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THE ECONOMIC IMPACT—INDUSTRIAL AND REGIONAL —OF AN ARMS CUT*

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I. The Problem and its Analytical Formulation

1. The object of the computations described in this paper was to determine what effect a hypothetical reduction in military accompanied by a compensating increase in non-military demand would have on the industrial composition and regional distribution of employment in the continental United States. By compensation is meant the maintenance of the total level of employment in the economy.

In a paper published four years ago,¹ input-output analysis was used to estimate the effect of such a change in the structure of final demand on the industrial distribution of the labor force for the country as a whole. The present study carries that inquiry one step further. The impact of the hypothetical shift from military to civilian demand is projected here not only in inter-industrial, but also in inter-regional terms. Specifically, the territory of the continental United States has been subdivided into 19 distinct regions, and the shift in the industrial composition of output and employment was assessed for each one of them.

Had we attempted to study each region separately and then simply to add the results to arrive at corresponding aggregates for the country as a whole, the total national output figures and the corresponding total input figures for each distinct category of goods and services could not have been expected to match. In other words, the results of such isolated regional studies would not comprise a consistent

picture of the national economy as a whole. The simple scheme of multi-regional analysis on which the present computations are based provides for simultaneous balancing of all input-output flows from the point of view of each individual region, as well as for the U.S. economy as a whole.

For some goods — let them be called Local — a balance between production and consumption tends to be established separately within each region; for other goods — let them be identified as National — such a balance typically is achieved only for the country as a whole. Within each region the output of a National good might exceed or fall short of its total input, the deficit or surplus being evened out by exports to or imports from other regions. Retail Trade and Auto Repair Services are characteristically Local industries while Coal Mining and Aircraft Manufacturing are typically National. The difference between the two obviously should be explained in terms of the relative mobility or transportability of their output.

To separate National industries from the Local, all sectors were arranged in order of the increasing magnitude of inter-regional, as compared with the intra-regional, trade of their respective products. Then, an admittedly somewhat arbitrary cut was made across that array, setting apart the Local industries, serving mainly users located within the region in which production occurs, from the National industries, supplying the entire national or even international market, whose products typically are being shipped for this reason in comparatively large amounts across regional lines.²

* All authors were members of the Harvard Economic Research Project. This study was financed by the National Science Foundation and the Rockefeller Foundation. The computations were performed on the IBM 7094 at the Harvard Computing Center.

¹ Wassily Leontief and Marvin Hoffenberg, "The Economic Effect of Disarmament," *Scientific American*, April 1961.

² The concluding observations at the end of this article describe a possible refinement of this approach which introduces a graduated distinction between National, Regional and Sub-regional industries and goods.

2. The multi-regional input-output computation itself can be visualized best as being performed in three distinct, successive rounds. The first consists of a conventional input-output calculation designed to determine the direct and indirect effects of the given shift from military to non-military final demands on the total output of all — that of Local as well as of National — goods for the country as a whole. The regional distribution of these total figures is determined in the second and the third rounds. All basic information on the input structure of each Local or National industry used again and again throughout these computations stems from the same large input-output table of the American economy. This common source of structural data ensures the internal consistency of all the final results.

For National industries the regional apportionment of the increase or the reduction in the total U.S. output is based in each instance on a simple, but in the first approximation, well-justified assumption of a uniform percentage change. For example, if the first stage computation indicates that as a result of curtailed military purchases and a simultaneous expansion of deliveries serving various types of final civilian demand, the total U.S. output of Electronic Equipment will fall by 5 per cent, then in the second stage that aggregate cut is allocated among the different regions on the assumption of an equal 5 per cent cut applied across-the-board. That presupposes, of course, knowledge of the actual output and employment levels maintained by the National industries in each region before the shift occurs.

The third and last step determines the geographic distribution of changes in the level of activities of Local industries producing goods for which the balance between supply and demand tends to be maintained within each region with relatively limited recourse to inter-regional trade. The input requirements that must be covered in each region by the output of its Local industries comprise: a) deliveries to final military and civilian users located in the same region, b) input requirements of the National industries operating in it, and c) the input requirements of the Local industries themselves.

Thus, the calculation of regional outputs of Local industries requires not only a knowledge

of final demand for the U.S. as a whole, but also a breakdown of military and non-military final demand by regions. While changes in the level of final deliveries of Steel, Chemicals and other National goods need be specified only for the country as a whole, the given shifts in military procurement and civilian purchases of Electric Power, Gas and Water, Office Supplies and other Local goods have to be specified separately for each region before the analysis of their regional impact can begin. The amounts of Local goods absorbed in each particular region by National industries operating in it can be ascertained easily by applying appropriate sets of technical input coefficients to the regional output figures derived for all National industries in the previous, second round of computations.

The regional output levels of Local industries, finally, can be derived through separate input-output computations in which the deliveries of Local goods to final users located in each region and to National industries operating within it play the role of a given bill of goods.

3. In this last stage of the multi-regional analysis, Households is treated as one of the Local industries — the largest one in fact. The output of that industry consists of labor services of various types. In contrast to previous computations of this kind, *for reasons of practical convenience the quantities of labor services are measured in this study not in man years but rather in terms of the total wage and salary payments received for them.*

The inputs of the Household sector are consumer goods purchased by it. Its input structure, like the input structure of any other industry, can be described accordingly by an array of consumption coefficients, each of which represents the amount of one particular type of good absorbed by the Household sector per unit of its own output, *i.e.*, per dollar of salaries and wages received by it.

That means, of course, that in the third stage of the multi-regional input-output computations, the given regional bill of goods is re-defined so as to include all military and non-military governmental purchases and private investment expenditure, but not the private consumption expenditures. Since Households

is treated at this stage of the computations as one of the Local industries, all goods absorbed by it appear not as final deliveries, but rather as components of that part of all output of each sector that serves indirect demand.

The internal consistency of the entire procedure is demonstrated by the fact that, if separated from deliveries to other Local and all the National industries and summed for the country as a whole, these regional inputs into Households will match exactly the private consumption column of the final bill of goods introduced into the computation in its very first stage.

4. That bill of goods itself, of course, must reflect the anticipated effect of a hypothetical reduction of military and a corresponding increase in civilian expenditures. For purposes of the present analysis, such a shift has been assumed to have occurred in the year 1958, which at the present time is the latest year for which a detailed input-output table of the U.S. economy has been compiled. The final bill of goods is represented by three components: Military Purchases, Private Household Consumption, and Non-Household Civilian final demand.³ The latter demand "contains" non-military deliveries to the federal, state and local governments, private and public gross investment, and net exports.

The hypothetical cut in military expenditure is visualized to take the form of a 20 per cent across-the-board reduction in each kind of military purchase. With the total 1958 defense expenditure included in the military vector amounting to 31.3 billion dollars, that means reducing it by 6.3 billion to 25.0 billion dollars.³ The compensating rise in non-military demand was assumed, on the other hand, to be represented by a proportional across-the-board increase in all kinds of non-military final deliver-

ies. Its total magnitude is chosen deliberately with the view of maintaining the total level of employment, or rather the combined wage and salary bill of all industries, at its original — that is, the actually observed — 1958 level.

Had the military shopping list contained the same goods and in the same proportions as the civilian, each million dollars' worth of additional non-military demand could re-employ the same number of hands and heads — commanding the same amount of wages and salaries — as would have been released by each million dollars' worth of military budget cut. However, the military product mix is very different from the civilian. A comparison of the results of two auxiliary input-output computations has shown that in 1958 the total wages and salaries paid for all the labor engaged directly and indirectly in production of one million dollars' worth of goods and services combined in the proportion demanded by the military are some 21 per cent larger than wages and salaries paid for labor inputs required for production of one million dollars' worth of outputs delivered in amounts reflecting the average product mix of all non-military final users.

Thus, it would take \$7.6 billion of additional civilian demand to compensate the cancellation of \$6.3 billion worth of military spending. Non-military final demand, as defined for this study, amounted in 1958 to \$418.0 billion.³ Stated in percentage terms, the shift in the economic impact as described below combines a 20 per cent cut in military purchases with a 1.8 per cent increase in the amount of goods and services absorbed by each of the two categories of final civilian users.

With the total labor input and wage bill remaining constant, a 1.8 per cent increase in the amount of all goods and services allocated to private consumption can be described as a proportional increase in all consumption coefficients. Accordingly, the column of technical coefficients used in the last stage of the multi-regional input-output computations to describe the input requirements of Households was obtained by raising by 1.8 per cent the consumption coefficients derived from the 1958 U.S. input-output table.

A translation of the theoretical scheme described above into concise mathematical lan-

³ Morris R. Goldman, Martin L. Marimont, and Beatrice N. Vaccara, "The Inter-Industry Structure of the United States, A Report on the 1958 Input-Output Study," *Survey of Current Business*, U.S. Department of Commerce, November 1964, Washington, D.C. A detailed description of the definitions and composition of the final demand vectors used in this study is given in Section IV. The vectors only include estimates of final purchases from endogenous industries, *e.g.*, the military vector does *not* include purchases from new construction since this is exogenous in this study. Thus, the sum of the elements included in the vectors does not represent all Final Demand. See footnotes to Table A-3.

guage is presented below. A reader not interested in details of computational procedure can skip Part II and proceed directly to Part III containing a summary of the principal conclusions of this study.

II. Mathematical Formulation of a Linear Multi-regional Input-Output System ⁴

1. Notation

The multi-regional economy described below consists of (n) National and ($l-1$) Local industries. When Households is treated as an endogenous sector the total number of Local sectors is (l). The locational distribution of all inputs and outputs is specified in terms of (r) distinct regions.

The quantities of all goods, including the labor services, are measured in physical units defined in each instance as "the amount purchasable for \$1, at 1958 prices."

Capital letters are used to designate rectangular and square matrices, low case latin letters to describe column and row vectors, and greek letters to define scalar magnitudes, except matrix dimensions, which are in parentheses.

A — square, ($n+l-1$) by ($n+l-1$), matrix of input coefficients of all National and Local industries, excluding Households.

A^* — $\left[\begin{array}{c|c} A_{NN}^* & A_{NL}^* \\ \hline A_{LN}^* & A_{LL}^* \end{array} \right]$ augmented square, ($n+l$) by ($n+l$), matrix of input coefficients of all sectors including Households, partitioned into:

A_{NN}^* — square ($n \times n$) submatrix of input coefficients describing flows from National to National industries.

A_{NL}^* — rectangular ($n \times l$) submatrix of input coefficients describing flows from National to Local sectors, including Households.

A_{LN}^* — rectangular ($l \times n$) submatrix of input coefficients describing flows from Local industries, including Households, to National industries.

A_{LL}^* — square ($l \times l$) submatrix of input coefficients describing flows from Local to Local industries, including Households.

w' — row vector of ($n+l-1$) labor input coefficients

of all National and Local industries, excluding Households.

c_0^* — column vector of the original ($n+l$) consumption coefficients, *i.e.*, the input coefficients of Households, including the coefficient describing inputs from Households to Households.

c_1^* — column vector of ($n+l$) consumption coefficients, including the input from Households to Households, adjusted to the change in the level of living which has resulted from the shift in final demand.

x — column vector of ($n+l-1$) total outputs of National and Local industries, excluding Households.

x^* — $\left[\begin{array}{c} x_N \\ \hline x_L^* \end{array} \right]$ column vector of ($n+l$) total outputs of all sectors partitioned into:
 x_N column vector of (n) total outputs of National industries, and
 x_L^* column vector of (l) total outputs of Local industries, including Households.

\hat{X}_N — diagonal matrix with the total outputs of National industries entered on its principal diagonal in the same order in which they are shown in x_N .

m, h, q — three column vectors of ($n+l-1$) quantities, measured in 1958 dollars, of National and Local goods, excluding labor, representing respectively the Military, the Household and the Non-Household Civilian component of the original, total final bill of goods.

m^*, q^* — two column vectors of ($n+l$) quantities of Military and Non-Household Civilian final demand, including labor.

ν_M, ν_H, ν_Q — three amounts of labor directly entering respectively into the Military, the Household and the Non-Household Civilian demand components of the original, total final bill of goods.

\hat{M}_L^*, \hat{Q}_L^* — two diagonal ($l \times l$) matrices of quantities of Local goods, including labor, representing respectively the Military and the Non-Household Civilian component of the original, total final bill of goods.

X_N^P — rectangular ($n \times r$) matrix each column of which shows the output levels of all National industries in one particular region.

P_N — rectangular ($n \times r$) matrix each column of which shows what fractions of the total output of each of the National industries are produced in one particular region.

