assumed to reside only in the community receiving the funds and not for the greater county or region. As noted above, the Department of Defense lists some firms' location as Pittsburgh -- and hence Pittsburgh becomes the location of the contract -- though the firm is located outside city limits.

Owing to the spread of benefits across city jurisdictional boundaries, a more accurate reflection of the net spending and military tax effects in Pittsburgh considers Allegheny County and the region as a base. Within the Pittsburgh region, 87.4 percent of the region's total milita benefits were spent in Allegheny County in 1993. The county's military spending deficit refle that county residents and corporations paid out more in taxes to support national defense activities than were returned in contracts, payrolls and veterans spending. Furthermore, the region's negative net balance was even higher, since fewer defense funds flowed into the ou five counties as the population base expands.

The implications for understanding future prospects remain uncertain at this time, to a number of factors. The current defense budget is not projected to decrease over the years, though shifts in priorities are expected to occur. This could affect local contracto depending on the type of work they perform for DOD. Additionally, the two Allegheny facilities, which were slated for closure, would have reduced the benefits accruing to th they had been closed down.

OTHER IMPACTS OF MILITARY SPENDING

In the above section, we estimated the direct benefits of military spending through civilian and military payrolls, prime contract dollars awarded to places in veterans spending. We then estimated the military tax burden, the share of taxes of the region to Washington to support Pentagon activities. The net result show balance sheet, with positive benefits accruing to the city, but a negative effect o Allegheny County and the metropolitan region are considered.

We now turn to analyze other impacts of military spending on the reg we will estimate the employment effects of defense contracting in Pittsburgh overview of local contractors, and discuss the role that military installations economy, including the potential effects of the slated closure of the 911th A

Employment Impacts of Shifting Defense Priorities

Over the past half decade, defense layoffs -- particularly at the p totaled in the hundreds of thousands nationwide. As the benefits of inc procurement were concentrated in particular regions of the country, s rising unemployment among the defense-dependent workforce, as places such as Connecticut and southern California continue to register unemployment rates above the national average.

The Pittsburgh region is not a heavily defense-dependent region. According to a Southwestern Pennsylvania Industrial Resource Center (SPIRC) survey of area manufacturing firms, fewer than ten percent of all manufacturing firms are engaged in defense production.[18] Thus, as the region did not benefit from the defense boom of the 1980s, it has likewise not suffered relative to other defense-dependent regions from 1990s cutbacks. Nonetheless, cuts are affecting firms and installations in the Pittsburgh region. Defense-related layoffs have occurred at Westinghouse, the region's major prime contractor, and also at other firms. Total contracts flowing to major defense contractors such as Contraves and Mine Safety Appliances decreased over the 1991-1993 period (see Table 2). Furthermore, subcontractors to defense companies, including many working on Westinghouse's Navy nuclear program, have suffered losses, as well.

The Report of the Defense Conversion Commission estimated the changes in defense-related private sector employment by state.[19] For the period between 1991 and 1997, the Report estimated that total defense jobs lost in the nation would total 957,007. Pennsylvania's loss was estimated to be 38,253, or about one percent of total nonfarm, private sector employment in the state in 1991. The state ranked 6th in terms of total projected job loss, after California, New York, Texas, Virginia and Massachusetts.

The largest numerical losses are projected to be concentrated in the manufacturing, trade and service sectors, according to two different sources of projections. Both the U.S. Bureau of Labor Statistics (BLS) and the Defense Conversion Commission (DCC) have projected employment losses with reduced levels of defense spending (see Table 8). Both studies are based on input-output models, which estimate the employment associated with both direct and indirect defense purchases.[20] With the exception of trade, their estimates are similar (noting that BLS estimates begin in 1992 and DCC estimates use 1991) with total employment projected to decline by 957,700 under the DCC estimates and 1,201,300 under the BLS assumptions.

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[18] SPIRC, Southwestern Pennsylvania Regional Action Plan: EDA/DOD Contractors' Survey, Pittsburgh, 1994. SPIRC's area covers the 13 county region, rather than the six county metropolitan region used for this report.
[19] See Defense Conversion Commission, Adjusting to the Drawdown: Impacts of Defense Spending Cuts on Industry Sectors, Occupational Groups, and Localities, Annex F (Bethesda, Maryland: Logistics Management Institute, February 1993), p. 3-5. The estimates are for nonagricultural, private sector employment. As such, these estimates do not include job losses from base closings and civilian Department of Defense employment.
[20] Norman C. Saunders, "Employment Effects of the Rise and Fall in Defense Spending," Monthly Labor Review 116, no. 4 (April 1993): 3-10. Saunders derives the employment estimates from the Bureau of Labor Statistics' input-output data base. The DCC uses an input-output model, the Defense Economic Impact Modeling System (DEIMS) to estimate the total goods and services produced to support defense needs. In both, the total includes both direct purchases made by DOD through its contracts and indirect purchases made by contractors to suppliers. In this way, the employment estimates drevied from an input-output table include indirect purchases, such as steel, that go into a wide range of weaponry, but are not directly procured by DOD. The differences between the two sets of estimates reflect differences in how the two models were built.

Table 8
Estimates of Defense-Related Employment
Selected Years and Projections to 1997
(in thousands)

Sector	BLS Estimates[1] 1992	1997	Change	DCC Estimates[2] 1991	1997	Change
Agriculture	20.2	11.8	-8.4	14.5	10.0	-4.5
Mining	27.4	18.2	-9.2	41.6	27.9	-13.8
Construction	152.7	99.8	-52.9	131.9	116.5	-15.3
Manufacturing	1,406.8	812.4	-594.4	1,656.8	1,036.3	-620.5
TCU[3]	225.8	139.9	-85.9	276.0	184.5	-91.5
Trade	428.2	289.6	-138.6	181.6	134.8	-46.7
FIRE[4]	47.2	21.5	-25.7	106.2	83.5	-22.7
Services	947.0	660.8	-286.2	834.4	691.7	-142.7
Total[5]	3,281.0	2,079.7	-1,201.3	3,242.9	2,285.2	-957.7

[1] U.S. Bureau of Labor Statistics.
[2] Defense Conversion Commission.
[3] TCU: Transportation, communications and public utilities.
[4] FIRE: Finance, insurance and real estate.
[5] BLS estimates include government. Total employment here excludes government. Totals may not add due to rounding.

Sources: Norman C. Saunders "Employment Effects of the Rise and Fall in Defense Spending," Monthly Labor Review 116, no. 4 (April 1993): 3-10; Defense Conversion Commission, Adjusting to the Drawdown, Annex F, February 1993.

Both the BLS and DCC estimation techniques project the greatest losses in defense-related employment to occur within the manufacturing sector. As we shall see below, Pittsburgh's defense-related employment tends to be concentrated in manufacturing industries. Services also comprise a large share of the projected job losses under both the BLS and DCC estimates. Within the services category, we can expect that much of these losses will occur within business services, educational institutions, and engineering. We now turn to estimating defense-related jobs in Pittsburgh, Allegheny County and the region.

Estimating Defense-Related Employment: We employ two methods to estimate defense-related employment in the region, both are based on DCC techniques. The first method estimates defense-related employment in each of the three years under study here for our three levels of spatial analysis. The second method then projects the losses in employment under anticipated cuts in defense spending priorities.

To estimate defense-related employment over the 1991-1993 period, prime contract data for counties and cities yielded the complete list of firms in the region receiving defense contracts.[21] Each establishment was classified according to its major SIC code.[22] This enabled us to aggregate the establishment data to sector totals for major industrial categories by contract dollars and number of firms receiving contracts (see Table 9).

Over the 1991-1993, an average of 79 firms in the city of Pittsburgh received prime contract awards from the DOD.[23] While the value of prime contracts fluctuated over the three years studied, the number of firms receiving contracts remained relatively stable.[24] In Allegheny County, an average of 158 firms per year conducted prime contract business with DOD between 1991 and 1993, while the number for the region totaled 214 firms. Manufacturing made up the largest number of firms receiving contracts, representing 36 percent in Allegheny County, 40 percent in the region, and 41 percent in the city. Though electrical machinery firms received the largest value of prime contracts within the manufacturing sector -- owing mainly to Westinghouse -- at the regional level, more firms in the fabricated metals, non electrical machinery and instruments sectors engaged in prime contracting activity. Though dominate in terms of prime contract dollars, manufacturing firms do not constitute the same proportion of total defense activity when total firms are considered. A significant number of service sector firms conduct defense work in the region; service firms received approximately one quarter of the number of contracts in the city and the county and 21 percent of the firms in the region.

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[21] U.S. Department of Defense, Prime Contract Awards, annual.

[22] When two or more SIC codes were listed for a firm, we classified the firm under the first, or predominate, activity. A complete listing of this data is contained in Appendix A.

[23] Firms data refers to individual firms receiving contracts, not to the total number of contracts. Many firms received multiple contracts in various locations, however. See Appendix A.

[24] See Appendix A. While the number of firms across the three years changed little for all three spatial levels analyzed, the value of contracts and, hence, the number of jobs derived from the contract dollars swung sharply, especially at the county and regional level. The main reason was the year-to-year change in Westinghouse contracts. For this reason, the three year average gives a better indication of employment impacts than year-to-year figures.