D_M^*, D_Q^* — rectangular ($l \times r$) matrices the columns of which represent respectively proportions of the total Military and of Non-Household Civilian final demand for the products of different Local industries, including Households, absorbed in one particular region.

⁴ The first — materially different, but formally similar to the present — version of that system was presented in Wassily Leontief (Ed.), *Studies in the Structure of the American Economy*, (Oxford University Press: New York, 1953), Ch. 4.

- α — the ratio of the magnitude of each element of total final Military demand after the shift from military to non-military expenditure to its magnitude before the shift.
- β — the ratio of the magnitude of each element of the Household and of the Non-Household Civilian components of total final demand after the shift from military to non-military expenditures to its magnitude before the shift.

2. Derivation of Computational Formulae

Basic relationship between the total final bill of goods — comprising deliveries to Household, Non-Household Civilian and Military final demand — and the total outputs of the National and Local industries, excluding Households:

$$x = (I - A)^{-1} [h + q + m]. \tag{1}$$

Corresponding relationship between the original, total level of employment and the combined labor inputs indirectly absorbed by all National and Local industries plus those directly entering final demand:

$$v = w'x + v_H + v_Q + v_M. \tag{2}$$

Relationship between the new final bill of goods and the new total level of employment that — by assumption — equals the original level of employment:

$$v = w' (I - A)^{-1} [\beta(h + q) + \alpha m] + \alpha v_M + \beta(v_H + v_Q). \tag{3}$$

Solution of the equation (3) above for β , with all other magnitudes appearing on the right-hand side considered as given:

$$\beta = \frac{v - \alpha[w' (I - A)^{-1} m + v_M]}{w' (I - A)^{-1} (h + q) + v_H + v_Q}. \tag{4}$$

Derivation of the new vector of the input coefficients of the Household sector through adjustment of the original vector to the shift in the level of living:

$$c_1^* = c_0^* \cdot \beta. \tag{5}$$

Derivation of the new ⁵ total output levels of National and Local industries, including Households:

$$x^* = (I - A^*)^{-1} [\beta q^* + \alpha m^*]. \tag{6}$$

Derivation of the new regional outputs of National industries from their new total outputs:

$$X_N^R = \hat{X}_N P_N. \tag{7}$$

⁵Strictly speaking, a subscript should be used to distinguish old and new outputs.

Derivation of the new regional outputs of Local industries, including Households:

$$X_L^{*R} = (I - A_{LL}^*)^{-1} [A_{LN}^* \cdot X_N^R + (\beta \hat{Q}_L^* \cdot D_Q^* + \alpha \hat{M}_L^* D_M^*)]. \tag{8}$$

The sum of the last two terms is a rectangular ($l \times r$) matrix each column of which represents the new combined Military and Non-Household Civilian final demand for the products of Local industries — including Households — in one particular region. The multiplication of $\beta \hat{Q}_L^*$ by D_Q^* and $\alpha \hat{M}_L^*$ by D_M^* are analogous to that performed on the right-hand side of (7); it involves application of given sets of regional distribution coefficients to previously obtained total figures of final Military and Non-Household Civilian deliveries of each kind of Local good. Any other method of determining the amounts of Local goods absorbed by Military and Non-Household Civilian final demand in each region would be equally acceptable, provided the regional figures add up to the corresponding elements of the diagonal matrix $(\beta \hat{Q}_L^* + \alpha \hat{M}_L^*)$; *i.e.*, provided the sum of all regional deliveries of each Local good equals the corresponding total amount of Military and Non-Household Civilian deliveries for the country as a whole.

One of the l rows of the rectangular matrix X_L^{*R} on the left-hand side of (8) describes the new regional outputs of the Household sector, that is the level of employment attained in each region after the hypothetical shift in the relative magnitude of the military and of the non-military components of final demand.

The formulae presented above describe the computations of regional output and employment figures after the shift from military to non-military expenditures. If the proportionality factors α and β are set equal to 1, the formulae describe the state of the economy and, in particular, the level and regional distribution of output and employment before the shift.

III. Summary of the Principal Findings

1. When the numerical conclusions presented are based on a straightforward application of a systematically developed theoretical theme, the results need little additional explanation. In

the present instance most of the explaining was done when the procedure was described by which the primary factual information fed into an analytical machine is transformed into final figures describing the results of the entire computation. They appear in the form of tables which describe in great detail changes in the inter-industrial and the inter-regional distribution of output and employment that would be brought about by a hypothetical 20 per cent reduction in the military bill of goods, combined with a compensating proportional increase in the non-military components of the final bill of goods. This non-military demand comprises consumption by private households, total investment, which includes new construction, and non-military governmental expenditures.

A detailed explanation of sources and methods used to obtain the basic matrix of input-output coefficients of all National and Local industries, to ascertain the actual composition of the military and non-military vectors of the final bill of goods for the year 1958 and last, but not least, to determine the regional distribution of the outputs of National industries and of the final military and non-military demand for locally produced goods will be found in Section IV below.

The number of industries in terms of which the productive apparatus of the American economy is described is 58, and the number of regions into which the territory of the continental United States was sub-divided for purposes of this description is 19; thus, the total number of output and employment figures resulting from this multi-regional input-output computation could exceed one thousand; in fact, since not all industries are present in all regions, the detailed tables reproduced in the Appendix contain a certain number of empty cells.

Since the hypothetical shift in the composition of final demand was balanced so as to leave the overall level of employment for the country as a whole the same as it was before, its economic impact takes the form of shifts in the labor force among different industries and among different regions.

The magnitudes of changes in output and employment that we are about to examine are — when expressed in relative terms — at most of

the order of a few percentage points up or a few percentage points down; in most instances, they are even smaller. Considering, however, that an unemployment rate of 5.5 per cent commonly is interpreted as a sign of serious malfunctioning of our economic system and that an eventual reduction of that figure to 4 per cent has been recognized as one of the major goals of national economic policies, even a half-of-one per cent change in employment level in one region or another must be taken to represent a noteworthy shift. The percentages to be examined may not meet that degree of accuracy, but they should indicate the direction of change in regional employment levels.

TABLE 1.—PERCENTAGE CHANGES¹ IN OUTPUT AND EMPLOYMENT² BY INDUSTRIES, AFTER A COMPENSATED³ 20% CUT IN ARMAMENT EXPENDITURES⁴

Sector Number ⁵	Industry	Percentage Change (%)
36N	Aircraft	-16.05
40N	Ordnance	-15.42
41N	Research and Development	-13.26
34N	Electronics Equipment	- 5.40
29N	Non-Ferrous Metals	- 2.21
38N	Instruments	- 1.59
32N	Electrical Apparatus	- 0.92
37N	Other Transportation Equipment	- 0.23
28N	Iron and Steel	- 0.04
31N	Non-Electrical Machinery	- 0.03
18N	Chemicals	0.15
13L	Maintenance Construction	0.20
24N	Rubber, Plastics	0.30
33N	Appliances, Lighting	0.34
22N	Oil Fields	0.38
23N	Petroleum Products	0.45
3L	Transportation	0.48
21N	Paint	0.48
30N	Fabricated Metals	0.54
11N	Miscellaneous Fabricated Textiles	0.54
19N	Plastics, Synthetics	0.59
26N	Glass	0.81
16N	Paper	0.83
17N	Paperboard Containers	0.93
9N	Miscellaneous Textiles, Rugs	0.97
14L	Government Enterprises	0.98
5N	Coal Mining	0.98
13N	Wood Containers	1.05
27N	Stone and Clay	1.10
1L	Printing, Publishing	1.12
10L	Business Services	1.14
8N	Fabrics, Yarn	1.19
15N	Office Furniture	1.19
20N	Drugs	1.21
35N	Motor Vehicles	1.21
39N	Miscellaneous Manufacturing	1.23
2L	Electricity, Gas, Water	1.24
12N	Lumber, Wood Products	1.26
5L	Communications	1.26

TABLE 1 (continued)

Sector Number ⁵	Industry	Percentage Change (%)
14N	Household Furniture	1.27
12L	Medical, Educational Services	1.31
3N	Forestry, Fisheries	1.33
4L	Trade	1.40
6L	Finance, Insurance	1.48
9L	Auto Repair Services	1.48
8L	Personal Services	1.56
25N	Leather	1.57
7L	Real Estate, Rentals	1.57
2N	Other Agriculture	1.65
11L	Amusements	1.66
10N	Apparel	1.66
6N	Food and Kindred Products	1.66
1N	Livestock	1.67
7N	Tobacco	1.76
17L	Households ⁶	1.81
4N	Agricultural Services	2.14

¹ Each figure represents the change in output and employment in each industry as a percentage of total output and employment in that industry before the arms cut.

² Employment and its regional distribution is measured in each industry by labor earnings.

³ Compensation is assumed to consist of a uniform proportional increase in all components of non-military final demand sufficiently large to maintain the aggregate employment in all sectors (consequently in all regions) taken together unchanged.

⁴ Source of data: Appendix Tables A-6 and A-7.

⁵ Note that the two local sectors which are dummy industries have been omitted from this ranking. N refers to National industry number, L to Local industry number.

⁶ Note that this percentage reflects the 1.81 per cent increase in all consumption coefficients. It represents the change in employment of employees in households such as domestic help or baby sitters.

2. Table 1 describes the impact of a postulated de-militarization of the final demand in terms of individual industries. The percentage figures show that of the 56 sectors listed,⁶ only 10 will experience a reduction in total output and employment; Aircraft, Ordnance and, significantly, Research and Development will take large cuts of over 13 per cent, while Electronic Equipment, Non-Ferrous Metals and Instruments will drop between 1.59 and 5.40 per cent. Among the four other industries registering losses rather than gains is Iron and Steel, which with its token 0.04 per cent cut barely maintains the traditional standing as an armament industry. Positive changes are on the other hand distributed more evenly and among a much larger number of industries.

Food Products, other soft consumer goods, and services gain most, basic industries such as Chemicals, Petroleum Products and Paper, least; Printing and Publishing, Motor Vehicles and other branches of processing show inter-

⁶ Two Local dummy sectors, 15L Office Supplies and 16L Business Travel and Entertainment, are not included in this tabulation.

mediate gains a few points above and below 1 per cent. The skewness of the entire distribution, specifically the bunched negative and widespread positive shifts reflect, of course, the contrast between the specialized nature of military demand and the broad product mix of the civilian.

3. The regional projection of the economic impact of disarmament is summarized in Table 2. As can be seen from the percentage entries,

TABLE 2. — PERCENTAGE CHANGE IN OUTPUT AND EMPLOYMENT BY REGION AFTER A COMPENSATED 20% CUT IN ARMAMENT EXPENDITURES

Region Number	Region	Total Net Change (%) (1)	Total Gross Increase (%) (2)	Total Gross Decrease (%) (3)
19	California	-1.85	0.54	2.39
16	Colorado, New Mexico	-1.40	0.67	2.07
17	Arizona, Nevada, Utah	-1.35	0.69	2.04
9	Maryland, Virginia, Delaware, W. Virginia, D.C.	-1.36	0.66	2.02
14	Texas	-1.00	0.73	1.73
18	Oregon, Washington	-0.81	0.91	1.72
12	Mississippi, Alabama	-0.73	0.89	1.62
8	Georgia, North and South Carolina	-0.57	1.02	1.59
10	Florida	-0.43	1.12	1.55
1	New England	-0.06	1.05	1.11
13	Arkansas, Louisiana, Oklahoma	0.21	1.26	1.05
7	Kansas, Iowa, Nebraska, Missouri	0.44	1.46	1.02
11	Kentucky, Tennessee	0.37	1.31	0.94
2	New York	0.66	1.44	0.78
3	New Jersey, Pennsylvania	0.53	1.26	0.73
15	Idaho, Montana, Wyoming	1.28	1.83	0.55
4	Michigan, Ohio	0.89	1.43	0.54
5	Indiana, Illinois, Wisconsin	0.93	1.46	0.53
6	Minnesota, North and South Dakota	1.54	1.96	0.42
	Total United States	..	1.16	1.16

in 10 of the 19 regions employment can be expected to contract while in the other 9 it will expand. The largest loss, -1.85 per cent, will be experienced in California, the biggest gain, + 1.54 per cent, in the mid-western region comprising Minnesota and the two Dakotas.

Neither the shift from one industry to another, nor the move from one region to another, considered separately, measures the total magnitude of readjustments that will be required of

the members of each regional labor force. Such a measure must take both into account, simultaneously. What is needed is a figure which shows what proportion of all men and women initially employed in all the different industries operating in a given region will lose their jobs and will have to look for new jobs in a different industry in the same region or in another region; in the latter case, the jobs they find in another region might or might not be in the same industry in which they worked before.

The figures entered in Column 3 of Table 2, accordingly, show what proportion of all the wage and salary earners will receive discharge notices and will have to look for new jobs. To emphasize the importance of these figures, the sequence in which the 19 regions are listed on the table reflects the order of decreasing magnitude of these "gross displacement" rates.

California, again, is at the head of the procession with the highest rate of 2.39 per cent, and Minnesota with North and South Dakota ranks lowest with only 0.42 per cent. A comparison of entries in Column 1 with those of Column 3 reveal that one region can experience a larger expansion in the total level of employment than another, but at the same time be subject to a greater stress as measured by the gross displacement figure. According to the computations the New York State region, for example, would expand its total employed labor force by 0.66 per cent while the corresponding figure for the Kentucky-Tennessee region is 0.37 per cent. At the same time 0.78 per cent of the original job holders in New York would have to change their jobs as against 0.94 per cent in Kentucky-Tennessee.

Employment agencies might be interested in the total number of new jobs created in a particular region, *i.e.*, in the sum total of the increases in employment figures of those industries expected to expand in each region. Expressed as percentages of total labor force initially employed in the region, these "gross job gains" figures are entered in Column 2. Strictly speaking, they do not present us with any new information since by definition they can be obtained simply by adding pair-wise the corresponding entries in Column 1 and Column 3.

The regional impacts of disarmament as summarized in Table 2 are described graphically on Chart 1. Each set of bars depicts the impact of the same hypothetical shift from military to non-military demand on the employment situation in one of the 19 regions. The total length of the bar extended downward from the horizontal baseline measures the gross job loss (described in Column 3 in Table 2). The total length of a bar extended upward represents the corresponding gross gain in jobs (described in Column 2 of Table 2). The solidly shaded section of the longer of the two bars shows the difference between their length; in other words, it measures the change in the total level of employment in a particular region. That change is negative when the solid bar extends below the horizontal line, and it is positive when it is above.

The geographic picture confirms the well-known fact that most of the resources serving directly or indirectly Final Military Demand come from the Western, South-Western and South-Eastern regions, while the Mid-West, the Great Lakes region and the North Atlantic and New England states depend to a large extent on civilian demand. A cut in military expenditures, accompanied by an expansion of the non-military bill of goods, thus will create more serious readjustment problems in the first than in the second group of regions.

IV. Data and Methods of Computation

1. The basic concern of this study was to determine the regional, combined with the industrial, effects of a reduction in armaments. Table A-1 gives the industrial classification used. The aggregation of states into 19 regions was chosen to make the data collection and the computations of a manageable size, while maintaining sufficient detail to detect regional differences.

The "A" matrix consisted of a domestic-base, 1958 80-order interindustry coefficient matrix made available by the Office of Business Economics in November 1964 and aggregated to 60 sectors at the Harvard Economic Research Project.⁷ New Construction coefficients were re-

⁷ The 60-sector classification is given in Table A-1 distinguishing between National and Local industries. A column of import coefficients also was obtained from the Department of Commerce for use in the calculations.

Ordnance (40N), the entire Federal Government final demand was put in the Military final demand vector. For the remaining sectors, each item in Military Prime Contracts which served as a control total for Military purchases from a particular group of industries was distributed in the proportion the sectors were to one another in the total Federal Government bill of goods, or in the proportion that the Department of Defense payrolls were to other Federal Government payrolls.¹²

The three vectors of final demand are shown in Tables A-2 and A-3.¹³ The next step (represented earlier as equation 3) was to establish the control total, ν , the aggregate level of direct and indirect labor earnings in 1958, which was to remain constant throughout the computations. This total included direct earnings in Household, Military, and Non-Household Civilian final demand categories, as well as the direct and indirect earnings received from the endogenous sectors. Earnings were defined to include wages and salaries and income of unincorporated enterprises, with a fixed markup of 20 per cent in all but a few sectors to account for consumer expenditures by those with incomes from sources other than employment. Such an even markup does not affect the role of earnings as a measure of labor input.

Since ν was to remain constant, the drop in total labor earnings caused by the decrease in military spending had to be offset by an increase in the other components of final demand which would produce a compensating increase in labor earnings. The postulated value for α was 0.8; then using equation (4), β was determined to be approximately 1.02.¹⁴ Earlier,

also was assigned zero Military final demand since the large entry for this sector in the total Federal Government vector represented operations of the Commodity Credit Corporation. Since sectors (1N), (2N), and (3N) now had zero elements in the Military vector, Agricultural Services (4N) also was assumed to have zero Military final demand.

¹² When it could be assumed that military and non-military expenditures would parallel closely the number of workers in each sector.

¹³ Households was separated from the other final demands, because in the later calculations this sector would become endogenous.

¹⁴ Therefore, a reduction of 20 per cent in Military expenditures was compensated by an approximate 2 per cent increase in the Household and Non-Household Civilian components of final demand.

the output and labor earnings generated by the three components of final demand were calculated to determine what the requirements actually were in 1958 (referred to as before the shift); now, the new requirements associated with the new final demands (referred to as after the shift) were estimated. The next step was to calculate the regional distribution of labor earnings both before and after the shift.

By including Households as an endogenous sector in the subsequent computations, the repercussion effect of household incomes and expenditures on the rest of the industries could be taken into account. Matrix A^* had to be constructed separately for the base year 1958 and for the situation after the level of living was increased by 1.81 per cent as part of the compensation for the arms cut. In both cases, it was formed by adding a row of labor coefficients and a column of consumption coefficients.

The labor coefficients were obtained by dividing wages and salaries plus income of unincorporated enterprises, inflated by 20 per cent, for each industry by output in that industry.¹⁵ The column of consumption coefficients for 1958 was obtained by dividing the deliveries from each industry to Households (h) by the total amount of labor earnings for the country as a whole (ν).¹⁶ The elements of this column of consumption coefficients were multiplied by 1.81 to obtain the adjusted column. The new diagonal element of the labor coefficient row and the consumption coefficient column was obtained by dividing direct earnings in Households, (ν_H), by the figure ν .

Then, the two new A^* matrices — one matrix containing the original consumption coefficients, the other the adjusted consumption coefficients — were partitioned into four submatrices by dividing all industries into two categories: National and Local.¹⁷ In the classification used, there were 41 National industries

¹⁵ See Table A-2, Column 2. Sources for labor earnings are given in Table A-10.

¹⁶ See Table A-2, Column 1. Consumption coefficients after the shift can be obtained by multiplying each element of this column by 101.8 per cent.

¹⁷ The division was based upon the data given in Charts 17 and 19, pp. 144 and 146 of Wassily Leontief (Ed.), *Ibid.*, showing the proportion of the output of different industries which is consumed within a region and that which is exported for two types of regions: states and census divisions. A diagram of the partition is shown in Section II.

and 17 Local industries, including Households.¹⁸

2. The regional distribution of the output of National industries, X_N^R , was obtained by directly allocating the share of national output to a region in proportion to that region's share in the productive capacity of a particular industry.¹⁹ The change in labor earnings by region for National industries was determined by subtracting the regional distribution of outputs before the shift from the distribution of outputs after the shift and multiplying by the labor coefficients.²⁰

The first step in establishing the level of output of each Local industry in each region was to distribute the final demand for Local industries by regions. Military demand was distributed according to Department of Defense payrolls in each region. Non-Household Civilian final demand was subdivided into its seven component bills of goods, each one was distributed according to a factor representing the importance of that final demand in a particular region, and the seven resulting matrices were added.²¹

Then, the output in each Local industry in each region was obtained by inserting the appropriate matrices and vectors on the right-hand side of equation (8). Outputs of Local industries before the shift were subtracted from the outputs after the shift and the result was multiplied by the labor coefficients to give the change in labor earnings in Local industries.²² The total change in labor earnings by regions, finally, was obtained by adding the change occurring in Local industries in a region to that occurring in National industries and to that

originating within the Military and Non-Household Civilian sectors of the economy.²³

V. Concluding Observations on Further Research

The same analytical scheme that permitted us to assess the economic implications of a hypothetical step toward disarmament, implemented by the same body of factual data, also can be used for evaluating the probable effect of specific measures of economic policies intended to mitigate the stresses of the transitional period. Such measures are usually designed to modify directly or indirectly the level, the composition and the regional distribution of the new civilian bill of goods. To assess their effect on the inter-industrial and inter-regional distribution of outputs and employment, it will be necessary only to repeat the sequence of computations described above with these re-adjusted versions of the final bill of goods. Whenever information on specific military budget cuts becomes available, this information can replace the hypothetical assumption of the proportional 20 per cent cut in military spending and the compensating 2 per cent increase in civilian purchases.

The following two refinements can be introduced into the procedure described above without changing the analytical basis of the general approach. The admittedly rigid assumption that whenever the total output of a National good goes up or down, it increases or decreases in the same proportion in all regions can be relaxed. After completion of the three-stage computation described above, the new regional distribution of consumption of each National good can be determined and then compared with the old. Some regions will turn out to be increasing their relative shares at the expense of the others. Accordingly, the geographic distribution of the output can be expected to be affected by this, at least to some extent. If the demand for steel were to contract in a Western but to expand in the Eastern regions, the share of the latter in the total output of steel might be expected to increase somewhat and the share of the Western mills to fall. To take account of this, a second round of multi-regional input-output computations can be undertaken in

¹⁸ See Table A-1. Since Business Travel and Entertainment and the Office Supply sectors are "dummy" sectors, their assignment to Local industries is arbitrary.

¹⁹ The sources for the P_N matrix, the distribution factors for National industries, are given in Table A-11. The actual distribution factors used are shown in Table A-5.

²⁰ See Table A-6 which includes the change in dollar and in percentage terms. Only one column is needed to represent the percentage changes for National industries since total U.S. demand for the industry's product determines the output within a particular region.

²¹ The sources for the D_o and D_M matrices, the distribution factors for Local industries, are given in Table A-12. Table A-4 contains the regionally distributed final demands.

²² See Table A-7 for dollar and for percentage changes in Local industries.

²³ See Table A-9.

which the set of the regional distribution coefficients applied to each of the National industries would be revised in the light of the numerical results of the first round.

The second refinement of the original procedure consists in breaking the regions into sub-regions.²⁴ The region, for example, which in the present computation includes Illinois, Indiana and Wisconsin can be subdivided into two parts, one comprising Illinois and Indiana and the other — Wisconsin. The percentage figures describing the participation of these three states in the total production of each National good would have to be split into two separate figures. The output of the industries originally classified as Local can be treated in two different ways. The regional outputs of some Local goods might balance the demand not only for the three states together, but also separately, in each of the two sub-regions. That might be true of automobile repair services and retail trade. Other Local goods, while not moving in sufficiently large amounts across the borders of the three-state region, still might be traded freely between its two parts. For such goods the distribution of the total regional output between the two sub-regions might be described better by a set of constant sub-regional coefficients. On the lower sub-regional level, these empirically determined coefficients would play a role analogous to that assigned to regional coefficients in determining the inter-

regional distribution of the total output of each National good. Without elaborating the technical details of such a complicated analytical scheme, involving not one but several layers of regional breakdowns, it suffices to observe that while the successive rounds of such computations can be introduced one by one without modifying the results of the higher rounds, the overall results always will be internally consistent at every stage.

Finally, an entirely different non-linear, multi-regional input-output scheme was proposed several years ago.²⁵ It is being tested now in the United States, in Latin America, and also in Europe. All of these inter-regional input-output schemes require detailed regional information which is not always available.

Thus, highest priority should be assigned to improvement of the basic data. For statistics which are collected on a national level, a systematic, regional breakdown becomes more and more important. On the other hand, most data collected by local and state organizations — often in connection with various programs of regional economic development — are limited in their usefulness because of lack of comparability with other regional and national statistics. This needs to be remedied by agreement on and compliance with certain common classifications and standards.

²⁵ Wassily Leontief and Alan Strout, "Multi-regional and Input-Output Analysis," Tibor Barna (Ed.), *Structural Interdependence and Economic Development*, (Macmillan: London, 1963), Ch. 7.

²⁴ See Wassily Leontief (Ed.), *Ibid.*, Ch. 4.