Table 9
Total Prime Contracts and Number of Firms by Sector
Pittsburgh and Region, Average for Fiscal Years 1991-1993

	City of Pittsburgh		Allegheny County		Pittsburgh region	
Sector	Contracts ($ millions)	Number of firms	Contracts ($ millions)	Number of firms	Contracts ($ millions)	Number of firms
Total	114.5	79	602.9	158	656.8	214
Mining	0.0	0	0.0	0	0.5	1
Construction	2.1	3	9.3	14	31.8	17
Manufacturing	44.7	33	513.0	57	534.6	85
Food	5.3	2	5.3	2	5.3	2
Chemicals	0.3	1	0.5	3	1.0	5
Petroleum	0.0	0	5.6	1	5.6	1
Rubber	0.0	0	0.1	1	0.6	5
Primary metals	0.3	1	0.4	3	1.0	5
Fabricated metals	0.2	3	11.8	9	13.4	14
Non elect. machinery	0.4	4	0.7	7	2.7	19
Electrical machinery	21.2	5	469.5	9	471.0	10
Transportation	1.8	1	1.8	1	1.8	2
Instruments	15.1	12	15.5	15	31.0	20
TCU[1]	0.2	1	0.7	1	1.0	6
Wholesale trade	0.8	10	2.4	17	3.3	21
Retail trade	0.5	2	1.6	6	1.6	6
FIRE	0.0	0	0.0	0	0.0	0
Services	65.1	21	72.7	39	77.9	46
Business services	3.4	7	3.7	11	6.3	12
Education	37.8	3	37.8	3	56.4	5
Engineering	4.8	5	12.3	17	13.2	20
NEC[2]	0.9	7	3.0	19	6.3	29

[1] TCU: Transportation, communications and public utilities.
[2] NEC: Not elsewhere classified.

Source: U.S. Department of Defense, Prime Contract Awards by State, County, Contractor, and Place, annual.

We use firms and contract data to estimate the number of defense-related jobs in each sector (see Table 10).[25] The Pittsburgh region had, on average, 27,513 defense-related jobs

[25] The average expenditure per defense-related job in Pennsylvania is estimated to be $23,873 in 1991. This includes an estimate of both prime contract and subcontract workers in defense-related industries in 1991. It does not, however, include an estimate of the indirect jobs created by this expenditure. See Joint State Government

between 1991 and 1993. Seventeen percent of them, or nearly 4,800 jobs, were located in the city of Pittsburgh, and fully 92 percent or 25,254 jobs are in Allegheny County. Allegheny County, with its multiple Westinghouse sites and an average of 158 firms receiving DOD prime contracts, represents the core of defense-related activities in the region.

Table 10
Defense-Related Jobs in the Pittsburgh Region
by Sector, Average for Fiscal Years 1991-1993

	City of Pittsburgh		Allegheny County		Pittsburgh region	
Sector	Average	Percent	Average	Percent	Average	Percent
Total	4,797	100.0	25,254	100.0	27,513	100.0
Mining	0	0.0	0	0.0	22	0.1
Construction	88	1.8	388	1.5	1,331	4.8
Manufacturing	1,871	39.0	21,490	85.1	22,391	81.4
Food	223	4.6	223	0.9	223	0.8
Chemicals	14	0.3	22	0.1	40	0.1
Petroleum	1	0.0	235	0.9	235	0.9
Rubber	0	0.0	4	0.0	26	0.1
Primary metals	11	0.2	16	0.1	43	0.2
Fabricated metals	8	0.2	493	2.0	563	2.0
Machinery	16	0.3	30	0.1	113	0.4
Elect. machinery	889	18.5	19,668	77.9	19,729	71.1
Transportation	73	1.5	73	0.3	74	0.3
Instruments	632	13.2	650	2.6	1,287	4.7
TCU	10	0.2	40	0.2	41	0.1
Wholesale trade	36	0.8	99	0.4	137	0.5
Retail trade	21	0.4	65	0.3	66	0.2
FIRE	0	0.0	0	0.0	0	0.0
Services	2,729	56.9	3,044	12.1	3,262	11.9
Business services	141	2.9	155	0.6	265	1.0
Education	1,584	33.0	1,584	6.3	2,361	8.6
Engineering	200	4.2	515	2.0	551	2.0
NEC	39	0.8	124	0.5	264	1.0

Sources: U.S. Department of Defense, Prime Contract Awards, annual and authors' estimates.

Estimates of employment for the city, county and region show more fluctuation in terms of the distribution of employment across sectors than do the data for firms. Here, manufacturing

Commission, Report of the Task Force on Defense Related Industries (Harrisburg: General Assembly of the Commonwealth of Pennsylvania, July 1993), pp. 13-14. See Appendix C for methdology.

represents 39 percent of total defense-related employment in the city of Pittsburgh, whereas the corresponding figures for Allegheny County and the region are much higher, at 85 percent and 81 percent respectively. Again, much of this owes to the significantly large share of prime contracts awarded to various Westinghouse sites in the region, since this estimation of employment is based on prime contract data. This also shows that defense contracting in the county and the region is more oriented toward manufacturing activity than in the U.S. as a whole.[26]

The city's defense-related employment is more diversified across industrial sectors than is the county's or the region's. Service firms received 57 percent of the city of Pittsburgh's prime contract, on average, between 1991 and 1993. Here educational institutions, particularly Carnegie Mellon's Software Engineering Institute, represent fully one-third of total defense-related employment. Engineering firms and business services, especially software and systems companies, added another seven percent to the city's total. For the city, county and the region, transportation/communications/public utilities (TCU) and trade firms received a relatively smaller share of total contracts than the national average, indicating that defense contracting activity in Pittsburgh is much more concentrated in a few sectors -- manufacturing and services -- than it is for the nation as a whole.

What can the region expect under anticipated changes in defense priorities over the remainder of the decade? We can apply these employment figures to estimate job loss in Pittsburgh and its region by using the DCC estimates of projected job loss by sector for 1991 to 1997. In 1991, defense-related employment totaled 26,881 in the region, or approximately three percent of the region's total private employment. With projected defense cutbacks, defense-related employment in the region is projected to decrease by nearly 9,000 to 17,895 by 1997 (see Table 11). Ninety percent of the projected drop in employment will be found in the manufacturing sector, the dominant sector among the region's defense-related activities. The next largest losses in jobs are projected to occur in services and the trade sectors. This squares with the list of the region's largest defense contractors.

Defense-Contracting Firms: For most defense contractors in the region, the "good old days of Reagan," as one informant described the period, is over. Most defense contractors face reductions or cancellations in their defense work, affecting both their workforces and the communities in which they are located. As our estimates above shows, nearly 9,000 workers, mainly in manufacturing activities, are projected to lose their jobs through 1997.

Who are the defense-contractors in the region? Above, we analyzed aggregate data to discern the distribution of firms and contracts over industrial sectors. Here, we focus on contractors to demonstrate that defense-related activities in the region crosses a range of diversified activities.

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[26] DCC estimates that in 1991 manufacturing represented just over 50 percent of the defense-related employment in the country. See Table 8.

Table 11
Pittsburgh Region Defense-Related Employment, 1991 and Estimates for 1997

Sector	1991	1997	Jobs lost 1991-97	Percent of jobs lost
Mining	66	44	-22	0.3
Construction	1,368	1,209	-159	2.0
Manufacturing	21,568	13,501	-8,066	90.0
Transportation/utilities	28	19	-9	0.1
Wholesale trade	223	166	-57	0.6
Retail trade	89	66	-23	0.3
FIRE	0	0	0	0.0
Services	3,188	2,643	-545	6.1
Other	351	247	-104	1.2
Total	26,881	17,895	-8,986	100.0

Source: Authors' calculations. See Appendix C, Table 4.

Unlike many other regions of the country, defense production in the Pittsburgh region does not constitute what we might call a territorial complex -- a well-developed set of interconnected firms performing work in a related series of industries.[27] The region lacks large prime contractors, who tend to subcontract out parts of the production process, often to local firms performing a variety of tasks. The exception to this is Westinghouse and its Navy work. SPIRC has identified a regional niche of suppliers in the Navy nuclear industry. Many of these firms are highly defense-dependent -- 80 percent to 90 percent, on average. Cutbacks in the Navy nuclear program has resulted in job losses in both the supplier firms and Westinghouse.[28] At Westinghouse's Cheswick facility, a 36 percent drop in DOD contracts contributed to a decrease in employment of 42 percent between 1990 and 1993, with more projected in the coming years.[29]

Though the region does not contain a large defense-related production complex, many firms linked to key sectors of the region's economy receive defense contracts, often to help advance new technologies or enhance development of existing products. Thus the Department of Defense can play a key role as an early customer of new technologies.[30] For instance, fast growing Fore Systems received DOD prime contracts in each of the three years studied here,

[27] For instance, for an analysis of the aerospace-electronics complex in southern California, see Allen J. Scott, Technopolis: High Technology Industry and Regional Development in Southern California (Berkeley and Los Angeles: University of California Press, 1993).
[28] SPIRC, Contractors' Survey, p. 3.
[29] SPIRC, Contractors' Survey, p. 4.
[30] See, for instance, Michael Borrus, Competing for Control: America's Stake in Microelectronics (Cambridge, Mass.: Ballinger, 1988).

soon after the company was formed in 1990. In 1992, the government accounted for 21 percent of the company's revenue; that figure has fallen steadily as the company shipments to commercial customers has grown and now numbers in the hundreds.[31] Likewise, many other firms, such as Mine Safety Appliances, RedZone Robotics, RJ Lee Group, and Contraves, are found in key regional industrial clusters such as metalworking, chemicals, and information services and benefit from government contracting.[32]

Critical to the region's relatively small defense complex are the research and development functions performed at many firms. Westinghouse Science and Technology Center, for instance, employs approximately 1,000 engineers and scientists, with approximately 50 percent of its work engaged in defense business. Westinghouse recently entered into a Technology Reinvestment Project (TRP) with the Ben Franklin Technology Center of Western Pennsylvania (BFTC) to develop and test an electric propulsion system for ships from technology they developed for the Navy. This project is part of the dual-use emphasis of the TRP, to date, the only significant conversion activity sponsored by the federal government. Dual use technology refers to technologies developed that have both military and commercial applications. Much debate surrounds both the practicality of dual use focuses and the government's dedication of most of its conversion funds to dual use programs.[33]

Educational establishments also mark an important part of R&D in the region, and some of this is also tied to defense. Both the University of Pittsburgh and Carnegie Mellon University receive substantial R&D funds -- defense and nondefense -- from the federal government. In fiscal year 1993, the University of Pittsburgh's government funding totaled $141.8 million, placing it eighth among the nation's universities in federal R&D funds, with much of that coming from the National Institutes.[34] Carnegie Mellon received $118.3 million, for an overall ranking of 45th for educational establishments receiving federal R&D dollars.

Between the two schools, however, Carnegie Mellon receives a greater share of its federal funds from the Department of Defense, largely owing to the funding that goes to the Software Engineering Institute. At the University of Pittsburgh, government funding is primarily from nondefense sources, largely through the National Institutes, and mainly to the medical school. At both universities, DOD dollars are in part dedicated to transferring technology from the defense side to the commercial sector. Much of the University of Pittsburgh's defense R&D money went to Concurrent Technologies Corporation (CTC) in Johnstown. CTC was formerly part of the University of Pittsburgh Trust, and, under Department of Defense funding, operates four Centers for Excellence in metalworking, environmental technologies, applied software engineering, and integrating information technologies and standards . CTC's mission is to improve the nation's

[31] Fore Systems Prospectus, May 23, 1994 and Fore Systems press release, 9 August 1994.
[32] Regional Economic Revitalization Initiative, The Greater Pittsburgh Region: Working Together to Compete Globally, Carnegie Mellon University, November 1994.
[33] For a discussion on dual use policies as part of industrial policy, see Joel S. Yudken and Michael Black, "Targeting National Needs: A New Direction for Science and Technology Policy," World Policy Journal 7, no. 2 (Spring 1990): 251-88.
[34] "Fact File: Top 100 Institutions in Total Research and Development Spending, Fiscal Year 1993," The Chronicle of Higher Education, 27 January 1995, p. A28.

industrial competitiveness through the adaptation of defense technologies to commercial applications. Beginning with funding in 1988, CTC has gradually built ties to firms and organizations in the region, including both universities, Fore Systems, and SPIRC.

Carnegie Mellon's Software Engineering Institute (SEI) is a Federally Funded Research and Development Center (FFRDC), dedicated to advancing the practice of software engineering. SEI receives its funding from DOD through the Advanced Research Projects Agency. Largely staffed with senior professionals from industry, SEI is not engaged in pure research, contrary to many perceptions, but in improving the practice of software. Through this, they have engaged in a variety of defense and nondefense work as well, including recent activity with the Department of Commerce. Following its initial mandate of establishing itself nationally, SEI, in the past few years, has begun to develop more programs and ties to local Pittsburgh area firms, including a Software Business Forum with the Pittsburgh High Technology Council and local software firms.

The Pittsburgh region's defense-related firms cross a broad range of sectors. Cutbacks in defense spending have been unevenly felt and will continue that way as national security priorities and funding levels shift. Many defense contractors have developed ties to other activities in the regional economy and would continue to benefit from such alliances. These operate across sectors, from SPIRC's role with small-to-medium sized manufacturing firms to SEI's initiative with the Pittsburgh High Technology Council. Attention should be paid to these types of alliances. With the region projected to lose an additional 9,000 defense-related jobs, largely in manufacturing industries, public, private and nonprofit initiatives aimed at the restoring competitiveness of defense-related firms could boost the region's economic health and help stem the tide of continuing job losses.

Local Bases and Impacts from Closings

In addition to the defense-related employment and firms described in the section above, the region hosts several DOD installations. Aside from small recruiting offices, the Pittsburgh region supports no active duty military facilities. All three of the armed forces, though, are represented in the region through reserve bases. The 99th Army Reserve Command's headquarters are in Oakdale, with facilities throughout the region. The Air Force 911th Airlift Wing is based out of the Pittsburgh International Airport. Finally, the Navy/Marine Corps Reserve have a new training facility in North Versailles.

As this report was being written, the Pentagon released a base closure and realignment proposal. This proposal would close or realign 146 defense facilities nationwide, resulting in the loss of approximately 34,200 civilian positions. As part of the Pentagon's fourth round of base closings since 1988, the current realignment plan would most seriously affect Texas, Alabama, New Mexico and Pennsylvania, with the following installations in the state on the list:

<u>Closings</u>:

1. Defense Distribution Depot, Letterkenny: loss of 4 military and 374 civilian positions.
2. Fort Indiantown Gap: loss of 136 military and 385 civilian positions.

3. Naval Aviation Engineering Service Unit, Philadelphia: loss of 10 military and 80 civilian positions.
4. Naval Air Technical Services Facilities - Philadelphia: loss of 4 military and 223 civilian positions.
5. Naval Air Warfare Center & Naval Command and Control Ocean Surveillance Center, Warminster: loss of 16 military and 332 civilian positions.

Realignments:

1. Defense Distribution Depot, Susquehanna: gain of 297 civilian positions.
2. Defense Distribution Region East, Harrisburg: gain 89 civilian positions.
3. Letterkenny Army Depot: loss of 35 military and 2,055 civilian positions.
4. Naval Air Warfare Center: Philadelphia - gain 261 civilian jobs.
5. Tobyhanna Army Depot: gain 300 civilian jobs.

In the Pittsburgh area, the Pentagon proposal called for closing the 911th Airlift Wing at the Greater Pittsburgh International Airport, resulting in the loss of 387 civilian positions. The Army Reserve Kelly Support Center in Oakdale, part of the 99th Army Reserve Command covering southwestern Pennsylvania, was slated for realignment, with a potential loss of 121 civilian positions. The Naval Reserve Training center in North Versailles was not mentioned in the base closure plans.[35]

The Pentagon proposal would have resulted in a loss of 221 military positions and a net loss of 3,379 civilian positions (4,326 losses and 947 gains). In sum, then, the Pentagon proposal would have cut 3,600 positions in Pennsylvania.

Local Pittsburgh political leaders rallied against the Pentagon proposal to cut the local bases.[36] Governor Tom Ridge appointed retired Army General Joe McCarthy to chair a committee that built a case for minimizing base closings in Pennsylvania. This committee worked with a coalition of political leaders from western Pennsylvania, headed by Pennsylvania Superior Court Judge John G. Brosky (a retired Air Force Reserve General). Under the coordination of the Allegheny County Commissioners, the coalition focused its efforts on saving the 911th Airlift Wing. Other local leaders championed the cause. The Pittsburgh City Council passed a resolution asserting that the base closure proposal was a serious threat to the region. U.S. Senator Rick Santorum met with senior Air Force officials to express his opposition to the 911th's closing, while Senator Arlen Specter was also active in challenging the Pentagon proposal.[37]

The fight against closing the local bases proceeded from the argument that they contribute significantly to the local economy. With regard to the 911th Airlift Wing, the Brosky group attributed $20 million in payrolls and $23 million in contracting activity to the base.[38] The local press reported that the base contributes approximately $14.3 in civilian wages and $12.4 million in

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[35] Ellen M. Perlmutter and Matthew P. Smith, "Military Base Closings Hit Home", The Pittsburgh Post-Gazette, 1 March 1995. p. A1.
[36] Permutter, "Military Closings," p. A1.
[37] Tom Barnes, "Specter Attempts to Save Base", The Pittsburgh Post-Gazette, 24 February 1995, p. B1.
[38] John G. Brosky, Letter to the editor, The Pittsburgh Post-Gazette, 12 March 1995, p. F1.

contracting activity to the local economy.[39] This latter contracting figure closely matches our estimate of $11.8 million in contracting activity associated with the base in 1993, though we could not isolate the 911th payrolls from other DOD payrolls.[40]

The total base expenditure of around $26 million constitutes less than one percent of the total county economy of $31 billion.[41] While this represents a relatively small contribution to the overall economy, of greater concern is finding economic alternatives for the 500 base employees who would need to find new work (the 911th plus the Kelly Support Center) in a region which has already suffered serious economic blows over the past 15 years. As with any attempt to cut budgets, the human costs illustrate the reason for the political resistance.

Following up on their initial organizing efforts, the Brosky group, as well as local members of Congress, testified in support of the bases to the Base Realignment and Closure Commission (BRAC), which makes all final closure decisions.[42] These local base supporters made the case to BRAC that the Pentagon's estimates of the operating costs and economic benefits of the local bases were grossly inaccurate, creating an unfairly negative conclusion about the value of shutting the bases.[43] Based upon this testimony, BRAC decided to review the Pentagon's calculations. In response, the Air Force revised its estimates of the value of the 911th, recommending to BRAC that the 911th remain open while another Air Reserve base in Chicago be closed instead.[44]

On 22 June 1995, BRAC issued its final decision -- keep the 911th open. The following day, BRAC also reversed its decision on the Kelly Army Support Center, recommending only minor reductions to be accomplished through normal attrition. Other Pennsylvania operations did not fare as well, however. During this review, BRAC also recommended closing the Letterkenny Army Depot, thus eliminating 2,500 jobs, and withdrawing federal support for Fort Indiantown Gap. President Bill Clinton signed the final BRAC report in late July.

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[39] David L. Michelmore, "911th Airlift Wing's Ultimate Fate Still Unclear", The Pittsburgh Post-Gazette, 3 March 1995, p. B1.

[40] We obtained this estimate by combining the contracts listed for the Greater Pittsburgh International Airport and Coraopolis. This total of $11.8 million is on par with the $12.4 figure reported above. For payrolls, we were not able to isolate the 911th payrolls from total DOD payrolls for the county, but the two estimates remain close.

[41] Steven Rushen, The Pittsburgh REMI Model: Population and Employment Forecasts and Simulation Techniques, University Center for Social and Urban Research, University of Pittsburgh, April 1995, p5.

[42] David L. Michelmore, "911th Closing Up in the Air after Meeting", The Pittsburgh Post-Gazette, 5 April 1995, p. B1.