APPENDIX TABLES

TABLE A-1, PART I
INDUSTRIAL CLASSIFICATION SCHEME

National Industry	Office of Business Economics 80-Order Sector*	National Industries
1N	1	Livestock
2N	2	Other Agriculture
3N	3	Forestry & Fisheries
4N	4	Agricultural Services
5N	7	Coal Mining
6N	14	Food
7N	15	Tobacco
8N	16	Fabrics, Yarn
9N	17	Rugs, Miscellaneous Textiles
10N	18	Apparel
11N	19	Miscellaneous Fabricated Textile Products
12N	20	Lumber and Wood Products
13N	21	Wooden Containers
14N	22	Household Furniture
15N	23	Office Furniture
16N	24	Paper
17N	25	Paperboard Containers
18N	10, 27	Chemicals
19N	28	Plastics, Synthetics
20N	29	Drugs
21N	30	Paint
22N	8	Oil Fields
23N	31	Petroleum Products
24N	32	Rubber
25N	33, 34	Leather
26N	35	Glass
27N	9, 36	Stone and Clay
28N	5, 37	Iron and Steel
29N	6, 38	Non-Ferrous Metals
30N	39-42	Fabricated Metals
31N	43-52	Non-Electrical Machinery
32N	53, 58	Electrical Apparatus
33N	54, 55	Appliances and Lighting Equipment
34N	56, 57	Communications & Electronic Equipment
35N	59	Motor Vehicles
36N	60	Aircraft
37N	61	Other Transportation Equipment
38N	62, 63	Instruments
39N	64	Miscellaneous Manufacturing
40N	13	Ordnance
41N	74	Research and Development

TABLE A-1, PART II
INDUSTRIAL CLASSIFICATION SCHEME

Local Industry	Office of Business Economics 80-Order Sector*	Local Industries
1L	26	Printing and Publishing
2L	68	Electricity, Gas, Water
3L	65	Transportation, Warehousing
4L	69	Trade
5L	66, 67	Communications

6L	70	Finance, Insurance
7L	71	Real Estate and Rentals
8L	72	Personal and Repair Services, Hotels
9L	75	Auto Repair Services
10L	73	Business Services
11L	76	Amusements
12L	77	Medical and Educational Services
13L	12	Maintenance Construction
14L	78, 79	Government Enterprises
15L	82	Office Supplies
16L	81	Business Travel, Entertainment
17L	..	Households

* Classification for Office of Business Economics 80-Order Sector is taken from: "The Interindustry Structure of the United States," *Survey of Current Business*, November 1964.

TABLE A-2, PART I
CONSUMPTION AND LABOR COEFFICIENTS FOR NATIONAL INDUSTRIES

National Industry	Classification	Consumption Coefficient ¹	Labor Coefficient ²
1N	Livestock	.0065	.3050*
2N	Other Agriculture	.0076	.2926
3N	Forestry & Fisheries	.0009	.3437*
4N	Agricultural Services	..	.3115*
5N	Coal Mining	.0008	.4405
6N	Food	.1423	.1562
7N	Tobacco	.0133	.0691
8N	Fabrics, Yarn	.0022	.2221
9N	Rugs, Miscellaneous Textiles	.0024	.2252
10N	Apparel	.0347	.3441
11N	Miscellaneous Fabricated Textile Products	.0035	.2266
12N	Lumber & Wood Products	.0005	.3211
13N	Wooden Containers	..	.3358
14N	Household Furniture	.0075	.3511
15N	Office Furniture	.0004	.4101
16N	Paper	.0027	.2609
17N	Paperboard Containers	.0001	.2928
18N	Chemicals	.0007	.2484
19N	Plastics, Synthetics	.0000	.2270
20N	Drugs	.0116	.2043
21N	Paint	.0001	.2427
22N	Oil Fields	..	.2122
23N	Petroleum Products	.0226	.1142
24N	Rubber	.0040	.3142
25N	Leather	.0081	.3648
26N	Glass	.0004	.4028
27N	Stone & Clay	.0007	.3454
28N	Iron and Steel	.0001	.3128
29N	Non-Ferrous Metals	.0000	.2300
30N	Fabricated Metals	.0022	.3490
31N	Non-Electrical Machinery	.0015	.3902
32N	Electrical Apparatus	.0009	.3877
33N	Appliances and Lighting Equipment	.0086	.2903
34N	Communications & Electronic Equipment	.0047	.3699
35N	Motor Vehicles	.0286	.1865
36N	Aircraft	.0001	.4136**
37N	Other Transportation Equipment	.0023	.3868
38N	Instruments	.0025	.3928

TABLE A-2, PART I (continued)

National Industry	Classification	Consumption Coefficient ¹	Labor Coefficient ²
39N	Miscellaneous Manufacturing	.0079	.3447
40N	Ordnance	.0005	.2972**
41N	Research and Development	..	.0568

TABLE A-2, PART II
CONSUMPTION AND LABOR COEFFICIENTS FOR
LOCAL INDUSTRIES

Local Industry	Classification	Coefficient ¹ Consumption	Labor Coefficient ²
1L	Printing and Publishing	.0076	.4624
2L	Electricity, Gas, Water	.0251	.1979
3L	Transportation, Warehousing	.0262	.5181
4L	Trade	.1900	.6152
5L	Communications	.0134	.4315
6L	Finance, Insurance	.0365	.4891
7L	Real Estate and Rentals	.1242	.0516
8L	Personal and Repair Services, Hotels	.0294	.6003
9L	Auto Repair Services	.0136	.1966
10L	Business Services	.0058	.3975
11L	Amusements	.0102	.3590
12L	Medical and Educational Services	.0634	.6131*
13L	Maintenance Construction	..	.3049
14L	Government Enterprises	.0029	.4488*
15L	Office Supplies
16L	Business Travel, Entertainment
17L	Households	.0108	.0108*

¹ Column vector of Personal Consumption Expenditure coefficients which became endogenous for the last part of computations. Consumption coefficients obtained from row distribution of final demands: "The Interindustry Structure of the United States," *Survey of Current Business*, November 1964, Table I, p. 21.

² Row vector of labor input coefficients after adjusting for interest and dividends. Those marked with * were not adjusted for interest and dividends. Those marked ** had special calculations made for interest and dividends. Labor coefficients: sources used to obtain uninflated coefficients are given in Table A-10.

TABLE A-3, PART I
FINAL DEMANDS FOR NATIONAL INDUSTRIES

National Industry No.	National Industries	Military ¹ (\$ Millions)	Non-Household Civilian ² (\$ Millions)
1N	Livestock	..	396.4
2N	Other Agriculture	..	3170.3
3N	Forestry & Fisheries	..	- 393.0
4N	Agricultural Services
5N	Coal Mining	..	367.0
6N	Food	132.2	389.9
7N	Tobacco	..	383.7
8N	Fabrics, Yarn	54.3	- 147.7
9N	Rugs, Miscellaneous Textiles	5.0	- 259.4
10N	Apparel	42.8	66.4
11N	Miscellaneous Fabricated Textile Products	103.7	10.6
12N	Lumber & Wood Products	..	2919.5
13N	Wooden Containers	1.2	- 11.3
14N	Household Furniture	17.7	493.3
15N	Office Furniture	15.1	1161.4
16N	Paper	43.6	- 378.5
17N	Paperboard Containers	2.1	15.6
18N	Chemicals	294.0	1353.3
19N	Plastics, Synthetics	2.8	256.8
20N	Drugs	90.4	559.1
21N	Paint	1.7	218.6

22N	Oil Fields	..	- 1208.0
23N	Petroleum	664.9	1222.5
24N	Rubber	78.8	621.2
25N	Leather	21.7	51.2
26N	Glass	1.9	86.5
27N	Stone & Clay	15.2	4618.4
28N	Iron and Steel	46.8	1950.4
29N	Non-Ferrous Metals	213.6	237.0
30N	Fabricated Metals	89.5	7396.6
31N	Non-Electrical Machinery	421.9	12975.5
32N	Electrical Apparatus	224.8	2314.3
33N	Appliances & Lighting Equipment	33.7	1253.0
34N	Communications & Electronic Equipment	1363.8	1532.0
35N	Motor Vehicles	122.8	3920.0
36N	Aircraft	6488.4	589.7
37N	Other Transportation Equipment	264.1	1776.6
38N	Instruments	277.2	1478.0
39N	Miscellaneous Manufacturing	22.6	449.2
40N	Ordnance	2263.0	100.0
41N	Research & Development	3643.7	1496.3

TABLE A-3, PART II
FINAL DEMAND FOR LOCAL INDUSTRIES

Local Industry No.	Local Industries	Military ¹ (\$ Millions)	Non-Household Civilian ² (\$ Millions)
1L	Printing and Publishing	52.5	282.2
2L	Electricity, Gas, Water	50.8	933.9
3L	Transportation, Warehousing	1037.7	5414.7
4L	Trade	493.2	11129.8
5L	Communications	27.1	947.3
6L	Finance, Insurance	..	689.2
7L	Real Estate and Rentals	18.2	2043.9
8L	Personal and Repair Services, Hotels	35.8	291.9
9L	Auto Repair Services	18.6	448.6
10L	Business Services	82.4	3749.5
11L	Amusements	2.5	251.6
12L	Medical and Educational Services	95.1	391.3
13L	Maintenance Construction	936.5	349.4
14L	Government Enterprises	101.4	218.6
15L	Office Supplies	43.2	172.0
16L	Business Travel, Entertainment	..	62.1
17L	Households	11198.0	47695.0
Total All Industries (National and Local)		31258.0	131647.8

¹ When this study was begun, specific data was not available for the Military final demand vector; therefore, the dollar amounts are estimates developed from adjusted control totals given for various sectors in *Military Prime Contract Awards and Subcontract Payments*, July 1962-June 1963, Office of the Secretary of Defense, Tables 6 and 7. The vector only includes estimates of final purchases from industries defined as endogenous for this study. Purchases by the Military on Prime Contracts differ from Military purchases defined by the Office of Business Economics. Some of these differences are explained in Hearings before the Subcommittee on Defense Procurement of the Joint Economic Committee, Congress of the United States, June 12, 1961, "Progress Made by the Department of Defense in Reducing the Impact of Military Procurement on the Economy," p. 141 and in the source cited above, p. 48.

² Row distributions of final demand were used to derive the final demand columns other than New Construction and Military. "The Interindustry Structure of the United States, . . ." *Survey of Current Business*, November 1964, Table 1, p. 21. Only the percentage distributions were released by the Office of Business Economics at the time this paper was written. The vector presented above includes New Construction, but excludes Military and Household final demands. The vector also only includes final purchases from the 57 industries defined as endogenous for this study.

TABLE A-4, PART I
MILITARY FINAL DEMAND FOR OUTPUTS OF LOCAL INDUSTRIES
(Millions of Dollars)

Region Number	1	2	3	4	5	6	7	8	9	10
Region	New England	New York	New Jersey, Penn.	Michigan Ohio	Indiana Illinois Wisconsin	Minn. So. Dak. No. Dak.	Iowa Mo. Neb. Kansas	Georgia No. Car. So. Car.	Va., W. Va. Maryland D.C., Del.	Florida
Local Industry										
1 Printing, Publishing	3	2	4	2	2	0	2	5	7	2
2 Electricity, Gas, Water	3	2	3	2	2	0	2	5	7	2
3 Transportation, Warehsng.	53	44	71	38	44	8	44	97	140	37
4 Trade	25	21	34	18	21	4	21	46	67	18
5 Communications	1	1	2	1	1	0	1	3	4	1
6 Finance, Insurance	0	0	0	0	0	0	0	0	0	0
7 Real Estate, Rentals	1	1	1	1	1	0	1	2	2	1
8 Repair Services, Hotels	2	2	2	1	2	0	2	3	5	1
9 Auto Repair Services	1	1	1	1	1	0	1	2	3	1
10 Business Services	4	4	6	3	3	1	4	8	11	3
11 Amusements	0	0	0	0	0	0	0	0	0	0
12 Medical, Educ. Services	5	4	7	4	4	1	4	9	13	3
13 Maintenance Construction	48	40	64	35	40	7	40	88	126	34
14 Government Enterprises	5	4	7	4	4	1	4	10	14	4
15 Office Supplies	2	2	3	2	2	0	2	4	6	2
16 Business Travel	0	0	0	0	0	0	0	0	0	0
17 Households	571	477	769	413	474	86	478	1052	1512	404
Region Total	724	605	974	523	600	109	606	1333	1916	512

Region Number	11	12	13	14	15	16	17	18	19	
Region	Tennessee Kentucky	Alabama Miss.	Oklahoma Louisiana Arkansas	Texas	Montana Wyoming Idaho	Colorado New Mexico	Arizona Nevada Utah	Oregon Wash.	Calif.	U.S. Total
Local Industry										
1 Printing, Publishing	2	2	2	5	0	2	1	2	8	52
2 Electricity, Gas, Water	2	2	2	4	0	2	1	2	7	51
3 Transportation, Warehsng.	33	41	43	92	6	33	27	36	149	1038
4 Trade	16	19	21	44	3	16	13	17	71	493
5 Communications	1	1	1	2	0	1	1	1	4	27
6 Finance, Insurance	0	0	0	0	0	0	0	0	0	0
7 Real Estate, Rentals	1	1	1	2	0	1	0	1	3	18
8 Repair Services, Hotels	1	1	1	3	0	1	1	1	5	36
9 Auto Repair Services	1	1	1	2	0	1	0	1	3	19
10 Business Services	3	3	3	7	0	3	2	3	12	82
11 Amusements	0	0	0	0	0	0	0	0	0	2
12 Medical, Educ. Services	3	4	4	8	1	3	2	3	14	95
13 Maintenance Construction	30	37	39	83	6	30	24	32	135	936
14 Government Enterprises	3	4	4	9	1	3	3	3	15	101
15 Office Supplies	1	2	2	4	0	1	1	1	6	43
16 Business Travel	0	0	0	0	0	0	0	0	0	0
17 Households	353	439	466	991	67	361	288	385	1613	11198
Region Total	447	557	591	1257	85	457	365	488	2044	14193

TABLE A-4, PART II
 NON-HOUSEHOLD CIVILIAN DEMAND FOR OUTPUTS OF LOCAL INDUSTRIES
 (Millions of Dollars)

Region Number	1	2	3	4	5	6	7	8	9	10
Region	New England	New York	New Jersey, Penn.	Michigan Ohio	Indiana Illinois Wisconsin	Minn. So. Dak. No. Dak.	Iowa Mo. Neb. Kansas	Georgia No. Car. So. Car.	Va., W. Va. Maryland D.C., Del.	Florida
Local Industry										
1 Printing, Publishing	23	48	32	31	39	9	20	19	32	10
2 Electricity, Gas, Water	60	109	86	89	96	25	53	44	102	29
3 Transportation, Warehsng.	390	816	705	583	682	133	360	390	607	230
4 Trade	710	1187	1296	1263	1464	242	577	518	754	323
5 Communications	59	98	105	105	117	19	48	42	78	22
6 Finance, Insurance	41	80	66	69	79	18	34	25	37	22
7 Real Estate, Rentals	121	182	243	245	273	38	99	92	126	42
8 Repair Services, Hotels	21	33	28	26	28	8	18	17	53	10
9 Auto Repair Services	28	51	43	42	49	11	24	19	44	16
10 Business Services	227	452	357	356	421	94	190	142	290	128
11 Amusements	9	52	14	18	19	3	8	4	12	6
12 Medical, Educ. Services	33	56	47	46	49	12	29	34	48	17
13 Maintenance Const.	301	516	427	426	440	112	266	321	445	154
14 Government Enterprises	24	35	30	26	29	8	20	27	55	12
15 Office Supplies	15	24	21	20	21	5	13	15	24	8
16 Business Travel	2	3	3	3	7	2	3	1	3	5
17 Households	3954	6401	5721	5316	5887	1406	3398	3859	6778	2204
Region Total	6017	10143	9224	8664	9699	2144	5161	5568	9489	3239

Region Number	11	12	13	14	15	16	17	18	19	
Region	Tennessee Kentucky	Alabama Miss.	Oklahoma Louisiana Arkansas	Texas	Montana Wyoming Idaho	Colorado New Mexico	Arizona Nevada Utah	Oregon Wash.	Calif.	U.S. Total
Local Industry										
1 Printing, Publishing	10	9	13	20	3	7	6	11	46	388
2 Electricity, Gas, Water	28	22	38	50	11	21	18	33	125	1039
3 Transportation, Warehsng.	188	170	288	461	58	153	130	236	914	7494
4 Trade	300	255	393	669	104	190	182	362	1329	12118
5 Communications	27	22	33	54	8	14	13	31	106	1003
6 Finance, Insurance	16	12	23	31	8	13	12	20	84	689
7 Real Estate, Rentals	58	49	69	121	15	24	22	64	198	2082
8 Repair Services, Hotels	11	8	13	18	4	8	6	12	44	366
9 Auto Repair Services	12	10	17	23	5	10	9	15	60	487
10 Business Services	91	71	132	179	43	77	72	116	482	3920
11 Amusements	4	1	4	6	1	4	12	4	77	257
12 Medical, Educ. Services	16	15	22	34	5	13	11	19	75	582
13 Maintenance Const.	149	144	201	323	48	120	101	177	697	5368
14 Government Enterprises	13	12	16	27	4	11	9	14	52	422
15 Office Supplies	7	7	10	15	2	6	5	8	33	259
16 Business Travel	1	1	3	3	2	2	3	2	11	62
17 Households	1908	1778	2597	4077	668	1610	1386	2247	9009	70202
Region Total	2840	2586	3872	6112	989	2282	1998	3370	13341	106739

TABLE A-5
DISTRIBUTION FACTORS AND TOTAL OUTPUTS OF NATIONAL INDUSTRIES ¹

Region Number	1	2	3	4	5	6	7	8	9	10
Region	New England	New York	New Jersey, Penn.	Michigan Ohio	Indiana Illinois Wisconsin	Minn. So. Dak. No. Dak.	Iowa Mo. Neb. Kansas	Georgia No. Car. So. Car.	Va., W. Va. Maryland D.C., Del.	Florida
National Industry	Fraction of Industry Total									
1 Livestock	0.027	0.032	0.041	0.054	0.158	0.092	0.217	0.043	0.032	0.010
2 Other Agriculture	0.016	0.016	0.021	0.046	0.087	0.069	0.134	0.087	0.023	0.035
3 Forestry, Fisheries	0.182	0.023	0.030	0.010	0.008	0.005	0.001	0.053	0.121	0.084
4 Agricultural Services	0.083	0.097	0.099	0.088	0.069	0.030	0.050	0.039	0.052	0.037
5 Coal Mining	0.001	0.	0.279	0.054	0.089	0.	0.010	0.	0.365	0.
6 Food, Kindred Products	0.047	0.095	0.107	0.092	0.154	0.039	0.098	0.036	0.043	0.017
7 Tobacco	0.008	0.006	0.152	0.016	0.001	0.	0.	0.390	0.190	0.073
8 Fabrics, Yarn	0.177	0.037	0.104	0.004	0.006	0.001	0.000	0.538	0.048	0.
9 Misc. Textiles, Rugs	0.207	0.084	0.201	0.073	0.081	0.005	0.008	0.189	0.056	0.001
10 Apparel	0.070	0.325	0.190	0.022	0.051	0.007	0.027	0.103	0.040	0.005
11 Misc. Fabricated Textile Prdts.	0.076	0.279	0.149	0.109	0.080	0.012	0.036	0.068	0.034	0.006
12 Lumber, Wood Products	0.049	0.032	0.028	0.036	0.070	0.016	0.023	0.077	0.041	0.016
13 Wooden Containers	0.069	0.037	0.061	0.070	0.102	0.013	0.022	0.116	0.065	0.046
14 Household Furniture	0.060	0.096	0.089	0.077	0.163	0.008	0.026	0.148	0.061	0.020
15 Office Furniture	0.040	0.161	0.104	0.229	0.162	0.010	0.043	0.035	0.045	0.011
16 Paper	0.145	0.101	0.102	0.117	0.136	0.025	0.018	0.065	0.035	0.028
17 Paperboard Containers	0.087	0.143	0.159	0.128	0.166	0.013	0.049	0.050	0.042	0.012
18 Chemicals	0.026	0.068	0.156	0.128	0.075	0.005	0.046	0.041	0.109	0.014
19 Plastics, Synthetics	0.050	0.047	0.139	0.088	0.021	0.006	0.009	0.097	0.234	0.052
20 Drugs	0.048	0.171	0.237	0.112	0.214	0.010	0.054	0.028	0.035	0.002
21 Paints	0.036	0.072	0.216	0.174	0.189	0.013	0.053	0.026	0.023	0.008
22 Oil Fields	0.	0.004	0.014	0.017	0.027	0.005	0.041	0.	0.011	0.000
23 Petroleum Products	0.012	0.017	0.159	0.062	0.140	0.007	0.039	0.004	0.010	0.003
24 Rubber, Misc. Plastics	0.164	0.066	0.121	0.286	0.140	0.005	0.029	0.009	0.033	0.001
25 Leather	0.325	0.172	0.126	0.046	0.121	0.	0.087	0.012	0.027	0.002
26 Glass	0.009	0.149	0.233	0.174	0.139	0.	0.002	0.037	0.113	0.017
27 Stone and Clay	0.055	0.062	0.148	0.142	0.129	0.022	0.067	0.036	0.054	0.025
28 Iron and Steel	0.025	0.052	0.265	0.221	0.197	0.019	0.014	0.004	0.066	0.000
29 Non-Ferrous Metals	0.108	0.080	0.154	0.136	0.140	0.009	0.016	0.006	0.044	0.004
30 Fabricated Metals	0.084	0.080	0.162	0.190	0.196	0.012	0.039	0.011	0.030	0.011
31 Non-Electrical Machinery	0.106	0.105	0.127	0.229	0.220	0.007	0.045	0.012	0.014	0.002
32 Electrical Apparatus	0.084	0.118	0.183	0.180	0.242	0.011	0.041	0.014	0.020	0.005
33 Appliances, Lighting Eqpt.	0.091	0.083	0.128	0.221	0.244	0.012	0.041	0.003	0.019	0.001
34 Electronics Equipment	0.110	0.153	0.216	0.036	0.252	0.006	0.023	0.022	0.034	0.005
35 Motor Vehicles	0.009	0.060	0.060	0.569	0.157	0.004	0.037	0.017	0.017	0.001
36 Aircraft	0.082	0.076	0.049	0.098	0.049	0.005	0.089	0.019	0.035	0.002
37 Other Transportation Eqpt.	0.132	0.061	0.161	0.069	0.119	0.008	0.020	0.009	0.136	0.026
38 Instruments	0.128	0.320	0.174	0.061	0.147	0.043	0.015	0.003	0.013	0.002
39 Misc. Manufacturing	0.181	0.228	0.142	0.106	0.129	0.007	0.037	0.042	0.003	0.006
40 Ordnance	0.075	0.150	0.033	0.062	0.038	0.026	0.042	0.007	0.044	0.018
41 Research and Development	0.052	0.108	0.059	0.031	0.121	0.017	0.011	0.007	0.164	0.014

¹ In all tables an entry of zero followed only by a decimal indicates the cell is empty. An entry consisting entirely of zeros, with no blank space, indicates the cell contains a figure of negligible size.