[43] David L Michelmore, "911th Might Get Stand-in on Military Base Closing List", The Pittsburgh Post-Gazette, 11 May 1995, p. A14.

[44] David L. Michelmore, "911th Wing Could Elude Base Closing", The Pittsburgh Post-Gazette, 14 June 1995, p. B1.

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out to the broader region, the population (and military tax burden) roughly doubles, but less direct defense spending occurs. We argue that the figures are best understood for Allegheny County and the six county region rather than only at the city of Pittsburgh level. People commute over municipal and county borders. Many of the veterans using veterans facilities in Pittsburgh live outside the city and even the county. The benefits of military spending spread well beyond jurisdictional borders and should be understood that way.

An estimate of defense-dependent jobs showed that roughly three percent of the regional workforce is employed by a defense prime contractor. This does not include subcontractors, nor personnel at the military facilities and veterans hospitals. Using a projection method for estimated job loss between 1991 and 1997, we found that the region could lose 9,000 defense-related jobs over the period, primarily concentrated in the manufacturing sector and thus contributing to the long-standing trend of manufacturing job loss in the region. Public and nonprofit initiatives exist to help some of these firms become more competitive, though the dollars available are not commensurate with the potential loss of contracts. In this area, the city and the region could pursue policies to help key regional industries, as outline by the Regional Economic Revitalization Initiative. Many of the defense-related firms are presently engaged in these areas, including metalworking, chemicals, information and communications, and environmental products and services.

Furthermore, the city could continue this report to examine in greater depth the needs and changes of defense-related firms and the role public policy and nonprofit initiative play or could play in their restructuring. The current proposed takeover of CBS by Westinghouse could portend great changes in Westinghouse' role in the regional economy. That, coupled with current defense cutbacks, would spell further job loss for the region.

The findings reported here are likely illustrative of other regions which have no large active duty military bases or territorial complex of large defense contractors and their suppliers. Many regional economies that garner substantial defense dollars also likely rely upon second and third tier contractors, veterans benefits and reserve bases. Furthermore, large prime contractors distribute small and midsized subcontracts throughout the country, often to maximize Congressional support for their products.[45] Thus, the Mayor's report can serve as a model for similar reports in comparable regions of the country.

Finally, the conclusions of this study do not fully support the ideological agenda which drove the creation of the Mayor's report - that defense spending is a morally and economically objectionable use of our national resources. There remains a strong moral and political rationale for opposing the maintenance of a national security state. This study finds that the economic rationale for such opposition is not as unequivocal as the advocates of the report might have anticipated. While the region does suffer a large net economic loss from defense spending and while there remains much inequity in defense spending, it has become a well-established contributor to many sectors of the economy, including those in the Pittsburgh region. Despite the current mood in Washington to bolster the Pentagon's budget, with or without additional defense

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[45] A. Ernst Fitzgerald, The Pentagonists: An Insider's View of Waste, Mismanagement, and Fraud in Defense Spending (Boston: Houghton Mifflin, 1989)

cutbacks, shifting priorities will dictate a shift in spending. Pittsburgh, already suffering from stagnant job growth, can ill afford greater losses; the city should support ongoing activities aimed at bolstering firm competitiveness and creating new jobs.

APPENDIX A

U.S. DEPARTMENT OF DEFENSE PRIME CONTRACT AWARDS, BY CITY AND COUNTY FOR PITTSBURGH REGION, BY FIRM AND STANDARD INDUSTRIAL CLASSIFICATION CODE

NEC: Not elsewhere classified.

Source: U.S. Department of Defense, Prime Contract Awards by State, County, Contractor, and Place, annual.

Table A1

U.S. Department of Defense Prime Contract Awards, Pittsburgh Region, by Firm, Fiscal Year 1991-1993

1991

City	SIC	Company	Total $
Pittsburgh	1622	A&L Inc.	1,219
	3841	AcutronicsAG Inc.	95
	NC	All Safe	30
	3812	Allied Signal Aero	713
	3334	ALCOA	200
	5087	American Stress Tech.	2
	4813	AT&T	100
	7011	Apico Hills Inc.	221
	7389	Applied Imaging Corp.	146
	7349	Associated Cleaning	31
	3823	Bachrach Inc.	363
	8711	Michael Baker Corp.	119
	3494	Basic Engineers Inc.	141
	2844	Beecham Inc.	333
	3443	Blumfeldt Engineering	118
	2819	Calgon Carbon Corp.	564
	7373	Carnegie Group, Inc.	7,854
	8221	CMU/SEI	49,884
	NC	CCS Associates	75
	5072	Chenango Supply Co.	38
	5045	Compaq Computer Corp	87
	3827	Contraves, Inc.	8,937
	1629	Crain Bros.	130
	2026	Dairyland Sales	2,216
	3822	Detroit Switch	143
	3723	Dravo Corp	2,400
	7381	Firm Security Systems	145
	2422	Flex Y Plan Industries	43
	3825	Foerster Instruments	664
	3664	Fore Systems Inc.	540
	3559	Gluco	48
	2522	Haskell of Pgh	74
	NC	Health Research & Serv.	49
	2099	HJ Heinz	2,639
	7011	Hilton and Towers	30
	7372	Incremental Systems Corp	82
	5085	Industrial Ball Valve	416
	3829	Industrial Mainteence Serv.	54
	3312	Jessop Steel Co.	195
	5451	Kraft General Foods	181
	1611	Landau Building Co.	1,552
	7371	Legent Corp.	160
	1623	Lite Way Communications	258
	5051	Mace Metal Sales Inc.	36
	8731	Magnascreen Corp.	1,721
	NC	Micom Systems	415
	8734	Microtronics Assoc.	100
	3842	Mine Safety Appliances	3,878
	3842	National Draeger	2,079
	3549	National Torch Tip Co. Inc.	29
	5145	Nestle Foods Corp.	280
	3841	Neurokinetics	99
	8734	NUS Corp.	2,343
	3674	Omni View Inc.	59
	3953	Pannier Corp.	38
	5000	Paramount Supply Corp.	30
	8331	PA Assn. for the Blind	136
	3443	Pitt DesMoines Inc.	-262
	8731	Pitt Applied Research	50
	7699	Plant Facilities Eng.	33
	5084	Process & Products Eng.	36
	5063	Richmond Electric Supply	31
	5541	Saga Corp. Food Service	154
	1731	Sargent Electric Co.	363
	3821	Shandon Inc.	59
	3826	Suprex Corp.	98
	5999	Telco Systems	72
	3569	Tigg Corp.	63
	7373	Transarc Corp.	566
	3446	Tru Weld Grating Inc.	28
	5065	United Technologies	220
	8221	University of Pittsburgh	2,437
	3300	USS Plate and Steel Sales	225
	5411	Valley Foods	203
	3600	Westinghouse	28,180
	3536	Westmont Industries	288
	5199	Wilshire Foam Products	94
		Pittsburgh Total	127,470

Table A1, continued

1991

City	SIC	Company	Total $
Allegheny County Municipalities			
Allison Park	5511	Allison Leasing INEC.	412
	4953	American Environmental Services	153
	8748	Atlas Resource Management	121
	3553	Dynamic Equipment Corp.	90
	NC	I.S. Resources	210
	8711	R&R International INEC.	103
	3589	Roediger Pittsburgh INEC.	133
		Total	1,222
Bakerstown	2992	Southwest Petro-Chemical Inc.	15,604
Bethel Park	3452	General Manufacturing Co.	165
	3600	Westinghouse	93
		Total	258
Blawnox	2813	Air Products & Chemicals	89
Brackenridge	5511	Libbey Owens Ford	175
	NC	Swedlow, INEC.	87
		Total	262
Carnegie	5085	Process Piping Specialists	91
Cheswick	NC	Engineering Trade & Construction	39
	3600	Westinghouse	446
		Total	485
Copella	5411	Glassmere Fuel Service	81

City	SIC	Company	Total $
Coraopolis	8711	Michael Baker Corp.	670
	NC	Freespan Mezzanines INEC.	41
	NC	Golden Triangle Construction	97
	7349	Nesmith Cleaning Co.	42
	3679	Pentek INEC.	32
	1731	Power Contracting INEC.	26
	NC	Safety Storage INEC.	36
	5051	SSAB Svenskt Stal AB	102
		Total	1,046
East McKeesport	3599	Radform Tool Co.	31
East Pittsburgh	3599	Atomatic Manufacturing Co.	103
Forest Hills	5000	United Scientific Corp.	32
Glenshaw	5085	Chicago Industrial Trading	139
	2821	Ranbar Tech. Inc.	92
	5085	Sealing Specialists Service	27
		Total	258
Greater Pgh. Airport	8331	Assoc. for Retarded Citizens	130
	1611	Brandt Paving Inc.	32
	NC	DA Danylo Inc.	119
	8712	Deeter Ritchey & Sippel	26
	4911	Duquesne Light	297
	8711	Intelcom Support Services	754
	1542	Landau Building Co.	37

Table A1, continued 1991

City	SIC	Company	Total $
Warrendale	3625	Benton Corp	1,997
	4225	Leco Corp	35
	8621	Society of Automotive Engineers	212
		Total	2,244
West Mifflin	1524	AARA Construction	27
	3544	Liberty Polyglass Inc.	168
	3600	Westinghouse	276,681
		Total	276,876
Wilkins	3600	Westinghouse	131,078
Allegheny County Total (w/o Pittsburgh) 1991			445,894