TABLE A-5 (continued)
DISTRIBUTION FACTORS AND TOTAL OUTPUTS OF NATIONAL INDUSTRIES

Region Number	11	12	13	14	15	16	17	18	19	
Region	Tennessee Kentucky	Alabama Miss.	Oklahoma Louisiana Arkansas	Texas	Montana Wyoming Idaho	Colorado New Mexico	Arizona Nevada Utah	Oregon Wash.	Calif.	U.S. Total Outputs ²
National Industry	Fraction of Industry Total									(\$ million)
1 Livestock	0.030	0.029	0.037	0.048	0.029	0.025	0.018	0.021	0.056	26026.6
2 Other Agriculture	0.033	0.033	0.062	0.102	0.031	0.022	0.022	0.040	0.123	22983.5
3 Forestry, Fisheries	0.004	0.034	0.066	0.090	0.004	0.001	0.001	0.120	0.166	1140.3
4 Agricultural Services	0.024	0.018	0.035	0.030	0.006	0.014	0.016	0.025	0.188	1547.3
5 Coal Mining	0.132	0.036	0.006	0.	0.003	0.010	0.016	0.001	0.	2741.1
6 Food, Kindred Products	0.032	0.015	0.029	0.038	0.007	0.012	0.009	0.027	0.102	63695.8
7 Tobacco	0.159	0.005	0.	0.	0.	0.	0.	0.	0.000	5921.9
8 Fabrics, Yarn	0.019	0.050	0.003	0.009	0.	0.	0.	0.003	0.001	10595.9
9 Misc. Textiles, Rugs	0.020	0.024	0.006	0.007	0.	0.	0.	0.	0.036	2180.7
10 Apparel	0.046	0.031	0.010	0.021	0.	0.001	0.002	0.005	0.043	14219.1
11 Misc.FabricatedTextilePrdts.	0.020	0.015	0.008	0.023	0.	0.002	0.002	0.015	0.067	2288.0
12 Lumber, Wood Products	0.030	0.046	0.053	0.023	0.043	0.008	0.009	0.275	0.124	7884.2
13 Wooden Containers	0.085	0.068	0.031	0.034	0.	0.003	0.	0.056	0.122	442.3
14 Household Furniture	0.055	0.024	0.026	0.024	0.	0.003	0.004	0.018	0.099	3271.6
15 Office Furniture	0.008	0.004	0.009	0.032	0.001	0.007	0.004	0.009	0.086	1496.2
16 Paper	0.019	0.046	0.050	0.020	0.	0.001	0.	0.057	0.033	9478.7
17 Paperboard Containers	0.016	0.003	0.022	0.015	0.	0.003	0.001	0.014	0.077	3626.5
18 Chemicals	0.066	0.015	0.054	0.105	0.003	0.014	0.001	0.038	0.035	12048.8
19 Plastics, Synthetics	0.181	0.	0.016	0.048	0.	0.	0.	0.	0.012	4216.3
20 Drugs	0.011	0.004	0.000	0.010	0.	0.001	0.	0.001	0.061	6605.7
21 Paints	0.033	0.004	0.005	0.032	0.	0.006	0.	0.009	0.100	1866.5
22 Oil Fields	0.010	0.015	0.262	0.421	0.029	0.048	0.007	0.001	0.089	9611.2
23 Petroleum Products	0.006	0.003	0.127	0.250	0.020	0.008	0.006	0.010	0.118	17268.7
24 Rubber, Misc. Plastics	0.014	0.019	0.008	0.013	0.	0.019	0.001	0.	0.072	6810.8
25 Leather	0.034	0.	0.008	0.008	0.000	0.008	0.000	0.002	0.020	3967.8
26 Glass	0.012	0.012	0.017	0.014	0.	0.	0.	0.019	0.052	2136.6
27 Stone and Clay	0.033	0.019	0.036	0.039	0.003	0.014	0.015	0.016	0.087	8825.6
28 Iron and Steel	0.013	0.041	0.002	0.018	0.001	0.012	0.011	0.005	0.035	19860.4
29 Non-Ferrous Metals	0.002	0.002	0.026	0.027	0.039	0.026	0.080	0.039	0.060	10171.0
30 Fabricated Metals	0.023	0.013	0.015	0.025	0.001	0.004	0.004	0.012	0.087	19904.0
31 Non-Electrical Machinery	0.014	0.004	0.009	0.026	0.001	0.004	0.004	0.007	0.064	23872.7
32 Electrical Apparatus	0.005	0.003	0.003	0.006	0.	0.004	0.000	0.008	0.073	6560.8
33 Appliances, Lighting Eqpt.	0.076	0.006	0.004	0.001	0.	0.000	0.	0.004	0.066	5894.0
34 Electronics Equipment	0.009	0.005	0.004	0.015	0.	0.001	0.007	0.001	0.102	8507.6
35 Motor Vehicles	0.009	0.004	0.002	0.010	0.	0.001	0.000	0.004	0.040	22732.0
36 Aircraft	0.001	0.013	0.011	0.065	0.	0.002	0.009	0.083	0.311	12646.5
37 Other Transport. Eqpt.	0.009	0.067	0.034	0.033	0.001	0.001	0.001	0.041	0.073	3721.2
38 Instruments	0.008	0.000	0.004	0.013	0.	0.002	0.002	0.002	0.065	4988.7
39 Misc. Manufacturing	0.014	0.010	0.010	0.004	0.001	0.013	0.005	0.008	0.053	5291.9
40 Ordnance	0.013	0.001	0.	0.014	0.	0.051	0.023	0.	0.405	4641.8
41 Research and Development	0.062	0.012	0.010	0.020	0.002	0.026	0.002	0.007	0.277	5301.8

² These Gross Domestic Output figures were estimated before the 1958 transactions matrix was released by the Office of Business Economics and are expected to vary somewhat from the O.B.E. output figures.

TABLE A-6.— CHANGE IN LABOR EARNINGS IN NATIONAL INDUSTRIES

Region Number	1	2	3	4	5	6	7	8	9	10	11	12
Region	New England	New York	New Jersey, Penn.	Michigan Ohio	Indiana Illinois Wis.	Minn. So.Dak. No.Dak.	Iowa Mo. Neb. Kan.	Ga. N.C. S.C.	Va. W.Va. Md. D.C. Del.	Fla.	Tenn. Ky.	Ala. Miss.
National Industry	Millions of Dollars											
1 Livestock	3.6	4.3	5.5	7.2	21.0	12.2	28.8	5.8	4.2	1.3	3.9	3.8
2 Other Agriculture	1.8	1.8	2.4	5.1	9.7	7.6	14.9	9.6	2.6	3.9	3.7	3.7
3 Forestry, Fisheries	0.9	0.1	0.2	0.1	0.0	0.0	0.0	0.3	0.6	0.4	0.0	0.2
4 Agricultural Services	0.9	1.0	1.0	0.9	0.7	0.3	0.5	0.4	0.5	0.4	0.2	0.2
5 Coal Mining	0.0	0.	3.3	0.6	1.1	0.	0.1	0.	4.3	0.	1.6	0.4
6 Food, Kindred Products	7.8	15.7	17.8	15.2	25.5	6.5	16.2	5.9	7.2	2.9	5.2	2.4
7 Tobacco	0.1	0.0	1.1	0.1	0.0	0.	0.	2.8	1.4	0.5	1.1	0.0
8 Fabrics, Yarn	5.0	1.0	2.9	0.1	0.2	0.0	0.0	15.1	1.3	0.	0.5	1.4
9 Misc. Textiles, Rugs	1.0	0.4	1.0	0.4	0.4	0.0	0.0	0.9	0.3	0.0	0.1	0.1
10 Apparel	5.7	26.5	15.4	1.8	4.2	0.5	2.2	8.4	3.3	0.4	3.7	2.5
11 Misc. Fabricated Textile Products	0.2	0.8	0.4	0.3	0.2	0.0	0.1	0.2	0.1	0.0	0.1	0.0
12 Lumber, Wood Products	1.5	1.0	0.9	1.1	2.2	0.5	0.7	2.4	1.3	0.5	1.0	1.5
13 Wooden Containers	0.1	0.1	0.1	0.1	0.2	0.0	0.0	0.2	0.1	0.1	0.1	0.1
14 Household Furniture	0.9	1.4	1.3	1.1	2.4	0.1	0.4	2.2	0.9	0.3	0.8	0.4
15 Office Furniture	0.3	1.2	0.8	1.7	1.2	0.1	0.3	0.3	0.3	0.1	0.1	0.0
16 Paper	3.0	2.1	2.1	2.4	2.8	0.5	0.4	1.3	0.7	0.6	0.4	0.9
17 Paperboard Containers	0.9	1.4	1.6	1.3	1.6	0.1	0.5	0.5	0.4	0.1	0.2	0.0
18 Chemicals	0.1	0.3	0.7	0.6	0.3	0.0	0.2	0.2	0.5	0.1	0.3	0.1
19 Plastics, Synthetics	0.3	0.3	0.8	0.5	0.1	0.0	0.1	0.5	1.3	0.3	1.0	0.
20 Drugs	0.8	2.8	3.9	1.8	3.5	0.2	0.9	0.5	0.6	0.0	0.2	0.1
21 Paints	0.1	0.2	0.5	0.4	0.4	0.0	0.1	0.1	0.1	0.0	0.1	0.0
22 Oil Fields	0.	0.0	0.1	0.1	0.2	0.0	0.3	0.	0.1	0.0	0.1	0.1
23 Petroleum Products	0.1	0.2	1.4	0.5	1.2	0.1	0.3	0.0	0.1	0.0	0.1	0.0
24 Rubber, Misc. Plastics	1.1	0.4	0.8	1.9	0.9	0.0	0.2	0.1	0.2	0.0	0.1	0.1
25 Leather	7.4	3.9	2.9	1.1	2.7	0.	2.0	0.3	0.6	0.1	0.8	0.
26 Glass	0.1	1.0	1.6	1.2	1.0	0.	0.0	0.3	0.8	0.1	0.1	0.1
27 Stone and Clay	1.8	2.1	4.9	4.7	4.3	0.7	2.3	1.2	1.8	0.8	1.1	0.7
28 Iron and Steel	- 0.1	- 0.1	- 0.7	- 0.6	- 0.5	- 0.1	- 0.0	- 0.0	- 0.2	- 0.0	- 0.0	- 0.1
29 Non-Ferrous Metals	- 5.6	- 4.1	- 7.9	- 7.0	- 7.2	- 0.5	- 0.8	- 0.3	- 2.3	- 0.2	- 0.1	- 0.1
30 Fabricated Metals	3.2	3.0	6.1	7.1	7.4	0.5	1.5	0.4	1.1	0.4	0.9	0.5
31 Non-Electrical Machinery	- 0.3	- 0.3	- 0.3	- 0.6	- 0.6	- 0.0	- 0.1	- 0.0	- 0.0	- 0.0	- 0.0	- 0.0
32 Electrical Apparatus	- 2.0	- 2.8	- 4.3	- 4.2	- 5.7	- 0.3	- 1.0	- 0.3	- 0.5	- 0.1	- 0.1	- 0.1
33 Appliances, Lighting Equipment	0.5	0.5	0.7	1.3	1.4	0.1	0.2	0.0	0.1	0.0	0.4	0.0
34 Electronics Eqpt.	-18.6	-26.0	-36.7	- 6.1	-42.9	- 1.0	- 4.0	- 3.8	- 5.7	- 0.8	- 1.5	- 0.9
35 Motor Vehicles	0.5	3.1	3.1	29.2	8.1	0.2	1.9	0.8	0.9	0.0	0.5	0.2
36 Aircraft	-68.7	-64.2	-41.5	-82.0	-40.9	- 4.1	-74.5	-16.2	-29.5	- 1.8	- 1.2	-10.8
37 Other Transportation Equipment	- 0.4	- 0.2	- 0.5	- 0.2	- 0.4	- 0.0	- 0.1	- 0.0	- 0.5	- 0.1	- 0.0	- 0.2
38 Instruments	- 4.0	-10.0	- 5.4	- 1.9	- 4.6	- 1.3	- 0.5	- 0.1	- 0.4	- 0.1	- 0.3	- 0.0
39 Misc. Manufacturing	4.1	5.1	3.2	2.4	2.9	0.2	0.8	0.9	0.1	0.1	0.3	0.2
40 Ordnance	-16.0	-31.9	- 7.0	-13.1	- 8.1	- 5.5	- 8.9	- 1.4	- 9.3	- 3.8	- 2.7	- 0.1
41 Research and Development	- 2.1	- 4.3	- 2.4	- 1.3	- 4.8	- 0.7	- 0.4	- 0.3	- 6.5	- 0.6	- 2.5	- 0.5
Net Increase	-64.2	-62.3	-18.5	-24.7	- 7.9	17.3	-14.3	39.1	-17.0	6.1	20.2	6.9
Gross Increase	53.5	81.6	88.3	92.4	107.8	30.7	76.0	61.5	37.8	13.5	28.6	19.8
Gross Decrease	117.7	143.9	106.8	117.0	115.8	13.4	90.3	22.5	54.8	7.4	8.4	12.9

TABLE A-6 (continued)