Other Counties

City	SIC	Company	Total $
Beaver County:			
Ambridge	3559	Economy Industrial	620
Beaver	5063	North Coast Electric Co.	83
	3600	Westinghouse	657
Conway	3599	Herr Voss Corp	27
Homewood	3600	Westinghouse	87
Koppel	3499	Babcock & Wilcox	72
	3812	Contraves	3,376
Ohioville	5065	Aschbacher & Assoc.	82
	2521	Flex Y Plan Industries	36
Patterson Heights	NC	PSG Industries Inc.	94
Beaver County Total 1991			5,134
Butler County:			
Butler	5051	AMI Metals Inc.	32
	NC	Adams Barnes PSP	69
	3829	Applied Test Systems Inc.	196
	7389	Tri State Design Inc.	105
	3599	Unimach	66
Evans City	3669	Mine Safety Appliances	16,842
Glassworks	4492	Pittsburgh Tug Co.	48
Mars	7699	Camscan USA Inc.	27
	3827	John Unertl Optical	30
Murrinsville	8711	STV Engineers	35
Saxonburg	3674	II VI Inc.	592
Valencia	NC	Collins & McLaughlin	31

Table A1, continued 1991

City	SIC	Company	Total $
Butler County, Cont			
Zelienople	3564	Robinson Industries Inc.	56
	3446	Universal Manufacturing	79
Butler County Total 1991			18,208
Fayette County:			
Lemont Furnace	3444	Invotech	674
Masontown	1611	Lane Construction	27,484
Uniontown	1611	Rhino Construction	90
Fayette County Total 1991			28,248
Washington County:			
Buffalo	5045	Memorex Corp.	26
Canonsburg	5084	Air Power of Ohio Co.	30
	5000	Appliance Parts Dist.	30
	3567	Hansen Inc.	67
	NC	JT Systems Inc.	43
	5045	Trilogic Corp.	475
Donora	3563	Elliot Turbomachinery	102
Eighty Four	1221	Keystone Coal	1,324
Ellsworth	1221	Keystone Coal	240
Houston	NC	Murdock Enterprises	29

City	SIC	Company	Total $
Independence	NC	JA Moody Co. Inc.	114
Meadowlands	3053	Industrial Gasket & Shim	78
Union	8711	Tams Consultants	205
Washington	3494	Amcast Industrial Corp	126
	NC	Cunningham Co. Inc.	-40
	3312	Jessop Steel Co.	27
	NC	Jetcraft Inc.	33
	NC	Murdock Enterprises	62
Washington County Total 1991			2,971
Westmoreland County:			
Alcoa Center	7389	Alcoa	340
Blairsville	2842	Space Chemical Inc.	550
Delmont	3482	Penn Ammunition	321
Derry	5112	Word Technology Systems	38
Greensburg	NC	Boyacheck Supplies Inc.	52
	3599	New Stanton Machine Tool	406
	3559	Nuclear Components Inc.	334
	8331	PA Assoc. for the Blind	1,736

Table A1, continued 1991

City	SIC	Company	Total $
Westmoreland County, continued			
Irwin	3544	Electrall Tool & Die Co.	121
	3829	Extrude Hone Corp	739
	3449	Harliss Specialties	-315
Jeannette	3563	Elliot Turbomachinery	402
	3732	Hanlon & Wilson	42
	7692	J & T Welding Co.	29
	3089	LP Aero Plastics	158
	3599	LRG Corp.	451
Latrobe	3069	Chestnut Ridge Foam Inc.	30
	5172	Latrobe Aviation	69
	3600	Westinghouse	300
Mount Pleasant	3089	CK Composites	30
	3444	Invotech	225
Murrysville	3842	Mine Safety Appliances	488
New Kensington	NC	Dodson Lindblom Assoc.	84
	5084	Metalworking Machinery Inc	158
	NC	Old World Trading	981
	NC	G. Valdes Enterprises	4,585
New Stanton	3829	General Nuclear Corp.	111
North Huntington	3669	Mine Safety Appliances	47
	3599	Painter Tool Inc.	97
	3544	Penn State Tool & Die	220

City	SIC	Contractor	Total $
Scottdale	3496	Marwais Steel Co.	699
	NC	Scottdale Mch. Fdry Constr	-27
	3599	Skovira Machine Co.	470
	5051	Tioga Pipe Supply Co.	28
Trafford	NC	Hasto Racine Inc.	28
	3599	MD Machine Co. Inc.	35
West Newton	NC	DRW Enterprises	-342
Youngwood	3674	Powerex Inc.	72
Westmoreland County Total 1991			13,792
Other Counties Total 1991			68,353
Total Pittsburgh Region 1991			641,717

Table A1, continued

1992

City	SIC	Company	Total $
Pittsburgh	2800	3M	62
	1622	A&L Inc.	331
	NC	AYA Technology	-358
	3841	Acutronic AG Inc	311
	3625	Aerotech	28
	5044	AM International	42
	2911	American Refining	96
	5087	American Stress Tech.	71
	4813	AT&T	304
	3823	Ametek Inc	50
	7371	Antaire	48
	7011	Apico Hills Inc	207
	3599	Atomatic Manufacturing	-32
	5049	Aura Co.	33
	3823	Bachrach	721
	3494	Basic Engineers	47
	9554	Beckwith Machinery	34
	5051	Blackhawk Steel	50
	NC	Brandname Contractors	436
	7373	Carnegie Group	-700
	8221	CMU/SEI	55,437
	NC	CCS Assoc	50
	1622	Ceder Creek Co.	97
	3827	Contraves	5,493
	5063	CooperI ndustries	29
	2026	Dairyland Sales	1,965
	7372	DASYS Inc	215
	5063	Doylestown Electric Sup	27
	3723	Dravo	1,650
	8221	Duquesne Univ.	268
	NC	E&O Wiegard	74
	3821	Fisher Scientific	275
	3825	Foerstrer Instruments	1,328
	3664	Fore Systems	1,337
	8331	Goodwill Industries	100
	2522	Haskell of Pgh	43
	NC	Health Research & Services	49
	2099	HJ Heinz	3,302
	1781	Hydro Group	200
	3829	Industrial Maintenence Service	125
	5661	Iron Age Corporation	75
	5661	Iron Age Protective Co.	43
	7371	Legent Corp.	84
	8731	Magnascreen	837
	7011	Marriot Corp	109
	7379	Maya Design Group	50
	NC	MB Holdings	30
	NC	Megator Corp	642
	NC	Micom Systems	240
	8734	Microtronics Associates	50
	3495	Miller Henry Spring Manufacture	89
	3842	Mine Safety Appliances	3,042
	3842	National Draeger	5,078
	3549	National Torch Tip Company	55
	8734	NUS Corp.	6,144
	3674	OmniView Inc.	55
	NC	PDF Solutions	98
	8331	PA Assoc Blind	72
	3495	Pittsburgh Spring	317
	7699	Plant Facilities Engineering	488
	NC	Plazck, Donald	60
	3824	Prominant Fluid Controls	129
	5045	Pruitt Energy Sources	30
	5013	Recon AT Parts Corp	68
	8711	Redzone Robotics	477
	5084	Rice DavidCo.	26
	NC	Serv Net Inc.	73
	3669	Star Tron Technology Corp	712
	NC	Swan Technologies	36
	5999	Telco Systems Inc.	278
	3826	Thar Design Inc.	50
	3569	Tigg Corp.	35
	8711	TriState Engineering & Mngm	30
	7521	Triangle Parking Co.	73
	5065	United Technologies	139
	8221	University of Pittsburgh	1,545
	8331	Vocational Rehab Center	35
	3600	Westinghouse	19,783
	5051	Williams & Co.	63
	7373	Xerox Corp.	95
		Pittsburgh Total	115,180

Table A1, continued

1992

City	SIC	Company	Total $
Allegheny County Municipalities			
Allison Park	5511	Allison Leasing Inc.	460
	8748	Atlas Resource Management	103
		Total	563
Bakerstown	2992	Southwest Petro-chemical Inc.	1,069
Bethel Park	NC	CSC Assoc.	63
	3452	General Manufacturing Co.	332
	5085	North American Pneumatic	35
		Total	430
Blawnox	2813	Air Products & Chemical	185
Brackenridge	NC	N-Met Inc.	28
Braddock	4492	Pittsburgh Tug Co.	279
Bridgeville	NC	Miller Centrifugal Casting	27
Carnegie	7371	Alternative Computer Solutions	102
	NC	Richard W. Nalwasky Inc.	26
		Total	128
Cheswick	3600	Westinghouse	80
Clairton	3829	Kurt J. Lesker Co.	205
Coraopolis	8711	Michael Baker Corp.	335
	8712	Beardsley, Beardsley, CWDN	195
	3699	Canon USA	29
	8712	Caste Lucian Architects	70
	5012	Daihatsu America Inc.	27
Coraopolis, continued	1542	RA Glancy & Sons Inc.	2,903
	1611	Landau Building Co.	685
	1611	Lane Construction	10,431
	NC	Ralph J. Meyer Co.	51
	NC	Sam Nally Shop Inc.	55
	7349	Nesmith Cleaning	37
	8717	Okon & Co. Inc.	247
	NC	Safety Storage Inc.	31
	5013	Snap On Tools	223
	5084	TMH Systems	27
		Total	15,346
East Pittsburgh	3599	Atomatic Manufacturing Co.	144
	8711	PSM Technologies	1,105
		Total	1,249
Glenshaw	3842	Mine Safety Appliances	41
Greater Pgh Airport	1721	AKI Painting Consulting	43
	8331	Assoc. For Retarded Citizens	133
	4911	Duquesne Light	357
	NC	Robert L. Kimball & Assoc.	76
	8712	Kingsland Scott BR HVKTT	37
	2599	Ladd Furniture	45
	3629	Lighthouse Electric	190
	NC	QBS Contracting Inc.	164
	1611	Rhino Construction Inc.	43
	5099	Robert & Co.	33
	1771	Samaras Construction Co.	136
	8741	Service Care of America	30
	1542	UHL Construction Co.	179
	4953	Waste Man[illegible]	

Table A1, continued 1992

City	SIC	Company	Total $
Greater Pgh	8711	Woolpert Consultants	30
Airport, cont.		Total	1,532
Jefferson	3600	Westinghouse	50
Leetsdale	NC	Tara Metals	78
McCandless	8734	Pace Inc.	58
McKeesport	3443	CP Industries	358
McKees Rocks	3069	ALCO Industries Inc.	90
	NC	Harnischfeger Ind.	77
	3443	Murray Co. J. Inc.	376
		Total	543
Monroeville	3519	Cummins Diesel Engines Inc.	55
	8748	International Technology	1,606
	3935	IT Corp.	2,000
	3827	RJ Lee Group Inc.	150
	5734	Tartan Labs	628
	8734	Testex Inc.	116
		Total	4,555
Morgan	5013	All Sources Services Inc.	81
Oakdale	7349	Associated Services Inc.	96
	5713	Faris Salvage	191
	3823	Industrial Scientific Co.	28
	NC	K Services	155
	8734	Reclamation Services Unlim.	35
	3537	Three Rivers Crane	58
	NC	Woodstock General	354
Oakdale, continued	7349	Associated Cleaning Inc.	95
	4953	Browning Ferris Ind.	-84
		Total	928
Oakmont	NC	Bowsteel Corp.	44
	3462	Edgewater Corp.	51
		Total	95
Sewickley	NC	Nu Brite Chemical	100
Stowe	5074	Mindeco Corp.	39
Turtle Creek	3661	Aydin Corp.	59
	NC	Roller Bearing Co.	88
	NC	TE Rocks Fasteners	64
	8711	White Engineering Surfaces	838
		Total	1,049
Upper St. Clair	8733	Battelle Memorial Institute	27
Verona	2522	Haskell of Pgh Inc.	304
	NC	Miller Herman Inc.	31
	NC	Officeworks Inc.	32
		Total	367
West Mifflin	3544	Liberty Polyglass Inc.	195
	3462	National Forge Co.	12,718
	3600	Westinghouse	227,695
		Total	240,608
Wilkins Township	3600	Westinghouse	79,157
Allegheny County Total (w/o Pittsburgh) 1992			349,255

Table A1, continued 1992

City	SIC	Company	Total $
Other Counties			
Beaver County			
Ambridge	5084	Total Equipment Co.	51
Beaver	8711	Michael Baker Corp.	29
	5063	Doylestown Electric Supplies	127
	5063	North Coast Electric Co.	127
	3600	Westinghouse	1,383
Conway	5084	Lynch Machinery Co.	262
Koppel	3499	Babcock & Wilcox	260
	3812	Contraves USA Inc.	8,086
Monaca	3325	Beaver Valley Alloy Found.	57
	3339	Zinc. Corp of America	153
Ohioville	2521	Flex Y Plan Industries Inc.	25
Rochester	5172	Ashland Oil	304
	2899	Octagon Process Inc.	62
Beaver County Total 1992			10,926
Butler County			
Butler	NC	Analysis & Technology Ind.	97
	3829	Applied Test Systems Inc.	165
	3599	Unimach Manufacturing	70
Evans City	3669	Mine Safety Appliances	1,555
Fombell	3600	Westinghouse	100
Harmony	NC	Control Systems Sales	29
Mars	3494	GA Industries Inc.	-51
	3669	Mine Safety Appliances	67
Saxonburg	3674	II VI Inc.	50
Slippery Rock	8221	Slippery Rock Univ.	42
Butler County Total 1992			2,124
Fayette County			
Belle Vernon	5172	Guttman Oil Co.	134
Brownsville	8712	Deeter Ritchey & Sippel	74
	NC	R. Christopher Goodwin	191
	1542	Russell Construction Co.	668
Fairbank	1611	Jackovich Industries & Const	32
Lemont Furnace	3444	Invotech	1,561
Masontown	1611	Lane Construction	28,578
Fayette County Total 1992			31,238
Washington County			
California	3599	California Precision Machining Co	158
	8221	Califonia Univ. of PA	59
Canonsburg	3567	Hansen Inc.	184
	NC	CH Reed Inc.	55
	3600	Westinghouse	32

Table A1, continued 1992

City	SIC	Company	Total $
Washington County, continued			
Donora	3563	Elliot Turbomachinery	35
	NC	Hoffling House & Co.	840
	NC	New Elliot Corp.	33
Houston	NC	Murdock Enterprises	43
Lawrence	NC	Micom Systems Inc.	26
Meadowlands	3053	Industrial Gasket & Shim	71
Union	8711	Tams Consultants Inc.	531
Washington	7389	Bolson Co Inc.	38
	NC	Murdock Enterprises	75
	NC	Tara Metals Inc.	53
	8221	Washington & Jefferson College	73
Washington County Total 1992			2,306
Westmoreland County			
Alcoa Center	7389	ALCOA	790
Blairsville	2842	Space Chemical Inc.	271
Delmont	3482	Penn Ammunitions	199
Forbes Road	7372	CACI Inc.	1,709
Greensburg	3599	Leese & Co.	205
	3291	Liberty Precision Tooling	28
	3599	New Stanton Machine Tool	269
	3829	Nuclear Components Inc.	354
	8331	PA Assoc for the Bilind	336

City	SIC	Company	Total $
Irwin	3544	Electrall Tool & Die Inc.	50
	3829	Extrude Hone Corp.	35
Jeannette	3563	Elliot Turbomachinery	288
	1541	Frost & Keeling	2,792
	3089	LP Aero Plastics	573
	3599	LRG Corp	-105
	3829	MVI Precision Machining	125
Latrobe	3069	Chestnut Ridge Foam Inc.	73
Manor	3441	Industrial Alloys Inc.	34
Mount Pleasant	3089	C-K Composites	53
Murrysville	3842	Mine Safety Appliances	1,067
New Stanton	3829	General Nuclear Corp.	31
	3089	Larizza Industries Inc.	287
North Huntington	3599	Painter Tool Inc.	534
	3544	Penn State Tool & Die Co.	-905
Scottdale	NC	Diversified Metels	49
	3599	Skovira Machine Co.	573
	5051	Tioga Pipe Supply Co.	109
Youngwood	3674	Powerex Inc.	32
Westmoreland County Total 1992			9,756
Total Other Counties 1992			56,350
Total Pittsburgh Region 1992			520,785

Table A1, continued

1993

City	SIC	Company	Total $
Pittsburgh	3841	Acutronic AG Inc.	247
	8731	Advanced Materials	49
	3625	Aerotech Inc	116
	5085	All Pak Inc	46
	5044	AM Intern. Inc.	43
	5087	Amer. Stress Tech	196
	4813	AT&T	304
	3823	Ametek Inc	27
	7371	Antaire Corp.	250
	7011	Apico Hills Inc. PA	147
	3823	Bachrach Inc.	2,357
	5051	Blackhawk Steel	-50
	3443	Blumfeldt Eng.	78
	NC	BrandName Con	60
	2819	Calgon Carbon Del	70
	3823	Calgon	52
	7373	Carnegie Group	100
	8412	Carnegie Institute	536
	8221	CMU/SEI	55,849
	NC	CE Davis Consultant	29
	3827	Contraves	1,671
	2026	Dairyland Sales	2,543
	7372	DASYS Inc.	494
	8712	DeeterRitchey	317
	3553	Delta Int. Machinery	447
	3822	Detroit Switch	47
	5084	Diesel Injection Geor	27
	8711	Dobil Lab	44
	3723	Dravo	1,115
	8221	Duquesne Univ.	255
	3861	Eastman Kodak	2,786
	7629	Emerson Electric	86
	3826	Extrel	38
	3825	Foerster Instruments	97
	3664	Fore Systems	2,751
	7372	Formtek	255
	8331	Goodwill	-35
	8734	Halliburton NUS	1,507
	NC	Health Research & Services Fnc	51
	2099	HJ Heinz	3,267
	3577	Hewlett Packard	65
	8731	Huls America	139
	1781	Hydro Group	2,093
	3829	Industrial Maintenenc	25
	3679	K2T	49
	1611	Landau Building	63
	7371	Legent Corp	100
	3312	Lukens Inc.	40
	3731	Marine Ways	86
	3669	MCI	34
	NC	William McLaughlin	60
	7371	Metacad	50
	3826	Millipore	28
	3842	Mine Safety Appliances	526
	2026	Montfort Dairy	73
	3842	National Draeger	3,537
	3674	Omniview Inc	547
	NC	PDF Solutions	497
	8331	PA Assn for Blind	88
	7371	Performance Signal	47
	5047	Phillips Electronics	186
	3322	Pgh Foundry & Mach.	61
	7629	Power Systems Tech	59
	3317	Premium Copper Brass	39
	8711	Redzone Robotics	389
	5084	Schlegel AssocInc	210
	3669	StarTron Tech	123
	3826	Suprex Corp.	49
	NC	Tara Metals	130
	5999	Telco Systems Inc	514
	3569	TIGG Corp	92
	7373	Transarc Corp	37
	8221	University of Pittsburgh	3,101
	8748	Viking Systems Int.	41
	8331	Vocat. Rehab Center	42
	3600	Westinghouse	9,357
	3585	York	61
		Pittsburgh Total	100,907

Table A1, continued

1993

City	SIC	Company	Total $
Allegheny County Municipalities			
Allison Park	5511	Allison Leasing Inc.	-28
	4953	American Environmental Services	206
		Total	178
Bethel Park	3452	General Manufacturing Co.	209
Brackenridge	NC	Pilkinton Holdings	-56
Braddock	4492	Pittsburgh Tug Co.	320
	3312	USX Corp.	100
		Total	420
Bridgeville	5075	Anderson Equipment	50
	3399	Dynamet Powder Products Inc.	121
	NC	Richard W. Nalwasky Inc.	85
		Total	256
Cheswick	3600	Westinghouse	387
	NC	Wheeler Brothers	29
		Total	416
Clairton	3829	Kurt J. Lesker Co.	49
Coraopolis	8711	Michael Baker Corp.	5,357
	6794	Blackstone Capital Partners	33
	3669	General Electric Mobile Commun	30
	1542	RA Glancy & Sons Inc.	101
	8711	Huntley & Huntley	54
	1611	Lane Industries Inc.	1,083
	7349	Nesmith Cleaning	39
	8717	O'Kon & Co. Inc.	128
	3679	Pentek Inc.	87