Region Number	13	14	15	16	17	18	19	20	21	22	23
Region	Oklahoma Louisiana Arkansas	Texas	Montana Wyoming Idaho	Colo. New Mexico	Ariz. Nev. Utah	Oregon Wash.	Calif.	U.S. Net Increase	U.S. Gross In- crease	U.S. Gross De- crease	Per Cent Change All Industries*
National Industry	Millions of Dollars										%
1 Livestock	4.9	6.4	3.9	3.3	2.3	2.8	7.5	132.8	132.8	0.	1.67
2 Other Agriculture	6.9	11.3	3.5	2.4	2.4	4.4	13.6	111.2	111.2	0.	1.65
3 Forestry, Fisheries	0.3	0.5	0.0	0.0	0.0	0.6	0.9	5.2	5.2	0.	1.33
4 Agricultural Services	0.4	0.3	0.1	0.1	0.2	0.3	1.9	10.3	10.3	0.	2.14
5 Coal Mining	0.1	0.	0.0	0.1	0.2	0.0	0.	11.8	11.8	0.	0.98
6 Food, Kindred Products	4.8	6.4	1.1	2.1	1.4	4.5	16.9	165.6	165.6	0.	1.66
7 Tobacco	0.	0.	0.	0.	0.	0.	0.	7.2	7.2	0.	1.76
8 Fabrics, Yarn	0.1	0.2	0.	0.	0.	0.1	0.	28.0	28.0	0.	1.19
9 Misc. Textiles, Rugs	0.0	0.0	0.	0.	0.	0.	0.2	4.8	4.8	0.	0.97
10 Apparel	0.8	1.7	0.	0.1	0.2	0.4	3.5	81.3	81.3	0.	1.66
11 Misc. Fabricated Textile Prdt.	0.0	0.1	0.	0.0	0.0	0.0	0.2	2.8	2.8	0.	0.54
12 Lumber, Wood Products	1.7	0.7	1.4	0.3	0.3	8.8	4.0	31.9	31.9	0.	1.26
13 Wooden Containers	0.0	0.1	0.	0.0	0.	0.1	0.2	1.6	1.6	0.	1.05
14 Household Furniture	0.4	0.3	0.	0.0	0.1	0.3	1.4	14.6	14.6	0.	1.27
15 Office Furniture	0.1	0.2	0.0	0.1	0.0	0.1	0.6	7.3	7.3	0.	1.19
16 Paper	1.0	0.4	0.	0.0	0.	1.2	0.7	20.4	20.4	0.	0.83
17 Paperboard Containers	0.2	0.1	0.	0.0	0.0	0.1	0.8	9.8	9.8	0.	0.93
18 Chemicals	0.2	0.5	0.0	0.1	0.0	0.2	0.2	4.6	4.6	0.	0.15
19 Plastics, Synthetics	0.1	0.3	0.	0.	0.	0.	0.1	5.7	5.7	0.	0.59
20 Drugs	0.0	0.2	0.	0.0	0.	0.0	1.0	16.3	16.3	0.	1.21
21 Paints	0.0	0.1	0.	0.0	0.	0.0	0.2	2.2	2.2	0.	0.48
22 Oil Fields	2.1	3.3	0.2	0.4	0.1	0.0	0.7	7.8	7.8	0.	0.38
23 Petroleum Products	1.1	2.2	0.2	0.1	0.1	0.1	1.0	8.8	8.8	0.	0.45
24 Rubber, Misc. Plastics	0.1	0.1	0.	0.1	0.0	0.	0.5	6.5	6.5	0.	0.30
25 Leather	0.2	0.2	0.0	0.2	0.0	0.0	0.4	22.7	22.7	0.	1.57
26 Glass	0.1	0.1	0.	0.	0.	0.1	0.4	7.0	7.0	0.	0.81
27 Stone and Clay	1.2	1.3	0.1	0.5	0.5	0.5	2.9	33.5	33.5	0.	1.10
28 Iron and Steel	- 0.0	- 0.0	- 0.0	- 0.0	- 0.0	- 0.0	- 0.1	- 2.7	0.	2.7	- 0.04
29 Non-Ferrous Metals	- 1.4	- 1.4	- 2.0	- 1.3	- 4.1	- 2.0	- 3.1	- 51.7	0.	51.7	- 2.21
30 Fabricated Metals	0.6	0.9	0.0	0.2	0.2	0.4	3.3	37.5	37.5	0.	0.54
31 Non-Electrical Machinery	- 0.0	- 0.1	- 0.0	- 0.0	- 0.0	- 0.0	- 0.2	- 2.8	0.	2.8	- 0.03
32 Electrical Apparatus	- 0.1	- 0.1	0.	- 0.1	- 0.0	- 0.2	- 1.7	- 23.4	0.	23.4	- 0.92
33 Appliances, Lighting Eqpt.	0.0	0.0	0.	0.0	0.	0.0	0.4	5.8	5.8	0.	0.34
34 Electronics Equipment	- 0.7	- 2.5	0.	- 0.1	- 1.2	- 0.2	- 17.4	- 170.0	0.	170.0	- 5.40
35 Motor Vehicles	0.1	0.5	0.	0.0	0.0	0.2	2.1	51.4	51.4	0.	1.21
36 Aircraft	- 9.2	- 54.6	0.	- 1.8	- 7.8	- 70.0	- 260.9	- 839.6	0.	839.6	- 16.05
37 Other Transportation Equipment	- 0.1	- 0.1	- 0.0	- 0.0	- 0.0	- 0.1	- 0.2	- 3.3	0.	3.3	- 0.23
38 Instruments	- 0.1	- 0.4	0.	- 0.0	- 0.1	- 0.1	- 2.0	- 31.1	0.	31.1	- 1.59
39 Misc. Manufacturing	0.2	0.1	0.0	0.3	0.1	0.2	1.2	22.4	22.4	0.	1.23
40 Ordnance	0.	- 3.0	0.	- 10.9	- 5.0	0.	- 86.1	- 212.7	0.	212.7	- 15.42
41 Research and Development	- 0.4	- 0.8	- 0.1	- 1.0	- 0.1	- 0.3	- 11.1	- 39.9	0.	39.9	- 13.26
Net Increase	15.8	- 24.6	8.5	- 4.9	- 10.2	- 47.4	- 316.2	- 498.3	879.0	1377.3	..
Gross Increase	27.8	38.5	10.6	10.4	8.0	25.5	66.6	879.0	879.0	0.	..
Gross Decrease	12.0	63.0	2.1	15.3	18.3	72.9	382.8	1377.3	0.	1377.3	..

* These figures are valid for the National industries on the regional, as well as on the national, level. This is because demand for the output of a National industry, no matter where it is located, is a function only of the total U.S. demand for its output; thus, the percentage change in output (equal to the percentage change in employment) of that industry in each region will be identical.

TABLE A-7. — CHANGE IN LABOR EARNINGS FOR LOCAL INDUSTRIES BY REGION

Local Industry	Region 1		Region 2		Region 3		Region 4		Region 5		Region 6		
	Region	New England	New York	New Jersey	Michigan	Indiana, Illinois	Ohio	Wisconsin	Minnesota, North	and South Dakota			
		\$ Million	%	\$ Million	%	\$ Million	%	\$ Million	%	\$ Million	%	\$ Million	%
1 Printing, Publishing		3.9	1.0	9.0	1.6	9.5	1.5	11.9	1.8	12.9	1.8	3.0	2.3
2 Electricity, Gas, Water		2.9	1.2	6.5	1.8	7.2	1.5	8.7	1.8	9.6	1.9	2.2	2.6
3 Transport., Warehsg.		4.6	0.5	19.0	1.2	17.6	0.9	25.0	1.3	28.0	1.3	6.8	1.8
4 Trade		49.2	1.3	107.5	1.9	117.4	1.8	143.5	2.1	157.8	2.1	35.7	2.7
5 Communications		3.6	1.1	8.0	1.7	8.9	1.6	10.8	1.9	11.9	1.9	2.7	2.5
6 Finance, Insurance		11.4	1.4	24.4	2.0	26.9	1.9	32.3	2.2	35.8	2.2	8.3	2.8
7 Real Estate, Rentals		3.0	1.5	6.3	2.2	7.0	2.0	8.4	2.4	9.3	2.4	2.2	2.9
8 Repair Services, Hotels		7.0	1.5	15.2	2.2	16.6	2.0	20.2	2.4	22.0	2.4	4.9	3.1
9 Auto Repair Services		1.4	1.4	3.0	2.1	3.2	1.9	3.9	2.3	4.4	2.3	1.0	2.7
10 Business Services		6.0	1.0	13.4	1.4	14.5	1.3	17.8	1.6	19.0	1.5	4.4	2.0
11 Amusements		2.0	1.6	4.6	2.2	4.7	2.2	5.7	2.5	6.2	2.5	1.4	3.1
12 Medical, Educ. Services		11.8	1.3	25.6	1.9	30.2	2.0	38.7	2.5	38.8	2.3	9.2	2.9
13 Maintenance Const.		0.9	0.3	6.1	1.3	4.5	0.9	8.3	1.5	9.0	1.5	2.5	1.9
14 Government Enterprises		2.3	0.9	6.0	1.6	6.2	1.4	8.1	1.8	8.8	1.8	2.1	2.4
15 Office Supplies		0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
16 Business Travel		0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
17 Households		3.9	1.7	8.2	2.5	9.0	2.3	10.8	2.7	11.9	2.7	2.6	3.4
Net Increase		113.9	1.2	262.9	1.8	283.5	1.7	354.3	2.0	385.5	2.0	89.0	2.6
Gross Increase		113.9	1.2	262.9	1.8	283.5	1.7	354.3	2.0	385.5	2.0	89.0	2.6
Gross Decrease		0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

TABLE A-7 (continued)

Local Industry	Region 7		Region 8		Region 9		Region 10		Region 11		Region 12		
	Region	Iowa, Missouri	Georgia, North &	Va., W. Va., Maryland	Florida	Tennessee	Alabama						
		Nebraska, Kansas	South Carolina	D.C., Delaware		Kentucky	Mississippi	\$ Million	%	\$ Million	%	\$ Million	%
1 Printing, Publishing		5.0	1.5	2.1	0.8	0.2	0.1	1.0	0.9	2.1	1.4	0.6	0.6
2 Electricity, Gas, Water		3.7	1.7	1.8	1.0	0.6	0.3	0.7	1.1	1.7	1.6	0.6	0.8
3 Transport., Warehsg.		9.2	1.0	- 2.2	-0.3	-10.0	-1.0	- 0.4	-0.1	2.8	0.6	- 1.5	-0.4
4 Trade		59.7	1.8	26.2	1.0	7.6	0.2	11.6	1.1	26.4	1.7	9.5	0.8
5 Communications		4.4	1.6	2.2	1.0	0.8	0.3	1.0	1.1	2.1	1.6	0.8	0.8
6 Finance, Insurance		14.0	1.9	6.8	1.1	2.5	0.3	2.8	1.2	6.2	1.8	2.4	1.0
7 Real Estate, Rentals		3.7	2.0	1.7	1.2	0.6	0.4	0.7	1.3	1.6	1.9	0.6	1.0
8 Repair Services, Hotels		8.2	2.0	3.6	1.1	1.3	0.3	1.5	1.2	3.7	1.9	1.3	0.9
9 Auto Repair Services		1.7	1.9	0.7	1.0	0.2	0.3	0.3	1.1	0.7	1.8	0.3	0.8
10 Business Services		8.1	1.5	4.7	1.0	2.5	0.5	2.1	1.2	3.6	1.4	1.4	0.9
11 Amusements		2.3	2.1	1.0	1.2	0.4	0.3	0.5	1.3	1.0	2.0	0.4	1.0
12 Medical, Educ. Services		16.0	2.0	6.3	1.0	- 5.5	-0.6	2.2	0.9	4.4	1.2	1.9	0.7
13 Maintenance Const.		2.5	0.8	- 2.9	-1.2	- 6.4	-2.1	- 0.9	-0.9	0.3	0.2	- 1.3	-1.1
14 Government Enterprises		3.1	1.4	0.8	0.4	- 0.6	-0.3	0.4	0.5	1.3	1.3	0.2	0.3
15 Office Supplies		0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
16 Business Travel		0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
17 Households		4.4	2.2	2.0	1.2	0.8	0.4	0.8	1.4	2.0	2.2	0.7	1.1
Net Increase		146.1	1.7	54.7	0.8	- 4.9	-0.1	24.5	0.9	60.0	1.5	18.0	0.6
Gross Increase		146.1	1.7	59.8	0.8	17.6	0.2	25.7	0.9	60.0	1.5	20.8	0.7
Gross Decrease		0.	0.	5.1	0.1	22.5	0.3	1.3	0.0	0.	0.	2.7	0.1

TABLE A-7 (continued)