City	SIC	Company	Total $
Corapolis, cont.	3444	AR Scalise	46
	1731	Vince's Electrical Service	104
		Total	7,062
East Pittsburgh	3575	Vocollect Inc.	49
Glenshaw	3842	Mine Safety Appliances	60
Greater Pgh	3444	A&B Heating & Plumbing Co.	138
Airport	8748	Apex Environmental Inc.	29
	8331	Assoc. For Retarded Citizens	144
	4953	Browning-Ferris Industries	28
	2813	Consolidated Natural Gas Co.	54
	1542	DiCicco Contracting Corp.	832
	4911	DQE Inc.	381
	8711	Intelcom Support Services	527
	1731	JB Leppla Electric	27
	NC	Robert L. Kimball & Assoc.	144
	1611	Lone Pine Construction Inc.	76
	1731	M&K Electrical Co.	114
	5999	Penn Record Systems	34
	1542	PKD Inc.	694
	1611	Rhino Construction	1,059
	8741	Service Care of America	30
	2952	TA Robinson Asphalt Paving	46
	NC	Tennant Co.	27
	1611	Thomas & Son Builders & Const	186
	1611	Tony Baiano Construction	140
	NC	Williams Contg Specialists Co.	43
		Total	4,753
Leetsdale	NC	Tara Metals	119

Table A1, continued 1993

City	SIC	Company	Total $
Allegheny County, continued			
McKees Rocks	3069	ALCO Industries	107
	5172	Chevron USA Inc.	538
	3398	Clifton Steel Co.	37
	3462	McKees Rocks Forgings Inc.	31
	5172	Naughton Energy Corp.	369
	5039	Universal Steel Buildings	113
		Total	1,195
McKeesport	3443	Chatwins Group Inc.	389
	5043	Photographic Supply	25
		Total	414
Monroeville	8748	International Technology Corp.	2,060
	3827	RJ Lee Group Inc.	449
	5734	Tartan Labs Inc.	227
		Total	2,736
Neville Island	8711	Theta Technologies	3,137
Oakdale	7349	Associated Services Inc.	130
	7381	Knight Protective Services	288
	1611	Oakdale Construction Co.	195
	1629	Parsons Corp.	908
	4941	Penn American Water Co.	62
	8731	Science Applications Intern. Corp	72
	7381	Wright International Detective Ag.	29
		Total	1,684
Oakmont	3325	Specialty Steel & Forgings Co.	40
Sewickley	2819	Environtrol Inc.	52
Tarentum	5411	Glassmere Fuel Services Inc.	110

City	SIC	Company	Total $
Turtle Creek	8711	AWK Consulting Inc.	244
	3661	Aydin Corp.	222
	8711	White Engineering Surfaces Corp	1,270
		Total	1,736
Verona	2522	Haskell of Pittsburgh Inc.	601
Warrendale	8621	Society of Automotive Engineers	90
West Mifflin	4581	Corporate Jets Refuelers Inc.	56
	3462	National Forge Co.	17,894
	3600	Westinghouse	238,850
		Total	256,800
Wexford	3446	Truweld Grating Inc.	42
Wilkins	3600	Westinghouse	387,726
Total Allegheny County 1993			669,878

Table A1, continued 1993

City	SIC	Company	Total $
Other Counties			
Beaver County			
Ambridge	5064	Builders' Buying Exchange	115
	5722	Ceiling Fans Inc.	107
Beaver	8711	Michael Baker Corp.	68
	NC	Midco Component Sales	70
	5063	Primary Electric Supplies	55
	3600	Westinghouse	582
Conway	5084	Lynch Machinery Inc.	139
East Rochester	5167	Emultec Inc.	27
Koppel	3812	Contraves, Inc.	8,307
	3861	Eastman Kodak	1,140
Ohioville	2521	Flex Y Plan Ind.	126
Rochester	3479	Ashland Industrial Products	104
Beaver County Total 1993			10,840
Butler County			
Butler	NC	Analysis & Technology Inc	40
	3829	Applied Test Systems Inc.	114
	3399	General Metals Inc.	34
	3599	Unimach Manufacturing	73
Evans City	3669	Mine Safety Appliances	966
Mars	3669	Mine Safety Appliances	44
Saxonburg	3674	II VI Inc.	276

City	SIC	Company	Total $
Slippery Rock	8221	Slippery Rock University	38
Butler County Total 1993			1,585
Fayette County			
Grindstone	3599	Shumar's Welding & Machine Serv.	95
Lemont Furnace	3444	Invotech Manufacturing	852
Masontown	NC	Jones Group, Inc.	2,700
	1611	Lane Industries Inc.	7,086
New Geneva	1794	CH&D Enterprises	300
	1611	Joseph B. Fay Co.	375
Newell	2873	Welland Chemical LTD	393
Uniontown	7371	Auto Soft Inc.	39
Fayette County Total 1993			11,840
Washington County			
California	3599	California Precision Machining Co.	36
	8221	California State University	45
Canonsburg	8743	Development Dimensions Inc.	35
	3567	Hansen Inc.	64
	NC	JT Systems, Inc.	31
	5045	Trilogic Corp.	85
Jefferson	3812	Teleflex Inc.	96

Table A1, continued 1993

City	SIC	Company	Total $
Washington County, continued			
Washington	3494	Amcast Industrial	69
	NC	Jetcraft Inc.	36
	5172	Latrobe Aviation	167
	8713	Mounts Engineering	35
	NC	Tara Metals	31
	8221	Washington & Jefferson College	66
Washington County Total 1993			796
Westmoreland County			
Alcoa Center	7389	ALCOA	519
Armbrust	8711	URS Corp.	1,315
Forbes Road	7372	CACI International, Inc.	5,828
	8742	Lyon Associates, Inc.	74
Greensburg	3599	Irwin Automation Inc.	158
	3599	Leese & Co.	46
	3599	New Stanton Machining & Tooling	357
	3829	Nuclear Components Inc.	144
	8331	PA Assoc, for the Blind	310
Harrison City	3545	Parker Hannifin Corp.	54
Jeannette	1541	Frost & Keeling Assoc.	98
	3829	MVI Precision Machining LTD	29
	3511	New Elliot Corp.	29
Murrysville	3842	Mine Safety Appliances	1,715
Mount Pleasant	3089	C-K Composites, Inc.	65
New Stanton	3089	Larizza Industries	173
North Huntington	8744	Centech Group Inc.	198
	3599	Painter Tool Inc.	42
	3829	Precision Defense Services	29
Scottdale	3496	Marwais Steel Co.	263
	3599	Skovira Machine Co.	563
West Newton	NC	DRW Enterprises	-159
Youngwood	3674	Powerex Inc.	190
Westmoreland County Total 1993			11,910
Other Counties Total 1993			36,971
Total Pittsburgh Region 1993			807,756

APPENDIX B: The Military Tax Burden

The following method was used to estimate the Military Tax Burden for the city of Pittsburgh, Allegheny County and the surrounding region. The calculations are based on estimates of federal personal income taxes paid, total federal income taxes paid (including corporate and excise taxes), and percent of the federal budget dedicated to national defense.

1. Per capita federal income taxes for the city of Pittsburgh, Allegheny County and Pittsburgh region: Estimated by using Pennsylvania income taxes because federal income taxes were not available on a city or county basis:

a. Pennsylvania per capita income taxes = total Pennsylvania personal income taxes divided by population (see below).

Worksheet 1: Pennsylvania per capita personal income taxes, 1991-1993

Year	Income Taxes ($ billions)	Population (thousands)	Taxes per capita
1991	22,061.6	11,949.0	1,846
1992	23,306.2	11,995.0	1,943
1993*	NA	NA	2,040

* NA -- not available at the time of this report. The 1993 figure was estimated from previous years growth projection.

b. Estimate local per capita income taxes by using an adjustment factor. The adjustment factor is the ratio of local per capita income to state per capita income. This assumes that higher per capita income in the local area yields higher per capita income taxes (see below).

Worksheet 2: Per capita income and adjusted per capita income taxes, 1991-1993

Area	1991	1992	1993
Per capita income:			
Pittsburgh	19,579	20,532	21,652
Allegheny County and region	19,946	21,175	22,340
Pennsylvania	19,557	20,642	21,351
Per capita adjustment factor:			
Pittsburgh/Pennsylvania	1.001	0.995	1.014
County/Pennsylvania	1.020	1.026	1.046
Adjusted per capita income taxes:			
Pittsburgh	1,848	1,933	2,069
Allegheny County and region	1,883	1,993	2,134

2. Per capita taxes spent on the military by local residents and corporations.

a. Estimate total income taxes, including corporate and excise taxes, based on individual income taxes and the tax flows multiplier. This multiplier is used to inflate the federal individual income tax to account for other tax flows from the city. Individual income taxes represented 70 percent of total federal revenues (exclusive of Social Security and other trust funds) for fiscal years 1991-1993. The multiplier equals 1/0.7, or 1.43.

b. Estimate percent of federal budget dedicated to national defense. Multiply local adjusted per capita income taxes by the tax flows multiplier and also the military share of the budget. This gives the adjusted per capita federal income taxes paid to support defense activities.

Worksheet 3: Adjusted per capita federal income taxes, 1991-1993

	1991	1992	1993
Military portion of federal budget	.37	.39	.38
Per capita military tax burden:			
Pittsburgh	1,000	1,080	1,121
Allegheny County	1,000	1,114	1,157
Region	1,000	1,114	1,157

c. Calculate the total military tax burden by multiplying per capita figures by population figures for city of Pittsburgh, Allegheny County and region. Here, 1990 Census population was used for all three years, owing to different estimation procedures for the three spatial levels for subsequent years (see Table 6).

Sources: U.S. Internal Revenue Service Statistics of Income Bulletin: (Fall 1993 and Spring 1994); U.S. Bureau of the Census, 1994 Statistical Abstract of the United States; U.S. Office of Management and Budget 1995 Budget of the United States; Pennsylvania Departments of Commerce and Labor and Industry.

APPENDIX C: Estimating Defense-Related Employment

To estimate defense-related employment in the Pittsburgh region and the projec losses under current Department of Defense cutbacks, we used the methodology provid Defense Conversion Commission (DCC).[46] First, the amount of defense-related employ the region was estimated for 1991 by using individual firm contracts classified by Standar Industrial Classification (SIC) code. These were then aggregated to two and one digit le DCC estimated that in Pennsylvania the average expenditure per defense-related job is $2 Dividing contract data by that figure yielded the total number of jobs by SIC code for each three years under study. We then used DCC's projected job loss figures to estimate 1997 d related employment in the Pittsburgh region by multiplying the percent change in the nation employment by the estimated defense-dependent employment in Pittsburgh for each sector. Totals were obtained by adding the sectors.

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[46] Defense Conversion Commission, Adjusting to the Drawdown, Annex F.

Table C1
Estimating Jobs in Pittsburgh -- City of Pittsburgh -- by SIC code

	Prime Contracts ($ 000s)			Number of Firms			Number of Jobs		
Sector	1991	1992	1993	1991	1992	1993	1991	1992	1993
Total	127,470	115,180	100,900	79	80	77	5,340	4,825	4,227
Construction	3,522	628	2,156	5	3	2	148	26	90
Manufacturing	55,341	46,146	32,501	34	30	35	2,318	1,933	1,361
Food	4,855	5,267	5,883	2	2	3	203	221	246
Chemicals	897	62	70	2	1	1	38	3	3
Petroleum	0	96	0	0	1	0	0	4	0
Rubber	0	0	0	0	0	0	0	0	0
Stone, clay, glass	0	0	0	0	0	0	0	0	0
Primary metals	620	0	140	1	0	3	26	0	6
Fabricated metals	25	453	78	4	3	1	1	19	3
Non electrical machinery	428	58	665	4	3	4	18	2	28
Electrical machinery	28,779	21,915	12,977	3	5	7	1,206	918	544
Transportation	2,400	1,650	1,201	1	1	2	101	69	50
Instruments	17,182	16,602	11,487	12	11	14	720	695	481
Misc. manufacturing	38	0	0	1	0	0	2	0	0
Trans./Com./Utilities	100	304	304	1	1	1	4	13	13
Wholesale trade	1,270	625	658	11	12	7	53	26	28
Retail trade	610	396	514	4	2	1	26	17	22
FIRE	0	0	0	0	0	0	0	0	0
Services	66,058	65,410	63,947	18	21	25	2,767	2,740	2,679
Business services	8,984	-230	1,333	7	6	8	376	-10	56
Education	52,321	1,913	59,205	2	3	3	2,192	80	2,480
Engineering	4,333	7,538	2,486	5	5	6	182	316	104
NEC	569	1,430	827	4	12	6	24	60	35

Source: U.S. Department of Defense, Prime Contract Awards by State, County, Contractor, and Place, annual; Pennsylvania Joint State Government Commission, Report of the Task Force on Defense-Related Industries, 19 and authors' calculations.

Table C2
Estimating Jobs in Pittsburgh -- Allegheny County -- by SIC code

	Prime Contracts ($ 000s)			Number of Firms			Number of jobs		
Sector	1991	1992	1993	1991	1992	1993	1991	1992	1993
Total	573,364	464,536	770,785	157	164	154	24,017	19,459	32,287
Construction	5,090	15,048	7,675	16	10	15	213	630	321
Manufacturing	484,870	371,810	682,377	57	53	60	20,310	15,574	28,584
Food	4,855	5,267	5,883	2	2	3	203	221	246
Chemicals	1,173	247	176	5	2	3	49	10	7
Petroleum	15,604	1,165	46	1	2	1	654	49	2
Rubber	122	90	107	1	1	1	5	4	4
Stone, clay, glass	0	0	0	0	0	0	0	0	0
Primary metals	697	0	438	2	0	7	29	0	18
Fabricated metals	2,166	14,288	18,827	10	8	8	91	599	789
Non electrical machinery	953	510	714	9	7	5	40	21	30
Electrical/electronic	439,134	329,175	640,279	7	9	11	18,395	13,789	26,820
Transportation	2,400	1,650	1,201	1	1	2	101	69	50
Instruments	17,492	17,026	12,045	13	15	17	733	713	505
Misc. manufacturing	38	2,000	0	1	1	0	2	84	0
Trans./Com./Utilities	615	892	1,357	5	5	7	26	37	57
Wholesale trade	4,274	1,090	1,753	20	19	12	179	46	73
Retail trade	2,118	1,675	857	8	5	5	89	70	36
FIRE	0	0	33	0	0	1	0	0	1
Services	73,809	69,968	74,245	35	41	40	3,092	2,931	3,110
Business services	9,085	201	1,819	10	11	12	381	8	76
Education	52,321	1,913	59,205	2	3	3	2,192	80	2,480
Engineering	11,219	11,532	14,124	16	19	16	470	483	592
NEC	2,588	3,812	2,488	14	30	14	108	160	104

Source: U.S. Department of Defense, Prime Contract Awards by State, County, Contractor, and Place, annual; Pennsylvania Joint State Government Commission, Report of the Task Force on Defense-Related Industries, 1993; and authors' calculations.

Table C3
Estimating Jobs in Pittsburgh -- Pittsburgh Region -- by SIC code

	Prime Contracts ($ 000s)			Number of Firms			Number of jobs		
Sector	1991	1992	1993	1991	1992	1993	1991	1992	1993
Total	641,717	520,986	807,756	217	219	205	26,881	21,823	33,836
Mining	1564	0	0	1	0	0	66	0	0
Construction	32,664	47,118	15,534	16	16	18	1,368	1,974	651
Manufacturing	514893	390,693	698,065	87	84	85	21,568	16,365	29,241
Food	4,855	5,267	5,883	2	2	3	203	221	246
Chemicals	1,723	580	569	6	4	4	72	24	24
Petroleum	15,604	1,165	46	1	2	1	654	49	2
Rubber	418	1,076	345	5	6	3	18	45	14
Stone, clay, glass	0	28	0	0	1	0	0	1	0
Primary metals	1,064	1,000	991	4	3	9	45	42	42
Fabricated metals	3,920	16,291	20,115	16	13	12	164	682	843
Non electrical machinery	4,060	1,865	2,166	22	19	15	170	78	91
Electrical machinery	440,842	330,772	641327	8	10	12	18,466	13,855	26,864
Transportation	2,442	1,650	1201	2	1	2	102	69	50
Instruments	39,655	28,511	24,695	18	19	22	1,661	1,194	1,034
Misc. manufacturing	38	2,000	0	1	1	0	2	84	0
Trans./Com./Utilities	663	892	1,357	6	5	7	28	37	57
Wholesale trade	5,325	2,157	2,341	21	24	18	223	90	98
Retail trade	2,118	1675	964	8	5	6	89	70	40
FIRE	0	0	33	0	0	1	0	0	1
Services	76,105	73,146	84,356	39	48	51	3,188	3,064	3,534
Business services	9,316	1,968	7686	11	12	14	390	82	322
Education	52,321	57,424	59,354	2	6	6	2,192	2,405	2,486
Engineering	11,459	12,166	15,849	17	21	22	480	510	664
NEC	8,384	5,303	5,237	29	40	19	351	222	219

Source: U.S. Department of Defense, Prime Contract Awards by State, County, Contractor, and Place, annual; Pennsylvania Joint State Government Commission, Report of the Task Force on Defense-Related Industries, 1993; and authors' calculations.

Table C4
Projected Change in U.S. Defense-Related Employment
By Sector, 1991-1997

Mining	-33.1
Construction	-11.6
Manufacturing	37.4
Trans./communications/utilities	33.2
Wholesale trade	25.7
Retail trade	25.7
FIRE	21.4
Services	17.1
Other	29.5

Source: Defense Conversion Commission, Adjusting to the Drawdown, Appendix F.

APPENDIX D: List of Military Facilities in the Pittsburgh Region

99th Army Reserve Command:

1. Charles E. Kelley U.S. Army Support Facility, Oakdale
2. U.S. Army Readiness Group & Headquarters Pittsburgh, Oakdale
3. North Hills U.S. Army Reserve Center(USARC) & Annex, Allison Park
4. Beaver Falls USARC, Beaver Falls
5. Brownsville USARC, Brownsville
6. Butler USARC, Butler
7. Greensburg USARC, Greensburg
8. New Kensington Mem USARC, New Kensington
9. U.S. Army Support Element, Neville Island
10. PVT. Sterling Morelock USARC, Pittsburgh
11. COL. Harold E. Steele USARC, Pittsburgh
12. LTG Malcolm Hay USARC, Pittsburgh
13. Uniontown USARC, Uniontown
14. Washington USARC, Washington
15. AMSA 104 (G), Greensburg,
16. AMSA 105 (G), Oakdale

911th Airlift Wing:

1. Greater Pittsburgh International Airport, Moon

Navy/Marines:

1. U.S. Navy and Marine Corps Reserve Readiness Center, North Versailles

Other:

1. Department of Defense Office - Federal Building, Pittsburgh
2. Defense Logistics Agency - Federal Building, Pittsburgh,