Local Industry	Region 13		Region 14		Region 15		Region 16		Region 17		Region 18	
	Region Oklahoma, Louisiana Arkansas	Region Arkansas Louisiana	Region Texas	Region Texas	Region Montana Wyoming, Idaho	Region Montana Wyoming, Idaho	Region Colorado New Mexico	Region Colorado New Mexico	Region Arizona Nevada, Utah	Region Arizona Nevada, Utah	Region Oregon Washington	Region Oregon Washington
	\$ Million	%	\$ Million	%	\$ Million	%	\$ Million	%	\$ Million	%	\$ Million	%
1 Printing, Publishing	2.3	1.3	1.1	0.4	1.0	2.1	-0.0	-0.0	0.0	0.1	1.0	0.6
2 Electricity, Gas, Water	1.9	1.4	1.0	0.5	0.8	2.2	0.1	0.2	0.0	0.0	0.6	0.6
3 Transport., Warehsg.	2.9	0.5	3.7	-0.4	2.0	1.4	-2.5	-1.1	-2.0	-1.0	0.2	0.0
4 Trade	28.8	1.6	17.1	0.6	12.6	2.5	1.6	0.2	1.7	0.2	12.4	0.8
5 Communications	2.3	1.5	1.3	0.6	1.0	2.4	0.1	0.2	0.1	0.2	0.8	0.6
6 Finance, Insurance	7.0	1.7	4.6	0.7	3.0	2.5	0.6	0.3	0.5	0.3	2.9	0.8
7 Real Estate, Rentals	1.9	1.6	1.3	0.7	0.8	2.5	0.2	0.4	0.2	0.4	0.8	0.9
8 Repair Services, Hotels	4.0	1.8	2.2	0.6	1.8	2.9	0.2	0.2	0.2	0.2	1.7	0.9
9 Auto Repair Services	0.8	1.6	0.5	0.6	0.4	2.5	0.1	0.3	0.1	0.3	0.4	0.9
10 Business Services	4.1	1.3	3.3	0.7	1.6	1.9	0.5	0.4	0.5	0.5	2.0	0.9
11 Amusements	1.2	1.9	0.7	0.7	0.5	2.9	0.1	0.3	0.2	0.6	0.5	0.9
12 Medical, Educ. Services	7.4	1.7	3.3	0.5	3.4	2.9	-0.7	-0.4	0.3	0.2	2.8	0.8
13 Maintenance Const.	0.2	0.1	3.0	-1.1	0.7	1.4	-1.4	-1.7	-1.1	-1.5	0.6	-0.4
14 Government Enterprises	1.4	1.1	0.2	0.1	0.7	2.0	-0.2	-0.4	-0.2	-0.4	0.3	0.3
15 Office Supplies	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
16 Business Travel	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
17 Households	2.2	2.0	1.3	0.8	0.9	3.1	0.2	0.4	0.2	0.4	0.9	1.0
Net Increase	68.2	1.4	31.2	0.4	31.2	2.3	-1.2	-0.1	0.8	0.0	26.7	0.6
Gross Increase	68.2	1.4	37.9	0.5	31.2	2.3	3.6	0.2	4.1	0.2	27.3	0.7
Gross Decrease	0.	0.	6.7	0.1	0.	0.	4.9	0.2	3.3	0.2	0.6	0.0

TABLE A-7 (continued)

Local Industry	Region 19		U.S. Net Increase		U.S. Gross Increase		U.S. Gross Decrease	
	Region California	Region California	\$ Million	%	\$ Million	%	\$ Million	%
1 Printing, Publishing	-1.6	-0.3	65.2	1.1	66.8	1.1	1.6	0.0
2 Electricity, Gas, Water	-1.1	-0.3	49.6	1.2	50.7	1.3	1.1	0.0
3 Transportation, Warehsg.	-14.6	-0.9	81.4	0.5	118.2	0.7	36.8	0.2
4 Trade	-9.4	-0.2	816.8	1.4	826.2	1.4	9.4	0.0
5 Communications	-1.6	-0.3	61.4	1.3	63.0	1.3	1.6	0.0
6 Finance, Insurance	-1.9	-0.2	190.5	1.5	192.4	1.5	1.9	0.0
7 Real Estate, Rentals	-0.2	-0.1	50.1	1.6	50.3	1.6	0.2	0.0
8 Repair Services, Hotels	-1.8	-0.3	113.9	1.6	115.7	1.6	1.8	0.0
9 Auto Repair Services	-0.0	-0.0	22.9	1.5	22.9	1.5	0.0	0.0
10 Business Services	1.1	0.1	110.6	1.1	110.6	1.1	0.	0.
11 Amusements	0.2	0.1	33.6	1.7	33.6	1.7	0.	0.
12 Medical, Educ. Services	-14.9	-1.0	181.2	1.3	202.2	1.5	21.1	0.2
13 Maintenance Construction	-6.9	-1.3	10.3	0.2	34.9	0.7	24.6	0.5
14 Government Enterprises	-2.4	-0.6	38.7	1.0	42.0	1.1	3.4	0.1
15 Office Supplies	0.	0.	0.	0.	0.	0.	0.	0.
16 Business Travel	0.	0.	0.	0.	0.	0.	0.	0.
17 Households	-0.3	-0.1	62.7	1.8	63.0	1.8	0.3	0.0
Net Increase	-55.5	-0.4	1888.7	1.2	1992.6	1.3	103.8	0.1
Gross Increase	1.3	0.0	1888.7	1.2	1992.6	1.3	0.	0.
Gross Decrease	56.8	0.4	0.	0.	0.	0.	103.8	0.1

TABLE A-8. — DIRECT LABOR EARNINGS BEFORE
CHANGE BY REGION
(\$ Millions)

Region	Military Direct Labor Earnings ¹ (1)	Non- Household Civilian Direct Labor Earnings (2)	Household Direct Labor Earnings ² (3)
1 New England	571	2812	225
2 New York	477	5447	332
3 New Jersey, Pennsylvania	769	4184	385
4 Michigan, Ohio	413	4491	399
5 Indiana, Illinois, Wisconsin	474	4940	432
6 Minnesota, North & South Dakota	86	1234	78
7 Kansas, Iowa, Nebraska, Missouri	478	2441	197

8 Georgia, North & South Carolina	1052	1756	162
9 Maryland, Virginia, Del., W. Virginia, D.C.	1512	3754	203
10 Florida	404	1397	62
11 Kentucky, Tennessee	353	1202	91
12 Mississippi, Alabama	439	899	69
13 Arkansas, Louisiana, Oklahoma	466	1665	108
14 Texas	991	2094	168
15 Idaho, Montana, Wyoming	67	534	30
16 Colorado, New Mexico	361	888	48
17 Arizona, Nevada, Utah	288	809	42
18 Oregon, Washington	385	1477	94
19 California	1613	5783	345
Total United States	11198	47807	3472

¹ Military Direct Labor Earnings include earnings of both civilian and military employees of the Department of Defense. See Table A-12.

² Households were included as a Local industry, rather than as a separate Final Demand category.

TABLE A-9. — TOTAL CHANGE IN LABOR EARNINGS BY REGION
(\$ Millions)

Region	Military Direct Labor Earnings (1)	Non- Household Civilian Direct Labor Earnings (2)	Total ¹ Gross Decrease (3)	Total ² Gross Increase (4)	Total Net Increase (col. 4 - col. 3) (5)
1 New England	— 114.20	50.66	231.9	218.1	— 13.8
2 New York	— 95.43	98.14	239.3	442.6	203.3
3 New Jersey, Pennsylvania	— 153.70	75.39	260.5	447.2	186.7
4 Michigan, Ohio	— 82.53	80.92	199.5	527.6	328.1
5 Indiana, Illinois, Wisconsin	— 94.71	89.01	210.5	582.3	371.8
6 Minnesota, North & South Dakota	— 17.18	22.23	30.6	141.9	111.3
7 Kansas, Iowa, Nebraska, Missouri	— 95.70	43.99	186.0	266.1	80.1
8 Georgia, North & South Carolina	— 210.32	31.63	237.9	152.9	— 85.0
9 Maryland, Virginia, West Virginia, Delaware, D.C.	— 302.37	67.63	379.7	123.0	—256.7
10 Florida	— 80.78	25.17	89.5	64.4	— 25.1
11 Kentucky, Tennessee	— 70.59	21.66	79.0	110.3	31.3
12 Mississippi, Alabama	— 87.81	16.21	103.4	56.8	— 46.6
13 Arkansas, Louisiana, Oklahoma	— 93.19	29.99	105.2	126.0	20.8
14 Texas	— 198.27	37.73	268.0	114.1	—153.9
15 Idaho, Montana, Wyoming	— 13.37	9.62	15.5	51.4	35.9
16 Colorado, New Mexico	— 72.18	15.99	92.4	30.0	— 62.4
17 Arizona, Nevada, Utah	— 57.63	14.59	79.2	26.7	— 52.5
18 Oregon, Washington	— 77.02	26.61	150.5	79.4	— 71.1
19 California	— 322.59	104.19	762.2	172.1	—590.1
Total United States	—2239.58	861.36	3727.0 ³	3727.0 ³	..

¹ Column 1, plus gross decrease in National and Local industries, Tables A-6 and A-7.

² Column 2, plus gross increase in National and Local industries, Tables A-6 and A-7.

³ Totals may not add because of rounding.

TABLE A-10. — SOURCE REFERENCES FOR LABOR EARNINGS

Sector No.	Industry	Procedure	Source
1, 2	Livestock, Other Agriculture	Estimates of net income of farmers.	U.S. Dept. of Agriculture, <i>Agricultural Statistics</i> , 1961.
3, 4	Forestry, Agricultural Services	Wages and salaries of employees.	U.S. Dept. of Commerce, <i>Survey of Current Business</i> , July 1961.
5-41	Manufacturing Sectors	Wages and salaries of payroll workers, salaries of administrative workers, and income of unincorporated business were summed.	U.S. Dept. of Commerce, <i>Census of Manufactures</i> , 1958 and <i>Survey of Current Business</i> ,* July 1961.
All Local Sectors 1-16	Trade and Service Sectors	Same as for manufacturing.	U.S. Dept. of Commerce, <i>Census of Business and Selected Services</i> , 1958; Bureau of Employment Security, <i>Employment and Wages</i> , 1958; U.S. Dept. of Commerce, <i>Survey of Current Business</i> ,* July 1961.

* When the *Survey of Current Business* statistics were not detailed enough, the Income of Unincorporated Business was distributed among the 60-order sectors according to information given in Internal Revenue Service, *Corporation Income Tax Returns*, July 1958-June 1959.

TABLE A-11. — SOURCE REFERENCES FOR NATIONAL INDUSTRY OUTPUT DISTRIBUTION FACTORS

Sector No.	Industry	Factor	Source
1, 2	Livestock, Other Agriculture	Cash Receipts from Farm Marketings.	U.S. Dept. of Commerce, <i>Statistical Abstract of United States</i> , 1959, Table 832.
3	Forestry, Fisheries	An index composed of value of catch and volume of raw timber cut.	Same as above, Tables 919, 947.
4	Agricultural Services	Wages and salaries of employees.	Bureau of Employment Security, <i>Employment and Wages</i> , 1958.
5-40	Manufacturing Sectors	Wages and salaries of employees.	U.S. Dept. of Commerce, <i>Census of Manufactures</i> , 1958.
41	Research and Development	Payrolls.	U.S. Dept. of Commerce, <i>Census of Selected Services</i> , 1958.

TABLE A-12. — SOURCE REFERENCES FOR LOCAL INDUSTRY DISTRIBUTION FACTORS

Final Demand Category	Factors Used to Distribute Aggregate Local Outputs	Sources
Exports and Net Inventory Change	Regional distribution of labor earnings in each local industry.	Real Estate: U.S. Dept. of Commerce, <i>Statistical Abstract of U.S.</i> , 1961, Table 1067. Finance: <i>Statistical Abstract of U.S.</i> , 1960, Table 619. Others: Either U.S. Dept. of Commerce, <i>Census of Selected Services</i> or Bureau of Employment Security, <i>Employment and Wages</i> , 1958.
Imports	Regional distribution of total wages and salaries in all industries within a region.	U.S. Dept. of Commerce, <i>Survey of Current Business</i> , August 1961, Tables 4-27, line 2.
Gross Private Capital Formation	Expenditures on new plants and equipment.	U.S. Dept. of Commerce, <i>Statistical Abstract of U.S.</i> , 1961, p. 795, Table 1097.
Construction	Wages in contract construction.	Bureau of Employment Security, <i>Employment and Wages</i> , 1958.
State and Local Government	Wages and salaries of state and local government employees.	U.S. Dept. of Commerce, <i>Survey of Current Business</i> , August 1961, Tables 4-27, lines 28, 29, 30.
Federal Government	Wages and salaries of federal employees, except Department of Defense.	Same as above.
Military	Payrolls and allowances (only FY 1959 was available).	U.S. Congress, Joint Economic Committee, "Background Material on Economic Aspects of Military Procurement and Supplies," Subcommittee on Defense, March 1963, Table 3, p. 4.